Office of
Fissile Materials Disposition

United States Department of Energy

Surplus Plutonium Disposition Final Environmental Impact Statement

Volume I - Part A

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DOE/EIS-0283

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Cover Sheet

Responsible Agency: United States Department of Energy (DOE)

Title: *Surplus Plutonium Disposition Final Environmental Impact Statement* (SPD EIS) (DOE/EIS-0283)

Locations of Candidate Sites: California, Idaho, New Mexico, North Carolina, South Carolina, Tennessee, Texas, Virginia, and Washington

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Abstract: On May 22, 1997, DOE published a Notice of Intent in the Federal Register (62 Federal Register 28009) announcing its decision to prepare an environmental impact statement (EIS) that would tier from the analysis and decisions reached in connection with the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS*. At that time, the U.S. Environmental Protection Agency decided to be a cooperating agency. The *Surplus Plutonium Disposition Draft Environmental Impact Statement* (SPD Draft EIS) (DOE/EIS-0283-D) was prepared in accordance with NEPA and issued in July 1998. It identified the potential environmental impacts of reasonable alternatives for the proposed siting, construction, and operation of three facilities for the disposition of up to 50 metric tons (55 tons) of surplus plutonium, as well as a No Action Alternative. These three facilities would accomplish pit disassembly and conversion, plutonium conversion and immobilization, and mixed oxide (MOX) fuel fabrication.

For the alternatives that included MOX fuel fabrication, the SPD Draft EIS described the potential environmental impacts of using from three to eight commercial nuclear reactors to irradiate MOX fuel. The potential impacts were based on a generic reactor analysis that used actual reactor data and a range of potential site conditions. In May 1998, DOE initiated a procurement process to obtain MOX fuel fabrication and reactor irradiation services. In March 1999, DOE awarded a contract to Duke Engineering & Services, COGEMA Inc., and Stone & Webster (known as DCS) to provide the requested services. A *Supplement to the SPD Draft EIS* was issued in April 1999, which analyzed the potential environmental impacts of using MOX fuel in six specific reactors named in the DCS proposal. Those reactors are Catawba Nuclear Station Units 1 and 2 in South Carolina, McGuire Nuclear Station Units 1 and 2 in North Carolina, and North Anna Power Station Units 1 and 2 in Virginia.

DOE has identified the hybrid approach as its Preferred Alternative for the disposition of surplus plutonium. This approach allows for the immobilization of 17 metric tons (19 tons) of surplus plutonium and the use of 33 metric tons (36 tons) as MOX fuel. DOE has identified the Savannah River Site near Aiken, South Carolina, as the preferred site for all three disposition facilities (Alternative 3). DOE has also identified Los Alamos National

Laboratory in New Mexico as the preferred site for lead assembly fabrication, and Oak Ridge National Laboratory in Tennessee as the preferred site for postirradiation examination of lead assemblies.

Public Involvement: In preparing the SPD Final EIS, DOE considered comments on the SPD Draft EIS and the *Supplement to the SPD Draft EIS* received via mail, fax, and email, and comments recorded by phone and transcribed from videotapes. In addition, comments were captured by notetakers during interactive public meetings held on the SPD Draft EIS in August 1998 in Amarillo, Texas; Idaho Falls, Idaho; North Augusta, South Carolina; Portland, Oregon; and Richland, Washington, as well as during a public meeting on the *Supplement to the SPD Draft EIS* held in June 1999 in Washington, D.C. Comments received and DOE's responses to these comments are found in Volume III, the Comment Response Document, of the SPD Final EIS. Information on the surplus plutonium disposition program can be obtained by visiting the Office of Fissile Materials Disposition Web site at http://www.doe-md.com.

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List of Acronyms

AEA	Atomic Energy Act of 1954
AECL	Atomic Energy of Canada Limited
AED	aerodynamic equivalent diameter
AIRFA	American Indian Religious Freedom Act
ALARA	as low as is reasonably achievable
AMWTP	Advanced Mixed Waste Treatment Project
ANL–W	Argonne National Laboratory–West
APSF	Actinide Packaging and Storage Facility
AQCR	Air Quality Control Region
ARF	airborne release fraction
ARIES	Advanced Recovery Integrated Extraction System
AVLIS	Atomic Vapor Laser Isotope Separation
BEA	Bureau of Economic Analysis
BEIR V	Report V of the Committee on the Biological Effects of Ionizing Radiations
BIO	Basis for Interim Operation
BLM	Bureau of Land Management
BNFL	British Nuclear Fuels
BWR	boiling water reactor
CAA	Clean Air Act
CAB	Citizens Advisory Board
CANDU	Canadian Deuterium Uranium (reactors)
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CPP	Chemical Processing Plant
CWA	Clean Water Act of 1972, 1987
D&D	decontamination and decommissioning
DBA	design basis accident
DCS	Duke Engineering & Services, COGEMA Inc., and Stone & Webster
DNFSB	Defense Nuclear Facilities Safety Board
DOC	U.S. Department of Commerce
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
DR	damage ratio
DU PEIS	*Final Programmatic Environmental Impact Statement for Alternative Strategies for Long-Term Management and Use of Depleted Uranium Hexafluoride*
DWPF	Defense Waste Processing Facility
EA	environmental assessment
EBR	Experimental Breeder Reactor (I or II)
EIS	environmental impact statement
EPA	Environmental Protection Agency

ES&H	environment, safety, and health
ESTEEM	Education in Science, Technology, Energy, Engineering, and Math
ETB	Engineering Test Bay
ETTP	East Tennessee Technology Park
FAA	Federal Aviation Administration
FDP	fluorinel dissolution process
FEMA	Federal Emergency Management Agency
FFCA	Federal Facility Compliance Agreement
FFF	Uranium Fuel Fabrication Facility
FFTF	Fast Flux Test Facility
FI	field investigation
FM	Farm-to-Market (road)
FMF	Fuel Manufacturing Facility
FMEA	failure modes and effects analysis
FMEF	Fuels and Materials Examination Facility
FONSI	finding of no significant impact
FPF	Fuel Processing Facility
FPPA	Farmland Protection Policy Act
FR	Federal Register
GAO	General Accounting Office
GDP	gaseous diffusion plant
GE	General Electric Company
GENII	Generation II, Hanford environmental radiation dosimetry software system
GPS	global positioning satellite
HE	high explosive
HEPA	high-efficiency particulate air (filter)
HEU	highly enriched uranium
HFEF	Hot Fuel Examination Facility
HHS	Department of Health and Human Services
HIGHWAY	(computer code for distances and populations along U.S. highways)
HLW	high-level waste
HLWVF	high-level-waste vitrification facility
HMIS	Hazardous Materials Information System
HWTPF	Hazardous Waste Treatment and Processing Facility
HYDOX	hydride oxidation
IAEA	International Atomic Energy Agency
ICPP	Idaho Chemical Processing Plant
ICRP	International Commission on Radiological Protection
ID DHW	Idaho Department of Health and Welfare
INEEL	Idaho National Engineering and Environmental Laboratory
INRAD	Intrinsic Radiation
INTEC	Idaho Nuclear Technology and Engineering Center
IPE	Individual Plant Examination
ISC	Industrial Source Complex Model
ISC3	Industrial Source Complex Model, Version 3
ISCST3	Industrial Source Complex Model, Short-Term, Version 3
ISLOCA	interfacing systems loss-of-coolant accident
ITP	In-Tank Precipitation Process

LANL	Los Alamos National Laboratory
LCF	latent cancer fatality
LDR	Land Disposal Restrictions
LEU	low-enriched uranium
LLNL	Lawrence Livermore National Laboratory
LLW	low-level waste
LOCA	loss-of-coolant accident
LPF	leak path factor
LWR	light water reactor
M&H	Mason & Hanger Corporation
MACCS2	Melcor Accident Consequence Code System (computer code)
MAR	material at risk
MD	Office of Fissile Materials Disposition
MEI	maximally exposed individual
MIMAS	Micronized Master
MMI	Modified Mercalli Intensity
MOX	mixed oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Science
NCRP	National Council on Radiation Protection and Measurements
NDA	nondestructive analysis
NEPA	National Environmental Policy Act of 1969
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPH	natural phenomena hazard
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRU	National Research Universal
NTS	Nevada Test Site
NWCF	New Waste Calcining Facility
NWPA	Nuclear Waste Policy Act
NWS	National Weather Service
ORIGEN	ORNL Isotope Generation and Depletion Code
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PBF	Power Burst Facility
PEIS	programmatic environmental impact statement
PFP	Plutonium Finishing Plant
PIE	postirradiation examination
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
PNNL	Pacific Northwest National Laboratory
PRA	probabilistic risk assessment
PSD	prevention of significant deterioration
PUREX	Plutonium-Uranium Extraction (Facility)
PWR	pressurized water reactor
R&D	research and development

RADTRAN 4	(computer code: risks and consequences of radiological materials transport)
RANT	Radioactive Assay and Nondestructive Test
RAMROD	Radioactive Materials Research, Operations and Demonstration
RCRA	Resource Conservation and Recovery Act, as amended
REA	regional economic area
RF	respirable fraction
RfC	reference concentration
RfD	reference dose
RFETS	Rocky Flats Environmental Technology Site
RFP	Request for Proposal
RIA	Reactivity Insertion Accidents
RIMS II	Regional Input-Output Modeling System II (computer code)
RISKIND	(computer code: risks and consequences of radiological materials transport)
ROD	Record of Decision
ROI	region of influence
RMF	Radiation Measurements Facility
RWMC	Radioactive Waste Management Complex
S/A	Similarity of Appearance (provision of Endangered Species Act)
SAR	safety analysis report
SARA	Superfund Amendments and Reauthorization Act of 1986
SCDHEC	South Carolina Department of Health and Environmental Control
SCE&G	South Carolina Electric & Gas Company
SCSHPO	South Carolina State Historic Preservation Officer
SDWA	Safe Drinking Water Act, as amended
SEIS	supplemental environmental impact statement
SHPO	State Historic Preservation Officer
SI	sealed insert
SMC	Specific Manufacturing Complex
SNF	spent nuclear fuel
SNM	special nuclear material
SPD	surplus plutonium disposition
SPD EIS	*Surplus Plutonium Disposition Environmental Impact Statement*
SPERT	Special Power Excursion Reactor Test
SRS	Savannah River Site
SSM PEIS	*Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management*
SST/SGT	safe, secure trailer/SafeGuards Transport
SWMU	solid waste management unit
SWP 1	Service Waste Percolation Pond 1
TA	Technical Area
TCE	trichloroethylene
TNRCC	Texas Natural Resource Conservation Commission
TPBAR-LTA	tritium-producing burnable absorber rod lead test assembly
TRA	technical risk assessment
TRANSCOM	transportation tracking and communications system
TRU	transuranic
TRUPACT	TRU waste package transporter
TSCA	Toxic Substances Control Act
TSP	total suspended particulates

TVA	Tennessee Valley Authority
TWRS	tank waste remediation system
TWRS EIS	*Tank Waste Remediation System Final Environmental Impact Statement*
UC	Regents of the University of California
UFSAR	updated final safety analysis report
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEC	United States Enrichment Corporation
USFWS	U.S. Fish and Wildlife Service
UV	ultraviolet
VOC	volatile organic compounds
VORTAC	very high frequency omnidirectional range/tactical air navigation (facility)
VRM	Visual Resource Management
WAG 3	Waste Area Grouping 3
WERF	Waste Experimental Reduction Facility
WIPP	Waste Isolation Pilot Plant
WM PEIS	*Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*
WNP–1	Washington Nuclear Plant–1
WNP–2	Washington Nuclear Plant–2
WPPSS	Washington Public Power Supply System
WROC	Waste Reduction Operations Complex
WSRC	Westinghouse Savannah River Company
ZPPR	Zero Power Physics Reactor

Chemicals and Units of Measure

°C	degrees Celsius (Centigrade)
°F	degrees Fahrenheit
μCi	microcurie
μg	microgram
μm	micrometer (micron)
46°26'07"	46 degrees, 26 minutes, 7 seconds
Ci	curie
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dBA	decibel, A-weighted
DUF_6	depleted uranium hexafluoride
eH	oxidation reduction potential
ft	foot
ft^2	square foot
ft^3	cubic foot
g	gram
g	gravitational acceleration
gal	gallon
GWD	gigawatt days (per ton)
ha	hectare
hr	hour (in compound units)
in	inch
kg	kilogram
km	kilometer
km^2	square kilometers
kV	kilovolt
l	liter
lb	pound
m	meter
m^2	square meter
m^3	cubic meter
mg	milligram
mi	mile
min	minute
mph	miles per hour
mrem	millirem
MTHM	metric tons of heavy metal
MVA	megavolt-ampere
MW	megawatt
MWe	megawatt electric
MWh	megawatt-hour
N_2	nitrogen
nCi	nanocurie
NO_2	nitrogen dioxide
pCi	picocurie
pcm/F	percent mille/Farenheit
pH	hydrogen ion concentration
$PM_{2.5}$	particulate matter less than or equal to 2.5 μm in diameter
PM_{10}	particulate matter less than or equal to 10 μm in diameter
ppm	parts per million
PuO_2	plutonium dioxide
rad	radiation absorbed dose
rem	roentgen equivalent man
s	second
SO_2	sulfur dioxide
t	metric ton
ton	short ton
UF_6	uranium hexafluoride
UO_2	uranium dioxide
yd	yard
yd^3	cubic yard
yr	year (in compound units)
wt %	weight percent

Metric Conversion Chart

To Convert Into Metric			To Convert Out of Metric		
If You Know	**Multiply By**	**To Get**	**If You Know**	**Multiply By**	**To Get**
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
sq. inches	6.4516	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.092903	sq. meters	sq. meters	10.7639	sq. feet
sq. yards	0.8361	sq. meters	sq. meters	1.196	sq. yards
acres	0.40469	hectares	hectares	2.471	acres
sq. miles	2.58999	sq. kilometers	sq. kilometers	0.3861	sq. miles
Volume					
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.45360	kilograms	kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

Metric Prefixes

Prefix	Symbol	Multiplication Factor
exa-	E	1 000 000 000 000 000 000 = 10^{18}
peta-	P	1 000 000 000 000 000 = 10^{15}
tera-	T	1 000 000 000 000 = 10^{12}
giga-	G	1 000 000 000 = 10^{9}
mega-	M	1 000 000 = 10^{6}
kilo-	k	1 000 = 10^{3}
hecto-	h	100 = 10^{2}
deka-	da	10 = 10^{1}
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	μ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001= 10^{-12}
femto-	f	0.000 000 000 000 001 = 10^{-15}
atto-	a	0.000 000 000 000 000 001= 10^{-18}

Chapter 1
Background, Purpose of, and Need for the Proposed Action

1.1 BACKGROUND

In December 1996, the U.S. Department of Energy (DOE) published the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (*Storage and Disposition PEIS*) (DOE 1996a). That PEIS analyzes the potential environmental consequences of alternative strategies for the long-term storage of weapons-usable plutonium and highly enriched uranium (HEU) and the disposition of weapons-usable plutonium that has been or may be declared surplus to national security needs.[1] The Record of Decision (ROD) for the *Storage and Disposition PEIS*, issued on January 14, 1997 (DOE 1997a), outlines DOE's decision to pursue a hybrid approach to plutonium disposition that would make surplus weapons-usable plutonium inaccessible and unattractive for weapons use. DOE's disposition strategy, consistent with the Preferred Alternative analyzed in the *Storage and Disposition PEIS*, allows for both the immobilization of some (and potentially all) of the surplus plutonium and use of some of the surplus plutonium as mixed oxide (MOX) fuel in existing domestic, commercial reactors. The disposition of surplus plutonium would also involve disposal of both the immobilized plutonium and the MOX fuel (as spent fuel) in a potential geologic repository.[2,3]

On May 22, 1997, DOE published a Notice of Intent (NOI) in the Federal Register (FR) (DOE 1997b) announcing its decision to prepare an environmental impact statement (EIS) that would tier from the analysis and decisions reached in connection with the *Storage and Disposition PEIS*. This EIS, the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS), addresses the extent to which each of the two plutonium disposition approaches (immobilization and MOX) would be implemented and analyzes candidate sites for plutonium disposition facilities and activities (i.e., lead assembly fabrication and postirradiation examination),[4] as well as alternative technologies for immobilization. In July 1998, DOE issued the SPD Draft EIS. That draft included a description of the potential environmental impacts of using from three to eight commercial nuclear reactors to irradiate MOX fuel. The potential impacts were based on a generic reactor analysis. In March 1999, DOE awarded a contract for MOX fuel fabrication and irradiation services.[5] After this award, DOE issued a *Supplement to the SPD Draft EIS (Supplement)* (April 1999) that describes the potential environmental impacts of using MOX fuel at three proposed reactor sites and provides updated information on the proposed disposition program. These updates and site-specific analyses have been incorporated in this SPD Final EIS.

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[1] DOE addresses the disposition of surplus HEU in a separate environmental impact statement, the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996b) issued in June 1996, with the ROD (DOE 1996c) issued in August 1996.

[2] The U.S. Nuclear Regulatory Commission (NRC) has reviewed DOE's plans to place immobilized material into the potential geologic repository and has agreed that with adequate canister and package design features, the immobilized plutonium waste forms can be acceptable for disposal in the repository (Paperiello 1999).

[3] Sidebars are used throughout this SPD Final EIS to indicate where changes were made since the SPD Draft EIS and *Supplement* were issued. Section 1.7.4 discusses these changes.

[4] This SPD EIS also analyzes a No Action Alternative, i.e., the possibility of disposition not occurring and instead continued storage of surplus plutonium in accordance with the *Storage and Disposition PEIS* ROD.

[5] Limited activities may be conducted under this contract, including non-site-specific work associated with the development of the initial design for the MOX fuel fabrication facility and plans (paper studies) for outreach, long lead-time procurements, regulatory management, facility quality assurance, safeguards, security, fuel qualification, and deactivation. Under the contract options, no substantive design work or construction on the proposed MOX facility would begin before a SPD EIS ROD is issued, and any such work would depend on decisions in the ROD.

This SPD EIS analyzes a nominal 50 metric tons (t) (55 tons) of surplus weapons-usable plutonium, which is primarily in the form of pits (the core element of a nuclear weapon's fission component), metal, and oxides.[6] In addition to 38.2 t (42 tons) of weapons-grade plutonium already declared by the President as excess to national security needs, the material analyzed includes weapons-grade plutonium that may be declared surplus in the future, as well as weapons-usable, reactor-grade plutonium that is surplus to the programmatic and national defense needs of DOE. As depicted in Figure 1–1, there are seven locations of surplus plutonium within the DOE complex: the Hanford Site (Hanford) near Richland, Washington; Idaho National Engineering and Environmental Laboratory (INEEL) near Idaho Falls, Idaho; Lawrence Livermore National Laboratory in Livermore (LLNL), California;[7] Los Alamos National Laboratory (LANL) near Los Alamos, New Mexico; the Pantex Plant (Pantex) near Amarillo, Texas; the Rocky Flats Environmental Technology Site (RFETS) near Golden, Colorado; and the Savannah River Site (SRS) near Aiken, South Carolina.

Figure 1–1. Locations of Surplus Plutonium

Under the hybrid alternatives, about 34 percent of the surplus plutonium analyzed in this SPD EIS is not suitable for fabrication into MOX fuel due to the complexity, timing, and cost that would be involved in purifying the materials. The *Storage and Disposition PEIS* ROD determined that DOE would immobilize at least 8 t (9 tons)

[6] Some materials are already in a final disposition form (i.e., irradiated fuel) and will not require further action before disposal. These materials, therefore, are not included in the 50 t (55 tons) analyzed in this SPD EIS.

[7] Some of the surplus plutonium originally stored at RFETS was shipped to LLNL, where special handling and disassembly processes occurred. The receipt and disassembly of these materials and future processing work will result in the recovery of approximately 1.7 t (1.9 tons) of surplus plutonium at LLNL.

of the current surplus plutonium. Since issuance of the ROD, further consideration has indicated that 17 t (19 tons) of the surplus plutonium is not suitable for use in MOX fuel and should be immobilized. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not a reasonable alternative and is not analyzed. This SPD EIS does, however, analyze the immobilization of all the surplus plutonium. (See Section 2.3.2.1 for a discussion on the amounts of materials subject to disposition.) Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

In the *Storage and Disposition PEIS* ROD, DOE retained the option to use some of the surplus plutonium as MOX fuel in Canadian Deuterium Uranium (CANDU) reactors, which would have been undertaken only in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the SPD Draft EIS was issued, DOE determined that adequate reactor capacity is available in the United States to disposition that portion of the U.S. surplus plutonium suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is no longer actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor.[8] If Russia and Canada agree to disposition Russian surplus plutonium in CANDU reactors in order to augment Russia's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Comprehensive disposition actions are needed to ensure that surplus plutonium is converted to proliferation-resistant forms. In September 1993, President Clinton issued the *Nonproliferation and Export Control Policy* (White House 1993) in response to the growing threat of nuclear proliferation. Further, in January 1994, President Clinton and Russia's President Yeltsin issued a *Joint Statement by the President of the Russian Federation and the President of the United States of America on Non-Proliferation of Weapons of Mass Destruction and the Means of Their Delivery* (White House 1994). In accordance with these policies, the focus of the U.S. nonproliferation efforts includes ensuring the safe, secure, long-term storage and disposition of surplus weapons-usable fissile plutonium. Following publication of the SPD Draft EIS, the United States and Russia signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed and a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile (see Appendix A). The disposition activities proposed in this SPD EIS will enhance U.S. credibility and flexibility in negotiations on bilateral and multilateral reductions of surplus weapons-usable fissile materials inventories. [Text deleted.] The United States will retain the option to begin certain disposition activities, when appropriate, in order to encourage the Russians and set an international example.

This SPD EIS addresses both the immobilization and MOX approaches to surplus plutonium disposition, which include siting, construction, operation, and ultimate decontamination and decommissioning (D&D) of three types of facilities at one or two of four candidate DOE sites:

[8] A separate environmental review, the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE 1999a; Finding of No Significant Impact [FONSI], August 13, 1999), analyzes the fabrication and proposed shipment of MOX fuel rods for research and development activities involving the use of limited amounts of U.S. MOX fuel in a Canadian test reactor. The FONSI was announced in a press release on September 2, 1999, and made available to the public.

- A facility for disassembling pits (a weapons component) and converting the recovered plutonium, as well as plutonium metal from other sources, into plutonium dioxide suitable for disposition. This facility, the pit disassembly and conversion facility, is referred to in this document as the *pit conversion facility*. Candidate sites for this facility are Hanford, INEEL, Pantex, and SRS.

- A facility for immobilizing surplus plutonium for eventual disposal in a geologic repository pursuant to the Nuclear Waste Policy Act (NWPA), the plutonium conversion and immobilization facility, is referred to as the *immobilization facility*. This facility would include a collocated capability for converting nonpit plutonium materials into plutonium dioxide suitable for immobilization. The immobilization facility would be located at either Hanford or SRS. DOE identified SRS as the preferred site for an immobilization facility in the NOI to prepare the SPD EIS, which was issued in May 1997. Technologies for immobilization are also discussed in this SPD EIS.

- A facility for fabricating plutonium dioxide into MOX fuel, the MOX fuel fabrication facility, is referred to as the *MOX facility*. Candidate sites for this facility are Hanford, INEEL, Pantex, and SRS. Also included in this SPD EIS is a separate analysis of MOX lead assembly[9] activities at five candidate DOE sites: Argonne National Laboratory–West (ANL–W) at INEEL; Hanford; LLNL; LANL; and SRS. DOE would fabricate a limited number of MOX fuel assemblies, referred to as lead assemblies, for testing in a reactor before commencing fuel irradiation under the proposed MOX fuel program. Postirradiation examination activities at two sites, ANL–W and Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee, are also analyzed in this SPD EIS.

This SPD EIS also analyzes a No Action Alternative, as required by the National Environmental Policy Act (NEPA). In the No Action Alternative, surplus weapons-usable plutonium in storage at various DOE sites would remain at those locations. The vast majority of pits would continue to be stored at Pantex, and the remaining plutonium in various forms would continue to be stored at Hanford, INEEL, LLNL, LANL, RFETS, and SRS.[10]

1.3 DECISIONS TO BE MADE

DOE will base the following decisions on the analytical results of this SPD EIS and other cost, schedule, and nonproliferation considerations:

- Whether to construct and operate a pit conversion facility, and if so, where.

- Whether to construct and operate an immobilization facility, and if so, where (including selection of a technology for immobilization and the amount of plutonium to be immobilized).

- Whether to construct and operate a MOX facility, and if so, where (including separate selection of a site for fabrication of lead assemblies; a site for postirradiation examination; and the amount of plutonium, if any, to be fabricated into MOX fuel).

1.4 ISSUES IDENTIFIED DURING THE SCOPING PERIOD

In mid-1997, DOE conducted a public scoping process to solicit comments on its NOI concerning the disposition of surplus plutonium. Written comments were requested from the public via U.S. mail, fax, and Web site, and

[9] A MOX lead assembly is a prototype reactor fuel assembly that contains MOX fuel.

[10] Should the No Action Alternative be chosen, the ROD pursuant to this SPD EIS would also address the movement of the remaining surplus nonpit plutonium from RFETS in support of its planned closure in 2006.

oral comments were collected via telephone and at four public scoping meetings. During June and July 1997, about 640 people attended the scoping meetings held near the candidate sites for disposition facilities. The specific locations of the meetings were Idaho Falls, Idaho (near INEEL); Amarillo, Texas (near Pantex); North Augusta, South Carolina (near SRS); and Richland, Washington (near Hanford). These meetings were designed to provide a forum in which participants could discuss issues directly with DOE program officials, and DOE could solicit relevant input from affected or interested local and regional stakeholders. The meetings were conducted in a workshop format, providing stakeholders with numerous opportunities to learn about the issues and express their comments and concerns. Each workshop consisted of a short plenary session, followed by discussion groups and summarizing remarks. The comments provided at the scoping meetings were documented and used in the development of this SPD EIS.

A database was created to track written and oral comments received during the scoping process. More than 1,400 individual documents, culminating in 2,000 comments, were received and recorded in the database. An analysis was conducted of the comments received during the scoping process. They were initially grouped in the following seven areas: *proposed action, alternatives, facilities/technologies, impact, costs, public involvement*, and *other*. Comments were further categorized into four major groups according to their relationship to the scope of this SPD EIS: *already intended for inclusion in this SPD EIS, needs to be addressed in this SPD EIS, needs to be or is already addressed elsewhere*, and *other*. The following summary describes some of the major issues identified during the scoping process.

Issues Already Intended for Inclusion in This SPD EIS. Many comments received during the scoping process concern issues that were already intended to be included in this SPD EIS. For example, many commentors expressed concern over the potential environmental impacts of the various technologies at the candidate sites and requested that an in-depth analysis be conducted to determine the potential impacts. A concern was also expressed that making can-in-canister the preferred immobilization technology without an evaluation of alternative technologies circumvents the NEPA process. Other commentors recommended that this SPD EIS include a detailed accounting of the wastes that will be generated and the location of their ultimate disposal. A number of commentors were concerned that existing legal agreements with State governments and other agencies (e.g., triparty agreements) would be overlooked and possibly ignored. Other commentors addressed the quantity of plutonium to be immobilized or fabricated into MOX fuel. DOE is addressing all of these issues in this SPD EIS.

Additional Issues That Need to Be Addressed in This SPD EIS. A few commentors suggested that additional issues be considered in this SPD EIS. [Text deleted.] Some commentors suggested that Pantex be considered as a candidate site for the pit conversion facility under all situations, including the 50-t (55-ton) immobilization option, because most of the surplus pits are currently located there. In response to these comments, DOE added two alternatives to the SPD Draft EIS for the option of immobilizing all 50 t (55 tons) of surplus plutonium. Initially, the alternatives included siting both the pit conversion and immobilization facilities at one site (i.e., Hanford or SRS). The two new alternatives include Pantex as a candidate site for the pit conversion facility.

Issues That Need to Be or Are Already Addressed Elsewhere. Many comments received during the scoping process concern issues that are beyond the scope of this SPD EIS but are being or will be addressed elsewhere. These issues include the relationship of plutonium disposition and tritium production, and use of the Fast Flux Test Facility (FFTF) at Hanford solely for surplus plutonium disposition. The SPD EIS does not address using FFTF because the current DOE proposals do not include the use of surplus plutonium as a fuel source for FFTF.[11]

[11] DOE announced in a Notice of Intent (NOI) published September 15, 1999 (64 FR 50064), that it will prepare a programmatic EIS to evaluate the environmental effects associated with, among other options, the restart and operation of FFTF to meet the need for a range of research and development activities, medical isotope production, and plutonium 238 production to fuel National Aeronautics and Space Administration spacecraft.

A question was raised as to the role of the U.S. Nuclear Regulatory Commission (NRC) licensing requirements in regard to plutonium disposition facilities. Suggestions were made to include NRC processes in the SPD EIS. The NRC is a "commenting" agency on the SPD EIS. DOE provided copies of the SPD Draft EIS, *Supplement*, and SPD Final EIS to NRC for review and comment, and DOE is conducting regular meetings with NRC on the MOX approach, including fuel design and qualification.[12] In addition, an NRC license would be sought for the MOX facility. Domestic, commercial reactors operate under NRC licenses, and their proposed use of MOX fuel would be subject to review by NRC.

Some questions and concerns were also raised about the MOX fuel fabrication and reactor irradiation services procurement. (See Section 2.1.3 for a discussion of the procurement process and associated NEPA activities.) Many commentors suggested that DOE, in either this SPD EIS or other program studies, analyze the total cost of each alternative, including facility construction and modification, operations, and D&D, as well as all related site infrastructure costs. At the same time the SPD Draft EIS was issued, DOE released a cost study (DOE 1998a) focusing on site-specific costs to support site selection. As a followup to this study, DOE prepared a second report (DOE 1999b) that compiles life-cycle costs for the Preferred Alternative and addresses cost-related public comments.[13] These cost studies will be considered, along with the SPD EIS analyses, in the DOE decisionmaking process. Some commentors suggested that the potential impacts of the disposal of spent nuclear fuel generated by MOX fuel use be included in this SPD EIS. This issue has already been addressed in the *Storage and Disposition PEIS*, and disposal of spent nuclear fuel is addressed in the *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE 1999c).[14]

Other. Many of the comments received were expressions of opinion or comments not directly related to issues addressed in this SPD EIS. For example, opposition was expressed by both U.S. and Canadian citizens to using CANDU reactors. Similarly, a number of commentors expressed their support for or opposition to immobilization and MOX technologies. Others expressed support for specific facilities or questioned the viability of site-specific facilities for pit conversion, immobilization, or MOX fuel fabrication. A number of commentors expressed their concern over the market viability of MOX fuel, even though MOX fuel would not be sold on the open market. Some commentors expressed their support for a hybrid disposition approach using both immobilization and MOX fuel fabrication.

1.5 SCOPE OF THIS SPD EIS

Site-specific issues associated with siting, construction, and operation of the three surplus plutonium disposition facilities are analyzed in this SPD EIS. The three facilities would be designed so that they could collectively accomplish disposition of up to 50 t (55 tons) of surplus plutonium over their operating lives, as shown in Figure 1–2. When the missions of the plutonium disposition facilities are completed, deactivation

[12] DOE did not receive any comments from NRC on the SPD Draft EIS or *Supplement*.

[13] These two cost reports are available on the Office of Fissile Materials Disposition Web site at http://www.doe-md.com, in the public reading rooms at the candidate sites, and upon request.

[14] For purposes of this SPD EIS, a potential geologic repository candidate site at Yucca Mountain, Nevada, was assumed to be the final disposal site for all immobilized plutonium and spent fuel. Currently, Yucca Mountain is the only site being characterized as a potential geologic repository. In August 1999, DOE issued a separate EIS, the *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D) (DOE 1999c), to analyze the site-specific environmental impacts from construction, operation and monitoring, and eventual closure of a potential geologic repository at Yucca Mountain.

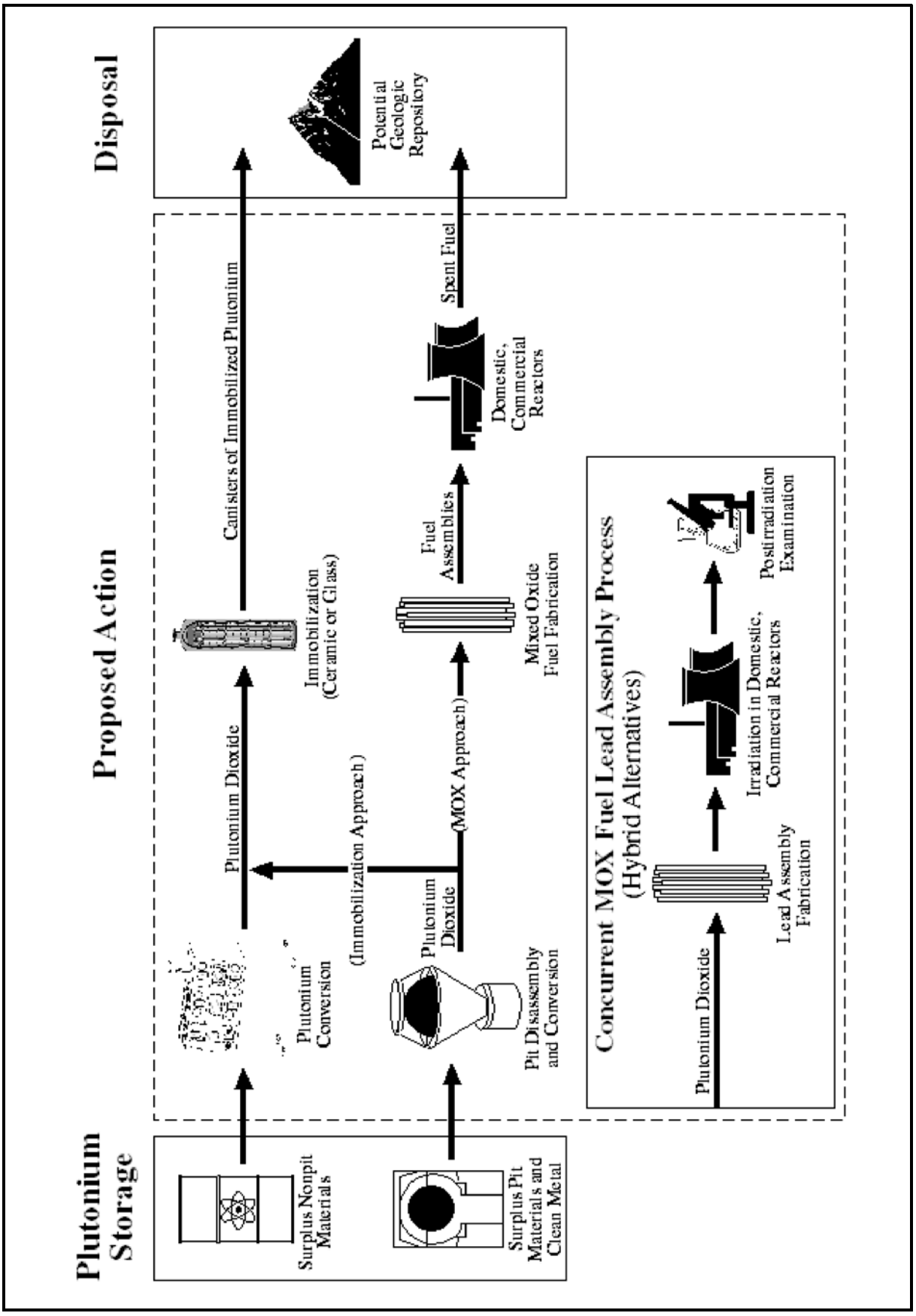

Figure 1–2. Proposed Surplus Plutonium Disposition Processes

and stabilization would be performed to reduce the risk of radiological exposure; reduce the need for and costs associated with long-term maintenance; and prepare the building for potential future use. (See Section 4.31.1 for a discussion on deactivation and stabilization.) At the end of the useful life of the facilities, DOE would evaluate options for D&D or reuse of the facilities. When DOE is ready for D&D of these facilities, an appropriate NEPA review will be conducted. (See Section 4.31.2 for a discussion of D&D.) This SPD EIS also analyzes transportation, including the following (see Section 2.4.4 for a more detailed discussion): plutonium from storage locations to the pit conversion facility or the immobilization facility, depending on the material and the alternative; plutonium dioxide from the pit conversion facility to the immobilization or MOX facility; recovered HEU from the pit conversion facility to Oak Ridge Reservation (ORR); depleted uranium hexafluoride from a representative DOE site to a representative commercial conversion facility (see Sections 2.4.4.2 and 2.4.4.3 for a more detailed discussion); uranium feed supply (uranium dioxide) from a representative commercial conversion facility to the immobilization and/or MOX fuel fabrication facilities and lead assembly facility; uranium fuel rods from a commercial fuel fabrication facility to the MOX facility and lead assembly facility; plutonium dioxide from LANL to the lead assembly facility; irradiated lead assemblies or rods from a reactor to the postirradiation examination site; spent fuel from the postirradiation examination site to INEEL for storage; MOX fuel to a commercial reactor; and immobilized plutonium to a potential geologic repository.[15] In addition to the various disposition alternatives, a No Action Alternative is also analyzed. In this alternative, disposition would not occur, and surplus plutonium would remain in long-term storage in accordance with the storage approach identified in the *Storage and Disposition PEIS* ROD.[16] For all alternatives analyzed in this SPD EIS, it is assumed that storage actions described in the *Storage and Disposition PEIS* ROD, as amended, have been accomplished.[17] Because this SPD EIS tiers from the analyses and decisions reached in association with the *Storage and Disposition PEIS*, information relevant to disposition options or candidate sites is incorporated by reference and summarized; it is not repeated here. [Text deleted.]

As part of the assessment of the MOX alternatives, this SPD EIS analyzes the fabrication of up to 10 lead assemblies that may be needed to support the MOX fuel program, although DOE plans to produce only 2. (See Sections 2.18.2 and 4.27 for a discussion of how impacts would be lower if only two lead assemblies were fabricated.) Existing DOE facilities at five candidate sites are analyzed, as is the transportation of feed materials to the lead assembly fabrication sites and the fabricated lead assemblies to a domestic, commercial reactor for test irradiation. Postirradiation examination may be required to support NRC licensing activities related to the use of MOX fuel in domestic, commercial reactors. This SPD EIS discusses postirradiation examination at two candidate sites, ANL–W and ORNL. These two sites are currently the only sites that possess the capability to conduct postirradiation activities without major modifications to facility and processing capabilities; only minor modifications for receipt of materials would be required. Other potential facilities, either within the DOE complex or in the commercial sector, would require significant modifications to meet expected requirements of the postirradiation examination.

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[15] Shipments of spent fuel are analyzed in the *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D) (DOE 1999c).

[16] Should the No Action Alternative be chosen, the ROD pursuant to this SPD EIS would also address the movement of the remaining surplus nonpit plutonium from RFETS in support of its planned closure in 2006.

[17] Recent studies indicated that cost savings could be realized from the transfer of nonpit materials from RFETS and Hanford to SRS earlier than specified in the *Storage and Disposition PEIS* ROD. A Supplement Analysis was prepared, and based on this analysis, DOE determined that a supplemental PEIS would not be needed; an amended ROD was issued in August 1998 (63 FR 43386) and included decisions to accelerate shipment of all nonpit surplus plutonium from RFETS to SRS and to relocate all Hanford surplus plutonium to SRS, if SRS is selected as the immobilization disposition site.

The ceramic immobilization, MOX fuel fabrication, and lead assembly processes require the use of uranium dioxide as a feed material, which can be obtained from either natural or depleted uranium. Because DOE has a large inventory of depleted uranium hexafluoride (the equivalent of 385,000 t [424,385 tons] of depleted uranium dioxide), this SPD EIS analyzes the use of a small amount of that inventory (about 137 t [151 tons] per year) to produce uranium dioxide (White 1997:1).[18, 19] Depleted uranium hexafluoride is currently stored at three DOE sites: the East Tennessee Technology Park in Oak Ridge, Tennessee; the Paducah Gaseous Diffusion Plant near Paducah, Kentucky; and the Portsmouth Gaseous Diffusion Plant (Portsmouth) near Piketon, Ohio. For purposes of analysis in this SPD EIS, Portsmouth is used as a representative site for a source of depleted uranium hexafluoride.[20] Included for evaluation in this SPD EIS are the activities necessary to package the depleted uranium hexafluoride for shipment to a representative commercial conversion facility (for purposes of analysis, this SPD EIS uses the General Electric Company's Nuclear Energy Production Facility in Wilmington, North Carolina) for conversion to uranium dioxide,[21] to transport the depleted uranium hexafluoride from Portsmouth to Wilmington, and to transport the uranium dioxide from Wilmington to the candidate immobilization, MOX fuel fabrication, and lead assembly sites (i.e., ANL–W, Hanford, INEEL, LLNL, LANL, Pantex, and SRS).

DOE's NOI announcing the preparation of this SPD EIS includes a table outlining 12 originally proposed disposition alternatives. Each alternative identifies the facilities, new or existing, at each candidate site that would be analyzed in this SPD EIS. [Text deleted.] Since the publication of the NOI, DOE further increased the number of alternatives for SPD EIS analysis to include a new MOX facility at Hanford, in addition to the alternative involving modifying the Fuels and Materials Examination Facility. For the option of immobilizing all 50 t (55 tons) of surplus plutonium, DOE also included Pantex as a candidate site for pit disassembly and conversion activities, making a total of four 50-t (55-ton) all-immobilization alternatives in the SPD Draft EIS. Previously, only Hanford and SRS had been considered as sites for pit disassembly and conversion activities for the 50-t (55-ton) all-immobilization case. Eight alternatives using a portion of Building 221–F at SRS for the immobilization facility that were analyzed in the SPD Draft EIS have been eliminated from this SPD Final EIS because the amount of space required for the immobilization facility would be significantly larger than originally planned. These eight alternatives are no longer considered reasonable because the new construction required for the proposed immobilization facility is now expected to be nearly the same whether the facility is entirely located in a new building or is built in addition to using a portion of Building 221–F at SRS. There are now 15 action alternatives presented as 11 sets of alternatives, plus the No Action Alternative. For a more detailed discussion of alternative development, see Section 2.3.

As indicated in the ROD for the *Storage and Disposition PEIS*, this SPD EIS analysis provides, in part, the basis for determining a specific immobilization technology. This SPD EIS analyzes in detail the proposed can-in-canister approach and compares the results with the impacts predicted in the *Storage and Disposition PEIS* for the homogenous immobilization approach in new ceramic immobilization and vitrification facilities.

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[18] The contractor chosen by DOE to conduct MOX fuel fabrication has the option of acquiring uranium dioxide from another source.

[19] Potential use of depleted uranium hexafluoride or facilities at the gaseous diffusion plants will be consistent with the *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* (DOE/EIS-0269, April 1999; ROD, August 1999) and the *Final Plan for the Conversion of Depleted Uranium Hexafluoride, As Required by Public Law 105–204* (DOE, July 1999).

[20] The Portsmouth Gaseous Diffusion Plant is used as a representative site because it is the only one of the three DOE sites that is currently capable of transferring the depleted uranium hexafluoride from the 12.7-t (14-ton) tails cylinders in which it is currently stored to the 2.28-t (2.5-ton) feed cylinders that are compatible with the processing equipment at a commercial facility (White 1997:5). However, DOE has no preference as to where the depleted uranium is acquired.

[21] Possible existing sites for this conversion facility include nuclear fuel fabrication facilities in Missouri, North Carolina, South Carolina, Washington, or a uranium conversion facility in Illinois. For purposes of analysis in this SPD EIS, the commercial nuclear fuel fabrication facility in Wilmington, North Carolina, is used as a representative site. DOE has no preference as to where conversion would occur.

In addition, for the can-in-canister approach, this SPD EIS separately analyzes the effects of immobilizing plutonium into either a titanate-based ceramic material or a lanthanide borosilicate glass.

To further define the potential processes to be used for the disposition of surplus plutonium, several research and development (R&D) activities are ongoing. A discussion of these R&D activities is provided in the *Pit Disassembly and Conversion Demonstration Environmental Assessment and Research and Development Activities* (DOE 1998b; Finding of No Significant Impact [FONSI], August 1998). Several of these R&D activities are likely to continue after the ROD for this SPD EIS is issued.

1.6 PREFERRED ALTERNATIVES

DOE's Preferred Alternative for the disposition of surplus weapons-usable plutonium is Alternative 3: to disposition up to 50 t (55 tons)[22] of plutonium at SRS using a hybrid approach that involves both the ceramic can-in-canister immobilization approach and the MOX approach. Approximately 17 t (19 tons) would be immobilized in a ceramic form, placed in cans, and embedded in large canisters containing high-level vitrified waste for ultimate disposal in a potential geologic repository pursuant to the NWPA. Approximately 33 t (36 tons) would be used to fabricate MOX fuel, which would be irradiated in existing domestic, commercial reactors. The proposed reactors are the Catawba Nuclear Station near York, South Carolina; the McGuire Nuclear Station near Huntersville, North Carolina; and the North Anna Power Station near Mineral, Virginia.[23] The resulting spent fuel would be placed in a potential geologic repository pursuant to the NWPA.

Pursuing the hybrid approach provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus weapons-usable plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in weapons again. Pursuing both immobilization and MOX fuel fabrication also provides important insurance against uncertainties of implementing either approach by itself. The construction of new facilities for the disposition of surplus U.S. plutonium would not take place unless there is significant progress on plans for plutonium disposition in Russia.

DOE's preference for siting plutonium disposition facilities is as follows:

- **Pit Disassembly and Conversion at SRS.** Construct and operate a new pit conversion facility at SRS for the purpose of disassembling nuclear weapons pits and converting the plutonium metal to a declassified oxide form suitable for international inspection and disposition using either immobilization or MOX/reactor approaches. SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

  [Text deleted.]

[22] Some materials are already in a final disposition form (i.e., irradiated fuel) and will not require further action before disposal. These materials are not included in this SPD EIS.

[23] No facility construction or MOX fuel fabrication or irradiation is to occur until the SPD EIS ROD is issued. Additionally, no MOX fuel is to be irradiated until NRC amends the operating license of each selected reactor prior to the specific reactor receiving the MOX fuel. Such site-specific activities would depend on decisions in the ROD, and DOE's exercise of contract options to allow such activities would be contingent on the ROD.

- **Immobilization at SRS (new construction and Defense Waste Processing Facility).**[24] Construct and operate a new immobilization facility at SRS using the ceramic can-in-canister technology. This technology would immobilize plutonium in a ceramic form, seal it in cans, and place the cans in canisters filled with borosilicate glass containing radioactive high-level waste (HLW) at the existing Defense Waste Processing Facility (DWPF). This preferred can-in-canister approach at SRS complements existing missions, takes advantage of existing infrastructure and staff expertise, and enables DOE to use an existing facility (DWPF). SRS was previously designated to be part of DOE's Preferred Alternative for immobilization in the NOI issued in May 1997. The ceramic can-in-canister approach would involve slightly lower environmental impacts than the homogenous approach (wherein the plutonium is incorporated into a homogenous mixture of plutonium and fission products in a single waste form). The ceramic can-in-canister approach would involve better performance in a potential geologic repository due to the ceramic form's expected higher durability under repository conditions and its lower potential for long-term criticality. In addition, it would provide greater proliferation resistance than the glass can-in-canister approach because recovery of plutonium from the ceramic form would require a more chemically complex process than has yet been developed.

- **MOX Fuel Fabrication at SRS (new construction).** Construct and operate a new MOX facility at SRS and produce MOX fuel containing surplus weapons-usable plutonium for irradiation in existing, domestic, commercial reactors. SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing support infrastructure and staff expertise. [Text deleted.]

- **Lead Assembly Fabrication at LANL.** Based on the consideration of capabilities of the candidate sites and input from the contractor team chosen for the MOX approach (the MOX procurement process is discussed in Chapter 2), DOE prefers LANL for lead assembly fabrication. LANL is preferred because it already has fuel fabrication facilities that would not require major modifications, and takes advantage of existing infrastructure and staff expertise. Additionally, the surplus plutonium dioxide that would be used to fabricate the lead assemblies would already be in inventory at the site.

- **Postirradiation Examination at ORNL.** If postirradiation examination is necessary for the purpose of qualifying the MOX fuel for commercial reactor use, DOE prefers to perform that task at ORNL. ORNL has the existing facilities and staff expertise needed to perform postirradiation examination as a matter of its routine activities; no major modifications to facilities or processing capabilities would be required. In addition, because ORNL is about 500 km (300 mi) from the McGuire Nuclear Station, the reactor that would irradiate the fuel, it is the closest candidate site for postirradiation examination activities.

[Text deleted.]

[24] DOE is presently considering replacement alternatives for the In-Tank Precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides from liquid HLW before vitrifying the high-level fraction in DWPF. Due to problems experienced with the operation of ITP as configured, DWPF is currently operating with sludge feed only. A supplemental EIS on DWPF operation is being prepared that analyzes three proposed alternatives: small tank precipitation, ion exchange, and direct grout. See Section 2.4.2.1 for a more detailed discussion of these alternatives.

1.7 SUMMARY OF MAJOR ISSUES IDENTIFIED DURING THE COMMENT PERIODS AND CHANGES TO THE SPD DRAFT EIS

1.7.1 Public Involvement Process for the SPD Draft EIS and the *Supplement to the SPD Draft EIS*

DOE issued the SPD Draft EIS in July 1998 and received public comments. The comment period ran from July 17, 1998, through September 16, 1998, although DOE considered all comments submitted after the close of the 60-day comment period. In August 1998, DOE held five public hearings at the following locations in the vicinity of the four candidate DOE sites and at one regional location:

Richland, Washington	August 4, 1998
Amarillo, Texas	August 11, 1998
North Augusta, South Carolina	August 13, 1998
Portland, Oregon	August 18, 1998
Idaho Falls, Idaho	August 20, 1998

DOE received comments on the SPD Draft EIS by mail, a toll-free telephone and fax line, the Office of Fissile Materials Disposition Web site, and at the public hearings. Altogether, DOE received approximately 3,400 comment documents from individuals and organizations. All comments are presented in Volume III, Parts A and B, of the Comment Response Document of this SPD Final EIS. Approximately 65 percent of the comments received consisted of mail-in postcard campaigns that expressed either support of or opposition to the use of various sites or technologies. About 12 percent were collected during public hearings, 10 percent were in letters received by mail, 10 percent were received by fax, 2 percent were received by telephone, and 1 percent were received through the Web site.

In April 1999, DOE issued the *Supplement* and received public comments. The comment period ran from May 14, 1999, through June 28, 1999, although DOE considered all comments received after the close of the 45-day comment period. On June 15, 1999, DOE held a public hearing in Washington, D.C. DOE received approximately 77 comment documents from individuals and organizations, which are presented in Volume III, Part B, of the Comment Response Document of this SPD Final EIS. Approximately 21 percent of the comments received were collected during the public hearing, 34 percent were in letters received by mail, 26 percent were received by fax, 5 percent were received by telephone, and 14 percent were received through the Web site.

1.7.2 Summary of Major Issues Raised on the SPD Draft EIS During the Public Comment Period

The following paragraphs highlight comments and issues that the public raised concerning information provided in the SPD Draft EIS. These comments were collected during the two separate public comment periods for the SPD Draft EIS and the *Supplement*. (Comments received on information specifically provided in the *Supplement* are summarized in Section 1.7.3.) Changes made to this SPD EIS in response to a comment are described.

Russian Disposition Program. A number of commentors expressed concern over Russian disposition activities and tying U.S. activities to Russian activities. The United States and Russia recently made progress in the management and disposition of plutonium. In July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. In September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain disposition activities in order to encourage the Russians and set an international example. DOE has updated this SPD EIS to reflect the agreement and statement of principles and included copies in Appendix A.

Site Selection. A large number of comments were received advocating one candidate site over another for various reasons, including the presence of existing facilities that could prove beneficial to plutonium disposition, skilled workers, safety records, reduced transportation, and perceived economic benefits. DOE has chosen SRS as its preferred site for the three surplus plutonium disposition facilities, as outlined in Section 1.6.

Approach to Plutonium Disposition. A number of commentors protested DOE's preference for the hybrid approach and the use of MOX fuel for surplus plutonium disposition. Among the comments received on this issue were many advocating the use of the immobilization approach for all of the surplus plutonium. Commentors argued that the immobilization approach was safer, cheaper, and faster. They also pointed out that the immobilization approach resulted in less transportation. Because specific reactors in North Carolina, South Carolina, and Virginia have been proposed for plutonium disposition, the transportation requirements associated with several hybrid alternatives that include the MOX facility at SRS and Pantex have decreased (because the proposed reactors are closer to these sites than the 4,000-km [2,500-mi] bounding distance analyzed in the SPD Draft EIS). As a result, these hybrid alternatives would require less transportation than some of the 50-t (55-ton) immobilization alternatives. Other commentors viewed the MOX approach as a Federal Government subsidy of the commercial nuclear power industry. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard.[25]

Safety and Health. Comments were received that questioned the safety and health aspects of operating the surplus plutonium disposition facilities. Commentors pointed out that DOE's safety record at other nuclear facilities had been poor in the past and questioned DOE's ability to safely operate the disposition facilities. The health and safety of workers and the public is a priority of the surplus plutonium disposition program, regardless of which approach is chosen. Operation of the disposition facilities would comply with applicable Federal, State, and local laws and regulations governing radiological and hazardous chemical releases. Within these limits, DOE believes that the radiation exposure and the level of contamination should be kept as low as is reasonably achievable.

Aqueous Processing of Plutonium. Some commentors questioned DOE's ability to produce clean plutonium dioxide that could be used in MOX fuel using the dry process proposed in the SPD Draft EIS. Questions were raised about the ability of this process to remove gallium and other pit materials from the plutonium before it is fabricated into MOX fuel. On the basis of public comments received on the SPD Draft EIS and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing (a small-scale aqueous process) as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N (which addressed plutonium polishing in the SPD Draft EIS) was deleted from this SPD Final EIS, and the impacts discussed therein were included in the impacts presented for the MOX facility in Chapter 4. Section 2.4.3 was also revised to include a discussion of plutonium polishing.

No attempt was made to evaluate the use of DOE's existing aqueous processing lines capable of dissolving pits, as advocated by some commentors. DOE determined that such aqueous processing, while a proven technology, is not a reasonable alternative for pit conversion because current aqueous processes using existing facilities would produce significant amounts of waste, and aqueous processing would complicate international inspection regimes because of classification issues.

[25] "Spent Fuel Standard" is a term coined by the National Academy of Sciences (NAS, 1994, *Management and Disposition of Excess Weapons Plutonium*, National Academy Press, Washington, D.C., pg.12.) and modified by DOE (glossary from Office of Fissile Materials Disposition Web site at http://www.doe-md.com) denoting the main objective of alternatives for the disposition of surplus plutonium: that such plutonium be made roughly as inaccessible and unattractive for weapons use as the much larger and growing stock of plutonium in civilian spent nuclear fuel.

Reprocessing. Several comments were received related to the reprocessing of plutonium and the civilian use of plutonium. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing. The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium that was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. At the end of the useful life of the facility, DOE would evaluate options for D&D or reuse of the facility for other purposes.

Inclusion of Generic Reactor Information in the SPD Draft EIS. Many comments were received on the inclusion of generic reactor information in the SPD Draft EIS. At the time the Draft was released, DOE did not know which specific reactors would be proposed for the MOX program. Subsequently, the Catawba, McGuire, and North Anna reactors were chosen as part of the contractor team that would implement the MOX option should the decision be made in the SPD EIS ROD to go forward with the hybrid approach (i.e., both immobilization and MOX). Specific reactor information provided as part of the procurement process was evaluated by DOE in an Environmental Critique in accordance with DOE's NEPA regulations at 10 CFR 1021.216. The Environmental Critique was considered by DOE before awarding the contract. An Environmental Synopsis based on the Environmental Critique was prepared and released to the public for comment in the *Supplement*. The comments received on the *Supplement* are summarized and responded to in Volume III, Part B, of the Comment Response Document. An opportunity for public comment will also likely be provided by NRC during the reactor operating license amendment process.

Transportation Concerns. Commentors raised concerns about the transportation involved with moving the surplus plutonium from storage locations to disposition sites and, in some cases, MOX fuel to reactor sites. Requests were made to limit the transportation where possible, to present the transportation information in a more understandable manner, and to ensure that the transportation was conducted as safely as possible. Additional information has been added to Chapter 2 of this SPD Final EIS, which shows the total transportation associated with each alternative and gives a graphic depiction of the transportation needed for each disposition approach (immobilization and MOX). As discussed in this SPD EIS, safe transportation is a major concern of DOE. All shipments of surplus plutonium would be accomplished using the safe, secure trailer/SafeGuards Transport (SST/SGT) system.[26] Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents that resulted in a fatality or release of radioactive material.

Cost of Plutonium Disposition. Many commentors focused on the cost of various surplus plutonium disposition facilities. Because cost issues are beyond the scope of this SPD EIS, commentors are referred to DOE's *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE 1998a) and *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE 1999b). Comments concerning the basis for DOE's cost estimates or requesting cost information were forwarded to DOE's cost analysis team.

[26] The SST/SGT is a specially designed component of an 18-wheel tractor-trailer vehicle. Although the details of the vehicle enhancements are classified, key characteristics are not, and include: enhanced structural supports and a highly reliable tie-down system to protect cargo from impact; heightened thermal resistance to protect the cargo in case of fire; deterrents to protect the unauthorized removal of cargo; couriers who are armed Federal officers and receive rigorous training and are closely monitored through DOE's Personnel Assurance Program; an armored tractor to protect the crew from attack; advanced communications equipment; specially designed escort vehicles containing advance communications and additional couriers; 24-hr-a-day real-time monitoring of the location and status of the vehicle; and significantly more stringent maintenance standards.

1.7.3 Summary of Major Issues Raised on the *Supplement to the SPD Draft EIS* During the Public Comment Period

Frequency of Reactor Accidents in Reactors Using MOX Fuel. A number of comments argued that the frequency of reactor accidents would be greater due to the use of MOX fuel. As reflected in the accident analysis included in Section 4.28, the consequences of a beyond-design-basis accident using MOX fuel are generally higher than those expected in the same reactor using low-enriched uranium (LEU) fuel. However, there is no basis for concluding that the frequency of these accidents would increase due to the use of MOX fuel. During the base contract period, the contractor team would work with the utilities to confirm the characteristics of the MOX fuel and whether any design modifications are necessary to maintain safety margins. No change in the frequencies of reactor accidents due to the use of MOX fuel has been made in this SPD Final EIS.

Risk Associated With Reactors Using MOX Fuel. Many commentors were concerned that there is an increase in accident risk from reactors using MOX fuel and that the plutonium in MOX fuel makes a reactor accident more dangerous to human health. There are differences in the expected risk of reactor accidents from the use of MOX fuel. Some accidents would be expected to result in lower consequences to the surrounding population, and thus, lower risks, while others would be expected to result in higher consequences and higher risks. The largest estimated increase in risk to the surrounding population due to the use of MOX fuel is an estimated 14 percent increase in the risk of latent cancer fatalities associated with an interfacing systems loss-of-coolant at North Anna. The likelihood of this accident occurring at North Anna is estimated to be one chance in 4.2 million per year. Before any MOX fuel is used for plutonium disposition, NRC would perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications. Expected risk is discussed in Section 4.28 of this SPD EIS.

Environmental Impacts Associated With Using MOX Fuel Versus LEU Fuel. Comments were received expressing a concern that the SPD Draft EIS failed to recognize avoided environmental impacts associated with using MOX fuel versus LEU fuel in existing commercial reactors. While the consequences of a beyond-design basis accident might be higher (as discussed above), and a slight increase in spent fuel could be expected by using MOX fuel instead of LEU fuel, the impacts associated with mining, milling, and enriching uranium are avoided. Section 4.28.3 has been added to this SPD Final EIS to address this issue.

Low-Level Waste. Comments were received on the isotopic breakdown of the low-level waste (LLW) that would be generated at the reactors using MOX fuel and the effect of this waste on existing burial grounds. There are differences in fission product inventories and activation products between an LEU and MOX core during a fuel cycle. However, the only time significant quantities of fission products could be released to the environment or end up in LLW would be in the event of a large-scale fuel leak. In regard to normal operations, experience with fabricating MOX fuel indicates a leakage rate of less than one-tenth of one percent. The use of MOX fuel would not be expected to result in any additional LLW because the reactors would continue to operate on the same schedule as if they were using only LEU fuel.

Public Hearings. A number of comments were received regarding the need to hold public hearings near the proposed reactor locations. DOE's NEPA regulations require that at least one public hearing be held to receive comments on a draft EIS (10 CFR Part 1021.313[b]). A public hearing was held in Washington, D.C., to collect public comments on the *Supplement*. No additional hearings were held near the specific reactor sites, but comments were solicited in the areas surrounding the proposed reactors. The *Supplement* was sent to interested groups and individuals near each of the reactors and an informational meeting about the proposed use of MOX fuel, sponsored by a South Carolina State Senator, was attended by DOE during the comment period. The transcript of this meeting is presented as Appendix A of the Comment Response Document.

1.7.4 Changes to the SPD Draft EIS and the *Supplement*

DOE revised the SPD Draft EIS and its *Supplement* in response to comments received from other Federal agencies; tribal, State, and local governments; nongovernmental organizations; the general public; and DOE reviews. The text was changed to provide additional environmental baseline information, reflect new technical data, make editorial corrections, respond to comments, and clarify text. Some of these changes involved recalculations of the impacts discussed in Chapter 4. In addition, DOE updated information due to events or decisions made since the SPD Draft EIS and *Supplement* were provided for public comment. Sidebars are used throughout this SPD Final EIS to indicate where changes have been made. Below is a brief discussion of significant (i.e., noneditorial) changes.

Revised Preferred Alternative. In the SPD Draft EIS, DOE's Preferred Alternative for siting the proposed disposition facilities was identified as either Alternative 3 (the pit conversion, immobilization, and MOX facilities at SRS) or Alternative 5 (the pit conversion facility at Pantex and the immobilization and MOX facilities at SRS). Under either alternative, the hybrid approach (i.e., immobilization and MOX) was preferred with the immobilization technology being the can-in-canister approach. No preference was identified in the SPD Draft EIS for the lead assembly or postirradiation examination activities, nor were the specific reactors that would use MOX fuel identified.

The *Supplement* identified SRS as the preferred site for the construction and operation of the pit conversion, immobilization, and MOX facilities. The *Supplement* also identified LANL as the preferred site for lead assembly activities and ORNL as the preferred site for postirradiation examination activities. Section 1.6 of this SPD Final EIS now identifies Alternative 3 as DOE's Preferred Alternative. In addition, Section 2.1.3 now identifies the three reactor sites that have been named as candidates for using MOX fuel subject to NRC license amendment. They are the Catawba Nuclear Station in York County, South Carolina; the McGuire Nuclear Station in Mecklenburg County, North Carolina; and the North Anna Power Station in Louisa County, Virginia.

Changes to the Immobilization Facility. Since the issuance of the SPD Draft EIS and as described in the *Supplement*, DOE has developed a more detailed conceptual design for the can-in-canister immobilization facility. Changes in the size of the immobilization facility have been reflected in Chapter 2 of this SPD Final EIS and the associated impact analyses throughout Chapter 4. No changes have been made to the basic processes proposed in the SPD Draft EIS for immobilization, to the amount of material being considered for immobilization, or to the rate of throughput.

As stated in the *Supplement*, the eight alternatives that included using portions of Building 221–F for immobilization (SPD Draft EIS Alternatives 3B, 5B, 6C, 6D, 7B, 9B, 12B, and 12D) were eliminated. These alternatives are no longer reasonable because the amount of new construction required for the proposed immobilization facility is now nearly the same whether the facility is located entirely in a new building or uses a portion of Building 221–F. Thus, there is no longer any advantage associated with the use of Building 221–F at SRS.

Changes Resulting From the MOX Procurement Process. As stated in the *Supplement*, information provided as part of the MOX procurement process relating to the MOX facility, including the addition of a plutonium-polishing module to the front end of the MOX facility, was analyzed by DOE in an Environmental Critique and summarized in an Environmental Synopsis prepared pursuant to DOE's NEPA regulations in 10 CFR 1021.216. The Synopsis was included in the *Supplement* and has been added to this SPD Final EIS as Appendix P. Appendix N, *Plutonium Polishing*, has been deleted from this SPD Final EIS, with the information in Appendix N incorporated into the body of the EIS. A description of the polishing module has been added to Section 2.4.3, and the impacts analysis has been incorporated into Chapter 4 of this SPD Final EIS. The polishing step is included in the MOX facility, so plutonium polishing is no longer considered as a contingency for the pit conversion facility.

As described in the *Supplement*, the size of the MOX facility has increased. The larger MOX facility is described in Chapter 2 of this SPD Final EIS, and the associated environmental impacts are presented throughout Chapter 4. No changes have been made in the amount of material proposed to be made into MOX fuel, the facility's throughput, or in the overall process to be used to fabricate the fuel.

Information related to the affected environment for the specific domestic commercial reactors that would irradiate the MOX fuel was provided in the *Supplement* and has been added to this SPD Final EIS as a new Section 3.7. Environmental impacts analyzed for the actual reactor sites was also provided in the *Supplement* and has been added to Section 4.28 of this SPD Final EIS.

Possible Delay of the Construction of the Actinide Packaging and Storage Facility. As stated in the *Supplement*, the schedule for the Actinide Packaging and Storage Facility (APSF) is uncertain at this time, and therefore, the disposition facilities at SRS analyzed in this SPD Final EIS were modified to disregard any benefit to the proposed facilities as a result of APSF being present. Chapter 4 of this SPD Final EIS presents the environmental impacts that would be associated with the construction and operation of surplus plutonium disposition facilities at SRS that are stand-alone and include no reliance on storage space or other functions at APSF. Throughout this SPD Final EIS, references to APSF have been qualified by the phrase "if built," and no credit has been taken in the environmental analyses for the presence of APSF.

Pit Repackaging Requirements. This SPD Final EIS was changed to reflect new decisions on the repackaging of pits at Pantex for long-term storage and the impacts of that decision on the need to repackage the pits for offsite transportation.

Pit repackaging for long-term storage. As discussed in the *Supplement*, work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 sealed insert (SI) container for long-term storage,[27] as described in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (DOE 1998c). This effort would be completed over 10 years, and the estimated dose to involved workers received from this repackaging activity would be about 104 person-rem. The SPD Draft EIS analyzed repackaging of the pits in an AT–400A container. The change to the AL–R8 SI changes the undisturbed long-term storage period for pits from 50 to 30 years because of the need to replace a seal in the container after 30 years; the AT–400A does not require that activity. This change has been incorporated into Chapter 4.

Pit repackaging for offsite transportation. The AL–R8 SI is not an offsite shipping container as was the AT–400A analyzed in the SPD Draft EIS. Therefore, if the decision were made to site the pit conversion facility at a site other than Pantex, the surplus pits would have to be taken out of the AL–R8 SI and placed in a shipping container.[28] This operation would also require the replacement of some pit-holding fixtures to meet transportation requirements. It is expected that this change would result in a total repackaging dose to involved workers of 208 person-rem. If the decision were made to locate the pit conversion facility at Pantex, then the pits could be moved from their storage location to the pit conversion facility in the AL–R8 SI using onsite transportation

[27] DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS.*

[28] At the present time, DOE is using the FL container for the offsite shipment of pits. There are not enough of these containers to meet the plutonium disposition mission. No new FL containers can be manufactured because of certification restrictions. Further, the current FL containers cannot be certified for a specific type of surplus pit. The Defense Nuclear Facilities Safety Board, in its Recommendation 99–1 (August 1999), noted that there is no container suitable for shipping pits from Pantex. Should DOE make any decisions that would require shipment of pits from Pantex, DOE would ensure the availability of a certified shipping container in a timeframe that would support those decisions.

vehicles. Under this option, there would be no increased exposures due to repackaging. This change has been incorporated into Chapter 4.

Environmental Impacts Associated With MOX Fuel Versus LEU Fuel. Section 4.28.3 was added to this SPD Final EIS to address the impacts associated with using MOX fuel versus LEU fuel in existing commercial reactors.

Uranium Conversion Impacts. Section 4.30.3, Incremental Impacts Associated With Uranium Conversion, was added to address potential impacts of the conversion of depleted uranium hexafluoride to uranium dioxide. (See Sections 2.4.4.2 and 2.4.4.3 for a discussion on conversion.)

New/Revised Documents and Changes to Cumulative Impacts. Section 1.7 of the SPD Draft EIS, Relationship to Other Actions and Programs, (Section 1.8 in this Final) was updated to reflect new or revised planning documents and related NEPA documents, such as the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment*, the *ROD for the Department of Energy's Waste Management Program: Treatment of Non-Wastewater Hazardous Waste*, the *Advanced Mixed Waste Treatment Project Final EIS* and ROD, and the *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site* and RODs. The information in the most recent programmatic and site documents has been used to update the discussion of cumulative impacts in Section 4.32 of this SPD Final EIS. In addition, cumulative impacts information has been added for LLNL and LANL (two candidate sites for lead assembly fabrication), ORNL (a candidate site for postirradiation examination), and the three reactor sites (Catawba, McGuire, and North Anna).

Affected Environment. Information on the affected environment for ORNL, a candidate site for postirradiation examination, has been added to Chapter 3 of this SPD Final EIS.

Consultations. Appendix O was added to provide the correspondence related to ecological resources, cultural resources, and Native American consultations. Table 5–2 provides a summary of these consultations, and Section 4.26 discusses the results of the consultations.

FFTF. Appendix D of the SPD Draft EIS was deleted. This SPD Final EIS does not address using FFTF because the current DOE proposals do not include the use of surplus plutonium as a fuel source for FFTF.

Comment Response. Volume III, the Comment Response Document, was added to this SPD Final EIS. The comments received during the two comment periods and their responses are presented in a side-by-side-format.

1.8 RELATIONSHIP TO OTHER ACTIONS AND PROGRAMS

The proposed plutonium disposition actions would require coordination with other ongoing DOE programs. This section provides brief summaries of NEPA and other planning documents related to these ongoing programs. Section 1.8.1 includes documents that deal directly with other aspects of the surplus plutonium disposition program, as well as documents from other programs that may provide feed materials for disposition activities. Other documents in this section analyze material treatment or stabilization activities at DOE sites that could yield weapons-usable fissile materials that would be dispositioned pursuant to the analysis in this SPD EIS. Section 1.8.2 includes documents that analyze the management of the various waste types across the DOE complex. Waste generated by the construction and operation of the proposed surplus plutonium disposition facilities would be managed in accordance with decisions made pursuant to the NEPA RODs of these documents. Also, some of the waste planning documents will reflect the waste management and environmental implications of the decisions made as a result of this SPD EIS. Section 1.8.3 highlights some of the documents that deal with

activities currently under way or planned for the SPD EIS candidate sites. The information in the most recent and programmatic site documents are considered in the cumulative impact assessment in Section 4.32.

1.8.1 Materials and Disposition Options

The *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (DOE/EIS-0229, December 1996) analyzes the environmental impacts of alternatives considered for the long-term storage of weapons-usable fissile materials (HEU and plutonium) and for the disposition of weapons-usable plutonium that has been declared surplus to national security needs. The ROD (January 1997) encompasses two categories of plutonium decisions: (1) the sites and facilities for the storage of nonsurplus plutonium and the storage of surplus plutonium pending disposition; and (2) the programmatic strategy for disposition of surplus plutonium. This ROD does not include the final selection of sites for plutonium disposition facilities or the extent to which the two plutonium disposition approaches (immobilization and MOX) will be ultimately implemented. (Those decisions will be based in part on the analysis in this tiered SPD EIS.) However, DOE does announce in the ROD that the list of candidate sites for plutonium disposition has been narrowed. It also announces the decision to store surplus and nonsurplus HEU in upgraded facilities at the Oak Ridge Reservation. DOE studies indicated that significant cost savings could be realized from the transfer of nonpit materials from RFETS and Hanford earlier than indicated in the *Storage and Disposition PEIS* ROD. DOE issued an amended ROD (August 1998) that supports the early closure of RFETS and the early deactivation of plutonium storage facilities at Hanford. The amended ROD includes decisions to accelerate shipment of all nonpit surplus plutonium from RFETS to SRS and the relocation of all Hanford surplus plutonium to SRS, if SRS were selected as the immobilization site. A supplement analysis to the *Storage and Disposition PEIS*, the *Supplement Analysis for Storing Plutonium in the Actinide Packaging and Storage Facility and Building 105–K at the Savannah River Site*, was issued in July 1998.

The *Pit Disassembly and Conversion Demonstration Environmental Assessment and Research and Development Activities* (DOE/EA-1207, August 1998; FONSI, August 1998) analyzes a proposed demonstration project at LANL to determine the feasibility of an integrated pit disassembly and conversion system as part of the surplus plutonium disposition strategy. This demonstration involves the disassembly of up to 250 pits and conversion of the recovered plutonium to plutonium metal ingots and plutonium oxide. The demonstration started in the fall of 1998 and will last up to 4 years. The results of the demonstration will help "fine-tune" the operational parameters of the pit conversion facility. The environmental assessment (EA) also describes ongoing R&D activities related to the disposition of surplus plutonium.

The *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999; FONSI, August 13, 1999) tiers from the *Storage and Disposition PEIS* and analyzes the fabrication and transport of a limited amount of U.S. MOX fuel to a Canadian reactor for test irradiation. Russian MOX fuel would also be irradiated as part of the experiment. The MOX fuel fabricated at LANL would be transported in U.S. Department of Transportation–approved containers by commercial carriers to a Canadian port of entry. At the Canadian border, Atomic Energy of Canada Limited (AECL) would take possession of the fuel and complete the shipment in the U.S. trucks to the National Research Universal (NRU) test reactor at Chalk River Laboratories in Chalk River, Ontario. The AECL would be responsible for conducting all subsequent fuel performance tests in the NRU reactor. All spent fuel resulting from the tests would be disposed of in Canada under the Canadian spent fuel program.

The *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site* (DOE/EIS-0277F, August 1998; ROD, November 1998; ROD, February 1999; Amended ROD, September 1999) evaluates the potential environmental impacts associated with reasonable management alternatives for certain plutonium residues and all scrub alloy currently stored at RFETS near Golden, Colorado. DOE previously decided to stabilize, if necessary, and

repackage the plutonium residues for safe interim storage at RFETS, as discussed in the *Solid Residue Treatment, Repackaging, and Storage Environmental Assessment* (DOE/EA-1120, April 1996; FONSI, April 1996). The management alternatives analyzed in the EIS are no action (which includes the application of variances to safeguards termination limits), processing without plutonium separation, and processing with plutonium separation. The ROD (November 1998) determined that the preferred alternative would be implemented, which includes (1) processing and packaging plutonium residues at RFETS in preparation for disposal at the Waste Isolation Pilot Plant (WIPP); and (2) packaging and shipping sand, slag, crucible and plutonium fluoride residues, and scrub alloy to SRS, where the materials would be stabilized in F-Canyon by chemically separating the plutonium from the remaining materials in the residues and scrub alloy. In a second ROD (February 1999), DOE decided to implement the preferred alternative specified in the final EIS for the remaining categories of materials. In an amended ROD (September 1999), DOE decided to ship the sand, slag, and crucible residues directly to WIPP and not the residues to SRS.

The *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* (DOE/EIS-0269, April 1999; ROD, August 1999) evaluates the environmental impacts of six alternative strategies for the long-term management of DOE-owned depleted uranium hexafluoride currently stored at the East Tennessee Technology Park in Oak Ridge, Tennessee; the Paducah Gaseous Diffusion Plant near Paducah, Kentucky; and the Portsmouth Gaseous Diffusion Plant near Piketon, Ohio. These alternatives involve cylinder technology and design; conversion of depleted uranium hexafluoride to another chemical form; and materials use, storage, disposal, and transportation. As indicated in its ROD, DOE selected the preferred alternative, which is to begin conversion of the depleted uranium hexafluoride as soon as possible, either to uranium oxide, uranium metal, or a combination of both, while allowing for future use of as much of this inventory as possible. This SPD EIS analyzes the conversion of depleted uranium hexafluoride, from a representative site (Portsmouth), to uranium dioxide, which would be used as feedstock for immobilization and MOX fuel and lead assembly fabrication.

[Text deleted.]

1.8.2 Waste Management

The *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE/EIS-0200-F, May 1997; Transuranic [TRU] Waste ROD, January 1998; Hazardous Waste ROD, August 1998) examines the potential environmental and cost impacts of strategic alternatives for managing five types of radioactive and hazardous wastes that have resulted, and will continue to result, from nuclear defense and research activities at a variety of sites around the United States. The WM PEIS provides information on the impacts of various siting configurations that DOE will use to decide at which sites to locate additional treatment, storage, and disposal capacity for each waste configuration. Any waste resulting from actions taken in this SPD EIS would be treated, stored, and disposed of in accordance with the RODs and other decisions resulting from the WM PEIS. To date, three RODs have been issued: for the treatment and storage of TRU waste (January 1998), for the treatment of hazardous waste (August 1998), and for the storage of HLW (August 1999). The TRU waste ROD determined that those DOE sites that currently have or will generate TRU waste will prepare it for storage and store it on the site, the only exception being that Sandia National Laboratory will transfer its TRU waste to LANL. The Hazardous Waste ROD decided that DOE will continue use of offsite facilities for the treatment of nonwastewater hazardous waste based on analysis from the WM PEIS. The Oak Ridge Reservation and SRS will treat some of their own nonwastewater hazardous waste on the site. The HLW ROD decided that immobilized HLW will be stored at Hanford, INEEL, SRS, and the West Valley Demonstration Project in New York until a geologic repository is licensed by NRC.

The *Waste Isolation Pilot Plant Final Environmental Impact Statement* (DOE/EIS-0026, October 1980; ROD, January 1981) and associated supplements (DOE/EIS-0026-S-1, January 1990; ROD, June 1990; and DOE/EIS-0026-S-2, September 1997; ROD, January 1998) analyze the development, operation, and transportation activities associated with WIPP, a mined repository for TRU waste near Carlsbad, New Mexico. TRU waste produced as a result of surplus plutonium disposition activities would be required to meet the WIPP waste acceptance criteria and would ultimately be disposed of at WIPP. This EIS covers transportation from all the SPD EIS candidate sites except Pantex. Therefore, transportation of TRU waste from Pantex to WIPP is analyzed in this SPD EIS.

The *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999) analyzes the construction, operation and monitoring, and eventual closure of a potential geologic repository at Yucca Mountain to dispose of commercial and DOE spent nuclear fuel, high-level radioactive waste, and materials that NRC determines by rule require the same degree of isolation. National transportation, Nevada transportation, and waste packaging are evaluated as part of the analysis. Three implementing design alternatives based on thermal load—low, intermediate, and high—are examined. High-level waste with immobilized plutonium and spent fuel produced from SPD EIS plutonium immobilization and MOX alternatives are included in the inventory analyzed in that EIS. This SPD EIS assumes for the purposes of analysis that Yucca Mountain is a potential geologic repository site.

The *Accelerating Cleanup: Paths to Closure* (DOE/EM-0362, June 1998) is DOE's blueprint for cleanup. It provides DOE's detailed projections on the scope, schedules, and costs for the cleanup of contaminated soil, groundwater, and facilities; treatment, storage, and disposal of waste; and effective management of nuclear materials and spent nuclear fuel. Included in the report are site waste and material disposition flow charts that describe each stream, the steps for processing or managing the wastes, and the permanent waste disposal sites that have been designated. This document is not a plan or a decisionmaking document; it describes the status and direction of DOE's draft cleanup strategy. Appropriate NEPA reviews will be conducted before any decisions are made. This SPD EIS reflects the proposals in *Paths to Closure* to the extent possible. Subsequent versions of *Paths to Closure* will reflect the waste management and environmental restoration implications of the decisions made as a result of this SPD EIS.

1.8.3 SPD EIS Candidate Sites

The *Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement* (TWRS EIS) (DOE/EIS-0189, August 1996; ROD, February 1997) satisfies the DOE commitment made in the *Disposal of Hanford Defense High-Level, Transuranic and Tank Waste Final Environmental Impact Statement* (DOE/EIS-0113, December 1987; RODs, March and April 1988) to prepare a supplemental NEPA analysis. The TWRS EIS was prepared in response to several important changes subsequent to the ROD, including a revised strategy for managing and disposing of tank waste and encapsulated cesium and strontium. The TWRS EIS evaluates, as a part of the proposed action: continued operation and management of the tank farms; waste transfer system upgrades; and retrieval and treatment of the tank waste, which would include the construction and operation of a facility to vitrify HLW and vitrify or similarly immobilize the low-activity waste. DOE decided to implement the preferred alternative for retrieval, treatment, and disposal of tank waste and to defer a decision on the disposition of cesium and strontium capsules. Two supplement analyses to the EIS were prepared for the TWRS EIS. The first was the *Proposed Upgrades to the Tank Farm Ventilation, Instrumentation, and Electrical Systems under Project W-314 in Support of Tank Farm Restoration and Safe Operations* (DOE/EIS-0189-SA1, June 1997). Based on this supplement analysis, upgrades or planned upgrades to the tank farm do not pose any additional potential environmental impacts, and therefore no additional NEPA analysis is required. The second supplement analysis was for the *Tank Waste Remediation System* (DOE/EIS-0189-SA2, May 1998). The analysis provides information on the most recent inventory of chemical

and radiological constituents in the tanks and new waste that is to be sent to the tanks for treatment. Based on the new data, it was concluded that there would be minimal changes from the impacts identified in the TWRS EIS, and therefore, no additional NEPA analysis is required.

The *Plutonium Finishing Plant Stabilization Final Environmental Impact Statement* (DOE/EIS-0244F, May 1996; ROD, July 1996) analyzes the potential environmental impacts of alternative approaches to: (1) stabilization of residual plutonium-bearing materials at the Hanford Plutonium Finishing Plant (PFP) to a form suitable for long-term storage; (2) removal of readily retrievable plutonium-bearing materials left behind in process equipment, process areas, and air quality and liquid waste management systems as a result of historic uses; and (3) interim storage of stabilized fissile material in existing PFP vaults pending decisions on ultimate storage and disposition of the material. DOE decided to remove readily retrievable plutonium-bearing materials in holdup at PFP. Following their stabilization, plutonium-bearing materials will be in a form suitable for interim storage in existing vaults at PFP. These materials are included in the plutonium inventory addressed in this SPD EIS. Other plutonium-bearing material having low plutonium content (less than 50 percent by weight) and meeting criteria established by DOE may be treated at PFP using a cementation process.

The *Final Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan,* (DOE/EIS-0222-F, September 1999) revises the scope of the EIS and alternatives in response to comments received on the original draft. The final EIS focuses on developing an overall strategy for future land use at Hanford and includes a proposed comprehensive land-use plan. The preferred alternative is to consolidate waste management operations in the Central Plateau, allow industrial development in the eastern and southern portions of the site, increase recreational access to the Columbia River, and expand Saddle Mountain National Refuge to include all of the Wahluke Slope, McGee Ranch, and Fitzner-Eberhardt Arid Lands Ecology Reserve.

The *Hanford Reach of the Columbia River Comprehensive River Conservation Study and Environmental Impact Statement* (Final, June 1994, National Park Service) evaluates protecting the Hanford Reach of the Columbia River in terms of its designation as a Wild and Scenic River, provisions for recreation access, and visitor interpretation and education.

The *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS-0203-F, April 1995; ROD, May 1995) is a complex-wide evaluation of alternatives for managing, through the year 2035, existing and reasonably foreseeable amounts of spent nuclear fuel within the DOE inventory. The EIS contains an analysis of the transportation of spent nuclear fuel, as well as sitewide alternatives for environmental restoration and waste management programs at the Idaho National Engineering Laboratory (INEL, now INEEL). The ROD designated Hanford, INEEL, and SRS for regional spent fuel storage and management, and made decisions for environmental restoration and waste management at INEEL. In March 1996, DOE issued an amendment to the May 1995 ROD to include a decision to regionalize the management of DOE-owned spent nuclear fuel by fuel type, including spent fuel currently stored at Hanford, INEEL, and SRS.

The *Final Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel* (DOE/EIS-0218F, February 1996; ROD, July 1996) evaluates the adoption of a joint DOE/Department of State policy to manage spent nuclear fuel from foreign research reactors, including HEU provided by the United States to other countries for research reactors. Management alternatives include a number of implementation options for port selection, transportation, and storage at DOE sites. The ROD selected a management policy that provided for the return to the United States of spent fuels from various research reactors, using two designated U.S. ports, and the management at INEEL and SRS. A supplement analysis (DOE/EIS-0218-SA-2, August 1998) was prepared to examine acceptance of foreign research reactor spent nuclear fuel under three scenarios not specifically examined in the EIS: (1)

accepting spent fuel not included in EIS-estimated inventories, (2) accepting spent fuel from countries in quantities greater than those identified in the EIS, and (3) transporting more than eight casks of spent fuel on a single ocean-going vessel. The supplement analysis concluded that the potential environmental impacts of these actions are bounded by the analysis performed in the EIS and, therefore, no supplement to the EIS need be prepared.

The DOE INEEL *Advanced Mixed Waste Treatment Project Final Environmental Impact Statement* (DOE/EIS-0290, January 1999; ROD, April 1999) evaluates four alternatives: (1) No Action Alternative under which existing waste management operations, facilities, and projects would continue; (2) the proposed action/preferred alternative under which BNFL, Inc., would build and operate an Advanced Mixed Waste Treatment Project (AMWTP) facility using proposed thermal and nonthermal treatment technologies for certification and shipment to WIPP or another acceptable disposal facility; (3) nonthermal treatment alternative under which some treatment of transuranic, alpha low-level mixed, and low-level mixed wastes would occur at an AMWTP facility at the same location as the proposed action, and wastes that require thermal treatment would be repackaged for storage; and (4) treatment and storage alternative, which would include the same processes as the proposed action/preferred alternative except treated waste would be placed in Resource Conservation and Recovery Act–permitted storage units at the onsite Radioactive Waste Management Complex for long-term storage. In the ROD, DOE selected the preferred alternative.

The *Final Environmental Impact Statement and Environmental Impact Report for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore* (DOE/EIS-0157, August 1992; ROD, January 27, 1993) evaluates the proposed action of ongoing and proposed facilities and activities at LLNL and Sandia National Laboratories, including near-term (within 5 to 10 years) proposed projects. Three other alternatives analyzed include no action, modification of operations, and shutdown and decommissioning. This EIS updates the sitewide EIS issued in 1982. A decision was made in the ROD to continue operations as outlined in the proposed action. A supplement analysis (DOE/EIS-0157-SA-01, March 1999) was prepared to examine current project and program plans and proposals for operations and identify new or modified projects or operations for the period 1998 to 2002 that were not considered in the 1992 EIS. The supplement analysis concluded that either the projected impacts are within the bounds of the 1992 EIS, the impacts were anticipated by mitigation measures established in the 1992 EIS, or the incremental differences in impacts are not significant; therefore, no supplementation to the 1992 EIS is needed.

The *Site-Wide Environmental Impact Statement for the Continued Operation of the Los Alamos National Laboratory* (DOE/EIS-0238, January 1999; ROD, September 1999) evaluates ongoing and reasonably foreseeable new operations and facilities at LANL in support of DOE missions. This sitewide EIS updates the LANL sitewide EIS issued in 1979. Currently, small-scale R&D activities related to pit disassembly and conversion and MOX fuel fabrication are being conducted at LANL. Chapter 1, Section 1.8, of the sitewide EIS describes the SPD EIS as a related NEPA document. A description of the proposed MOX fuel lead assembly fabrication is included in Chapter 2, Background on Los Alamos National Laboratory Facilities and Activities, in Sections 2.2.2.2 and 2.2.2.15. Impacts of MOX fuel lead assembly fabrication are included in the cumulative impacts section of the LANL sitewide EIS, Sections 5.6.1.3, 5.6.1.7, 5.6.1.8, and 5.6.1.9. A decision was made in the LANL ROD to implement the preferred alternative, which includes expansion of operations, as the need arises, an increase in the level of existing operations to the highest reasonably foreseeable levels, and full implementation of the mission elements assigned to LANL.

The *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996; ROD, January 1997) evaluates all current and proposed facilities and activities at Pantex, including weapons dismantlement and storage of the resulting nuclear materials and classified weapons components in the near term (over a 5- to 10-year period). This sitewide EIS addresses alternative interim storage sites for Pantex plutonium pits, some of which will

ultimately be disposed of as determined in this SPD EIS. A supplement analysis to the Pantex EIS was issued, *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998), to determine the potential impacts associated with repackaging pits into AL–R8 SI containers as opposed to the AT–400A container originally considered. The analysis concluded that the AL–R8 SI met the requirements that were established in the EIS for pit storage at Pantex and that no further NEPA documentation would be required. However, the seals in the AL–R8 SI containers must be changed after 30 years of storage,[29] and the pit-holding fixture in many of the AL–R8 SI containers must be modified. New shipping containers are also required to augment the limited number of existing shipping containers.

The *Final Environmental Impact Statement, Construction and Operation of the Spallation Neutron Source* (DOE/EIS-0247, April 1999; ROD, June 1999) analyzes the potential environmental impacts of constructing and operating a state-of-the-art Spallation Neutron Source facility at one of four sites: ORNL (preferred alternative); Argonne National Laboratory in Argonne, Illinois; Brookhaven National Laboratory in Upton, New York; and LANL. The ROD designated ORNL as the chosen site for the facility.

The *Final Environmental Assessment for Wastewater Treatment Capability Upgrade* (DOE/EA-1190, April 1999; FONSI, May 27, 1999) analyzes a proposed action to design, build, and operate a new wastewater treatment facility at Pantex.

The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (DOE/EIS-0236, September 1996; ROD, December 1996) evaluates the potential environmental impacts resulting from activities associated with nuclear weapons research, design, development, and testing, as well as the assessment and certification of their safety and reliability. The stewardship portion of the document analyzes the development of three new facilities to provide enhanced experimental capabilities. The stockpile management portion of the EIS concerns producing, maintaining, monitoring, refurbishing, and dismantling the nuclear weapons stockpile at eight sites, including Pantex and SRS. A decision was made in the ROD to downsize a number of facilities for stockpile dismantlement, and to build experimental facilities at LLNL. A draft supplement analysis (DOE/EIS-0236-SA6, June 1999) was prepared to examine the plausibility of a building-wide fire at LANL's plutonium facility and to look at new studies regarding seismic hazards at LANL. The draft supplement analysis was issued for public comment, and a final supplement analysis was issued on September 2, 1999. The supplement analysis concluded that there is no need to prepare a supplemental EIS.

The *Final Environmental Impact Statement, Interim Management of Nuclear Materials* (DOE/EIS-0220, October 1995) analyzes the potential environmental impacts of the management of certain nuclear materials at SRS pending decisions on their future use or ultimate disposition. The EIS includes an analysis of the construction of the SRS Actinide Packaging and Storage Facility. Five RODs have been issued since the Final EIS was published. On December 12, 1995, DOE issued a ROD and Notice of Preferred Alternatives (60 FR 65300) on the interim management of several categories of nuclear materials at SRS. DOE decided to stabilize plutonium and uranium stored in vaults using a combination of management methods. On February 8, 1996, DOE issued a supplemental ROD (61 FR 6633) on the stabilization of two of the remaining categories of nuclear materials (Mark-16 and Mark-22 fuels and other aluminum-clad targets) analyzed in the Final EIS. After considering a DOE staff study and recommendation on canyon facility utilization, DOE issued a second supplemental ROD on September 6, 1996 (61 FR 48474) for stabilization of the neptunium 237 solutions, obsolete neptunium targets, and plutonium 239 solutions. On April 2, 1997, DOE issued a third supplemental ROD (62 FR 17790) on stabilization in the F-Canyon and FB-Line facilities of the remaining

[29] This means that the undisturbed storage period changes from 50 to 30 years. See Section 1.7.4 for additional details on the effect of the AL–R8 SI decision on the surplus plutonium disposition program.

Taiwan Research Reactor spent nuclear fuel. In October 1997, DOE issued a fourth supplemental ROD to add an additional method, processing and storage for vitrification in DWPF, to those being used in the management of plutonium and uranium stored in vaults; and to amend its September 6, 1996, ROD to provide for use of the H-Canyon facilities to stabilize, to oxide forms, the plutonium 239 and neptunium 237 solutions stored in H-Canyon and obsolete neptunium 237 targets stored in K-Reactor.

The *Savannah River Site Waste Management Final Environmental Impact Statement* (DOE/EIS-0217, July 1995; ROD, September 1995) analyzes future SRS waste management needs for all waste types over the next 30 years, including the treatment, storage, and disposal of high-level, low-level, mixed, hazardous, and TRU wastes generated from environmental restoration, facility operations, and D&D of buildings. In the ROD, DOE selected phased approaches to waste treatment, storage, and disposal facilities identified in the Final EIS.

The *Spent Nuclear Fuel Management Draft Environmental Impact Statement* (DOE/EIS-0279D, December 1998) evaluates processes for the safe and efficient management of spent nuclear fuel and targets at SRS, including placing these materials in forms suitable for ultimate disposition. Alternatives analyzed include new packaging, new processing, and conventional processing technologies, as well as the No Action Alternative. The preferred alternative for 97 percent of the volume is to use a melt and dilute treatment process. The remaining 3 percent would be managed using conventional processing.

The *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE/EIS-0240, June 1996; ROD, July 1996) addresses the disposition of a nominal 200 t (220 tons) of HEU declared surplus to the national security needs of the United States. Alternatives include several approaches to blending down the highly enriched material to make it nonweapons usable and suitable for fabrication into fuel for commercial nuclear reactors. The ROD calls for blending, over time, as much material as possible (up to 85 percent) for commercial use, and blending the remainder for disposal as LLW. Blending sites include SRS.

The *F-Canyon Plutonium Solutions at Savannah River Site Final Environmental Impact Statement* (DOE/EIS-0219, December 1994; ROD, February 1995) evaluates alternatives to stabilize plutonium solutions currently stored in F-Canyon at SRS before their disposition as determined in this SPD EIS. The alternatives examined are taking no action, processing the solutions to plutonium metal, processing the solutions to plutonium dioxide, and transferring the solutions to the HLW tanks for vitrification in DWPF. DOE has processed the plutonium solutions to a metal form using the F-Canyon and FB-Line facilities at SRS.

The *Final Supplemental Environmental Impact Statement, Defense Waste Processing Facility* (DOE/EIS-0082-S, November 1994; ROD, April 1995) assesses the environmental impacts of the construction and operation of DWPF at SRS as modified from the original design addressed in a 1982 EIS. DWPF includes the HLW pretreatment process, the vitrification facility, facilities for the manufacture and disposal of saltstone (LLW resulting from the pretreatment of HLW), radioactive glass waste storage facilities, and associated support facilities. DOE is currently preparing a second supplement, which was announced in the Federal Register on February 22, 1999 (64 FR 8558), on the proposed replacement of the In-Tank Precipitation (ITP) process at SRS. The ITP process as presently configured cannot achieve production goals and safety requirements. Three alternative processes are being evaluated: small tank precipitation, ion exchange, and direct grout. Because replacement of the ITP process constitutes a substantial change to the operation of DWPF as evaluated in the *1994 Supplemental EIS*, DOE is preparing a second supplemental EIS that addresses the potential environmental impacts of ITP process alternatives. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent on DWPF providing vitrified HLW with sufficient radioactivity.

The *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE/EIS-0161, October 1995; ROD, December 5, 1995) evaluates the siting, construction, and operation of tritium supply technology alternatives and recycling facilities at five candidate sites, as well as the use of a commercial reactor

for producing tritium. The ROD determined that a dual-track approach would be used. One track explores the purchase of an operating or partially complete commercial light water reactor or the purchase of irradiation services from such a reactor. The second track would design, build, and test critical components of an accelerator system for production of tritium. The ROD states that DOE would select one of the alternatives at a later date to serve as the primary source of tritium for the nuclear weapons stockpile, with the other alternative developed as a back-up source, if feasible. SRS was selected as the location for the accelerator. (See Consolidated ROD discussion below.)

The *Final Environmental Impact Statement for Accelerator Production of Tritium at the Savannah River Site* (DOE/EIS-0270, March 1999; Consolidated ROD, May 1999) evaluates the siting, construction, and operation of a linear accelerator at SRS that would produce tritium, a gaseous radioactive isotope of hydrogen considered essential to the operation of U.S. thermonuclear weapons. DOE issued a Consolidated ROD that made the following decisions: (1) the use of commercial light water reactors is the primary source of tritium supply; (2) the accelerator at SRS is the backup tritium supply source, but will not be constructed; (3) the Tennessee Valley Authority's Watts Bar Unit 1 and Sequoyah Unit 1 and 2 reactors are the specific reactors that will provide irradiation services for tritium supply; (4) the H-Area location at SRS is the location for a new tritium extraction facility; and (5) the location and various technologies required to develop the accelerator as a backup to the commercial light water reactors are identified.

The *Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor* (DOE/EIS-0288, March 4, 1999; Consolidated ROD, May 1999) evaluates the production of tritium at one or more of five commercial light water reactors, including the transportation of irradiated tritium-producing burnable absorber rods from the reactors to the proposed tritium extraction facility at SRS. (See Consolidated ROD discussion above.)

The *Final Environmental Impact Statement for Construction and Operation of a Tritium Extraction Facility at the Savannah River Site* (DOE/EIS-0271, March 1999; Consolidated ROD, May 1999) evaluates the construction and operation of a facility for the extraction of tritium to support the DOE tritium production capability. (See Consolidated ROD discussion above.)

The *Final Environmental Impact Statement for Shutdown of the River Water System at Savannah River Site* (DOE/EIS-268, May 1997; ROD, January 1998) evaluates the shutdown of the River Water System used to pump large quantities of water from the Savannah River for cooling purposes within SRS. Alternatives for placing all or part of the system in standby mode are also considered. The ROD selected the No Action Alternative, that is, continuing the maintenance and operation of the Savannah River Water System for the foreseeable future.

The *Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above the Maximum Historical Storage Level at the Y–12 Plant, Oak Ridge, Tennessee* (DOE/EA-0929, September 1994; FONSI, September 1995) analyzes the continued receipt, prestorage processing, and interim storage of enriched uranium in quantities that would exceed the historic maximum storage level. On the basis of this EA, DOE determined that Y–12 would store no more than 500 t (551 tons) of HEU and no more than 6 t (6.6 tons) of LEU. HEU recovered from the SPD EIS pit conversion facility would be shipped to Y–12 for interim storage pending disposition.

The *Notice of Intent to Prepare a Site-Wide Environmental Impact Statement for the Oak Ridge Y–12 Plant* (64 FR 13179) was published March 17, 1999. The EIS will analyze current levels of Y–12 operations and foreseeable new operations and facilities for approximately the next 10 years. The EIS will also provide a baseline of impacts associated with current activities, analyze the potential impacts of constructing a new enriched uranium storage facility, and address siting issues associated with other possible modernization projects. HEU

received from the pit conversion facility would be shipped to Y–12 for interim storage pending disposition. HEU storage at Y–12 could be affected by decisions made in the EIS.

1.8.4 Cooperating Agencies

In May 1997, DOE notified several agencies, including NRC and the U.S. Environmental Protection Agency (EPA), that this SPD EIS was being prepared. On November 10, 1997, NRC informed DOE that it would be a "commenting" rather than "cooperating" agency.[30] In keeping with this decision, DOE provided copies of the SPD Draft and Final EIS and *Supplement* to NRC for comment. No agencies other than EPA have decided to be a cooperating agency for this SPD EIS.

1.9 ORGANIZATION OF THIS SPD EIS

This SPD EIS consists of three volumes. Volume I contains the main text of the EIS. Volume II contains technical appendixes that provide supporting details for the analyses in Volume I, as well as additional project information. Volume III contains the comments received on the Draft EIS during the public review periods, along with the DOE responses to these comments. An EIS Summary is also available.

Volume I consists of Chapters 1 through 9. Chapter 2 describes the surplus plutonium disposition alternatives, how the alternatives were developed, and the proposed types of disposition facilities. It also provides a comparison of the alternatives. Chapter 3 describes the potentially affected environments at the candidate sites. Chapter 4 provides summary descriptions of the potential impacts of the proposed action and alternatives on 13 resource areas. This chapter also describes cumulative impacts, D&D and deactivation and stabilization, irreversible and irretrievable commitments of resources, and the relationship between short-term uses of the environment and long-term productivity. Chapter 5 provides a description of the environmental and health and safety compliance requirements governing implementation of the alternatives and includes the status of required consultations with Federal, State, and local agencies. References are included at the end of each chapter. Chapters 6, 7, 8, and 9 are the glossary of terms, the list of SPD EIS preparers, the SPD EIS distribution list, and the index, respectively.

Volumes II and III provide information that supports Volume I. Volume II consists of 16 appendixes and includes background documents, process descriptions, facility data, descriptions of methods used to estimate environmental impacts of the alternatives, and the detailed impact analysis. Volume III includes the comments received on the SPD Draft EIS and the *Supplement*, the responses to the comments, and a brief summary of changes made to the SPD Draft EIS and the *Supplement* in response to the comments.

1.10 REFERENCES

DOE (U.S. Department of Energy), 1996a, *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement*, DOE/EIS-0229, Office of Fissile Materials Disposition, Washington, DC, December.

DOE (U.S. Department of Energy), 1996b, *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement*, DOE/EIS-0240, Office of Fissile Materials Disposition, Washington, DC, June.

[30] A cooperating agency participates in the NEPA process at the request of the lead agency developing an EIS. The cooperating agency is involved in the scoping process and may develop information and prepare environmental analyses in its area of special expertise and make available staff support to the lead agency (40 CFR 1501.6, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act)*. The lead agency may also request other agencies to comment on a draft EIS (40 CFR 1503.1).

DOE (U.S. Department of Energy), 1996c, *Record of Decision for the Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement*, 61 FR 40619, Office of the Federal Register, Washington, DC, August 5.

DOE (U.S. Department of Energy), 1997a, *Record of Decision for the Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement*, 62 FR 3014, Office of the Federal Register, Washington, DC, January 14.

DOE (U.S. Department of Energy), 1997b, *Notice of Intent to Prepare a Surplus Plutonium Disposition Environmental Impact Statement*, 62 FR 28009, Office of the Federal Register, Washington, DC, May 22.

DOE (U.S. Department of Energy), 1998a, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition*, rev. 0, DOE/MD-0009, Office of Fissile Materials Disposition, Washington, DC, July 22.

DOE (U.S. Department of Energy), 1998b, *Pit Disassembly and Conversion Demonstration Environmental Assessment and Research and Development Activities*, DOE/EA-1207, Office of Fissile Materials Disposition, Washington, DC, August.

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DOE (U.S. Department of Energy), 1999b, *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document*, MD-0013, Office of Fissile Materials Disposition, Washington, DC, November.

DOE (U.S. Department of Energy), 1999c, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*, DOE/EIS-0250D, Office of Civilian Radioactive Waste Management, North Las Vegas, NV, July.

Paperiello, C.J., 1999, U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Washington, DC, personal communication (letter) to L. Barrett, U.S. Department of Energy, Office of Civilian Radioactive Waste Management, Washington, DC, *U.S. Department of Energy Plans for Disposal of Surplus Weapons Plutonium*, January 25.

White, V.S., 1997, *Initial Data Report in Response to the Surplus Plutonium Disposition Environmental Impact Statement Data Call for the UO_2 Supply*, rev. 1, ORNL/TM-13466, Lockheed Martin Energy Research Corporation, Oak Ridge, TN, November.

White House, 1993, *Nonproliferation and Export Control Policy*, Office of the Press Secretary, Washington, DC, September 27.

White House, 1994, *Joint Statement by the President of the Russian Federation and the President of the United States of America on Non-Proliferation of Weapons of Mass Destruction and the Means of Their Delivery*, Office of the Press Secretary, Washington, DC, January 14.

Chapter 2
Alternatives for Disposition of Surplus Weapons-Usable Plutonium

2.1 ALTERNATIVES ANALYZED IN THIS SPD EIS

This *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) analyzes the potential environmental impacts associated with implementing the disassembly of pits (a component of nuclear weapons) and conversion of the recovered plutonium and clean plutonium metal at four candidate U.S. Department of Energy (DOE) sites; conversion and immobilization of plutonium from nonpit sources at two candidate DOE sites; and mixed oxide (MOX) fuel fabrication activities at four candidate DOE sites. This SPD EIS also evaluates immobilizing plutonium in ceramic or glass forms, and compares the can-in-canister approach with the homogenous ceramic immobilization and vitrification approaches that were evaluated in the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement (Storage and Disposition PEIS)* (DOE 1996a). As part of the MOX option, this SPD EIS also evaluates the potential impacts of fabricating MOX fuel lead assemblies (for test irradiation in domestic, commercial nuclear power reactors) at five candidate DOE sites, subsequent postirradiation examination of the lead assemblies at two candidate DOE sites, and addresses the impacts of irradiating MOX fuel in domestic, commercial reactors. Figure 2–1 is a map of the United States that identifies the proposed locations of the surplus plutonium disposition facilities.

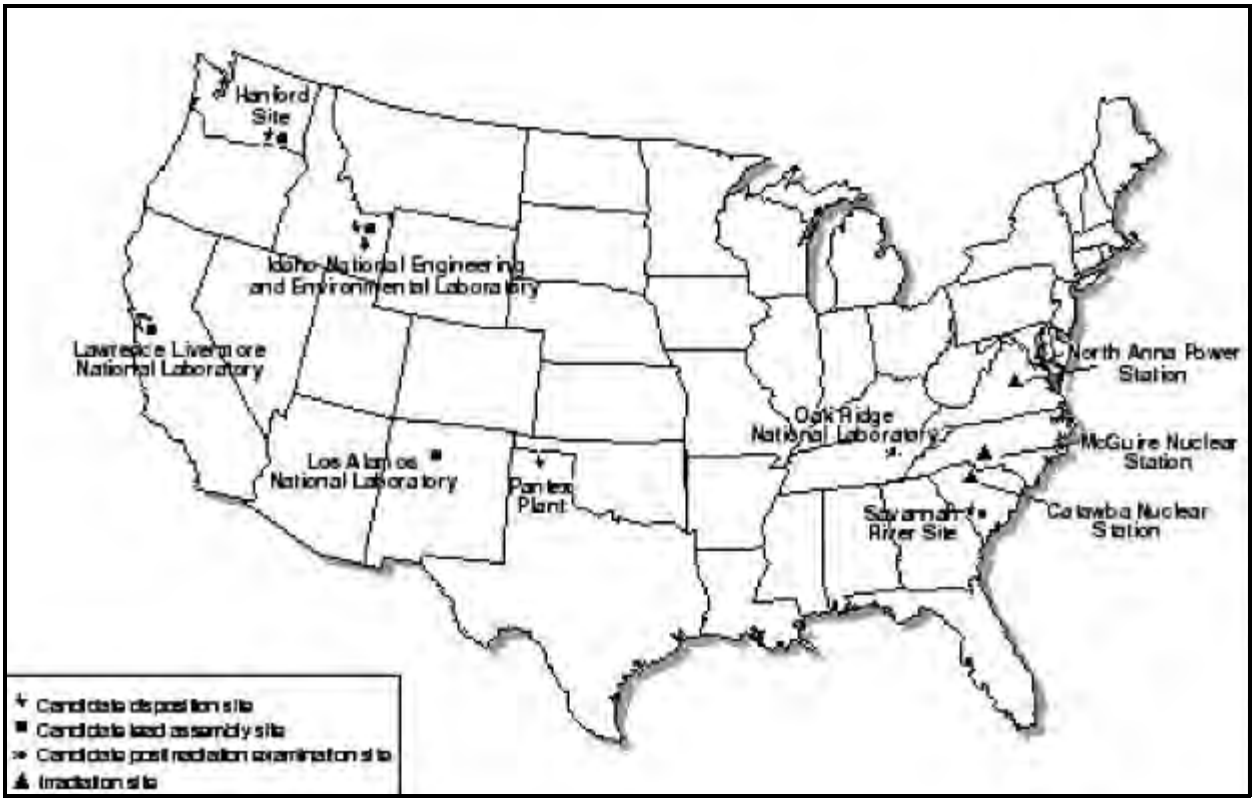


Figure 2–1. Proposed Locations of Surplus Plutonium Disposition Facilities

2.1.1 Surplus Plutonium Disposition Facility Alternatives

The alternatives analyzed in this SPD EIS are based on decisions announced in the Record of Decision (ROD) for the *Storage and Disposition PEIS*, as summarized in Chapter 1. Those decisions include:

- Combining the plutonium conversion and immobilization functions into a single facility,
- Pursuing the siting of a pit disassembly and conversion facility (pit conversion facility), a plutonium conversion and immobilization facility (immobilization facility), and a MOX fuel fabrication facility (MOX facility), and
- Reducing the number of possible disposition sites to be considered from six to four.

Fifteen surplus plutonium disposition alternatives and the No Action Alternative are shown in Table 2–1 and described in detail in Sections 2.5 through 2.16. The 15 action alternatives are organized into 11 sets of alternatives, reflecting various combinations of facilities and candidate sites, as well as the use of new or existing buildings. For example, Alternative 6, which would locate the pit conversion and MOX facilities at the Hanford Site (Hanford), and the immobilization facility at the Savannah River Site (SRS), has two variations, denoted as 6A and 6B. The variations occur because the MOX facility could be in new construction or in the Fuel and Materials Examination Facility (FMEF) at Hanford.

Each of the 15 alternatives includes a pit conversion facility, but additional facilities in each alternative vary depending on the amount of plutonium to be immobilized. Alternatives 2 through 10 involve the hybrid approach of immobilizing 17 t (19 tons) of surplus plutonium and using 33 t (36 tons) for MOX fuel, and therefore, require all three facilities. Alternatives 11 and 12 involve immobilizing all 50 t (55 tons), and therefore, only include a pit conversion facility and an immobilization facility.

Alternative 1, the No Action Alternative, does not involve disposition of surplus weapons-usable plutonium, but instead addresses continued storage of the plutonium in accordance with the *Storage and Disposition PEIS* ROD (DOE 1997a) and amended ROD (DOE 1998a).[1] Figures 2–2, 2–3, 2–4, and 2–5 are regional maps of the four candidate disposition sites: Hanford, Idaho National Engineering and Environmental Laboratory (INEEL), the Pantex Plant (Pantex), and SRS.

2.1.2 Immobilization Technology Alternatives

The *Storage and Disposition PEIS* discusses several immobilization technologies, including the homogenous ceramic and vitrification alternatives that were evaluated in detail, as well as the variants to those alternatives, which included the ceramic and glass can-in-canister approaches and another homogenous approach using an adjunct melter (discussed further in Appendix C of this SPD EIS). The ROD for the *Storage and Disposition PEIS* states that DOE would make a determination on the specific technology on the basis of "the follow-on EIS." This SPD EIS is that follow-on EIS, and identifies the ceramic can-in-canister approach as the preferred immobilization technology.

In order to bound the estimate of potential environmental impacts associated with ceramic and glass immobilization technologies, the *Storage and Disposition PEIS* analyzes the construction and operation of

[1] Should the No Action Alternative be chosen, the ROD pursuant to this SPD EIS would also address the movement of the remaining surplus nonpit plutonium from RFETS in support of its planned closure in 2006.

vitrification and ceramic immobilization facilities that use a homogenous approach. These facilities are based on generic designs that do not involve the use of existing facilities or specific site locations. These generic

Table 2–1. Surplus Plutonium Disposition Facility Alternatives Evaluated in This SPD EIS

Alternative	Pit Disassembly and Conversion	Plutonium Conversion and Immobilization	MOX Fuel Fabrication	Disposition Amounts (Plutonium)
1	**No Action**			
2	Hanford (FMEF)	Hanford (FMEF and HLWVF)	Hanford (New)	17 t Immobilization/ 33 t MOX
3	SRS (New)	SRS (New and DWPF)	SRS (New)	17 t Immobilization/ 33 t MOX
4A	Pantex (New)	Hanford (FMEF and HLWVF)	Hanford (New)	17 t Immobilization/ 33 t MOX
4B	Pantex (New)	Hanford (FMEF and HLWVF)	Hanford (FMEF)	17 t Immobilization/ 33 t MOX
5	Pantex (New)	SRS (New and DWPF)	SRS (New)	17 t Immobilization/ 33 t MOX
6A	Hanford (FMEF)	SRS (New and DWPF)	Hanford (New)	17 t Immobilization/ 33 t MOX
6B	Hanford (FMEF)	SRS (New and DWPF)	Hanford (FMEF)	17 t Immobilization/ 33 t MOX
7	INEEL (FPF)	SRS (New and DWPF)	INEEL (New)	17 t Immobilization/ 33 t MOX
8	INEEL (FPF)	Hanford (FMEF and HLWVF)	INEEL (New)	17 t Immobilization/ 33 t MOX
9	Pantex (New)	SRS (New and DWPF)	Pantex (New)	17 t Immobilization/ 33 t MOX
10	Pantex (New)	Hanford (FMEF and HLWVF)	Pantex (New)	17 t Immobilization/ 33 t MOX
11A	Hanford (FMEF)	Hanford (FMEF and HLWVF)	NA	50 t Immobilization/ 0 t MOX
11B	Pantex (New)	Hanford (FMEF and HLWVF)	NA	50 t Immobilization/ 0 t MOX
12A	SRS (New)	SRS (New and DWPF)	NA	50 t Immobilization/ 0 t MOX
12B	Pantex (New)	SRS (New and DWPF)	NA	50 t Immobilization/ 0 t MOX
[Text deleted.] Alternatives 3B, 5B, 6C, 6D, 7B, 9B, 12B, and 12D in the SPD Draft EIS have been deleted. Alternative 12C has been renumbered as 12B.[a]				

[a] Section 2.3.2.2 explains the deletion of these alternatives.

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; FPF, Fuel Processing Facility; HLWVF, high-level-waste vitrification facility (planned); NA, not applicable.

designs allow for surplus plutonium to be immobilized in a homogenous form, either within a ceramic matrix and formed into disks, or vitrified as borosilicate glass logs.

In order to support a decision on the immobilization technology and form, this SPD EIS evaluates the potential environmental impacts of the ceramic and glass can-in-canister technologies, and compares those impacts with the impacts of the homogenous facilities evaluated in the *Storage and Disposition PEIS*. This comparison is presented in Section 4.29.

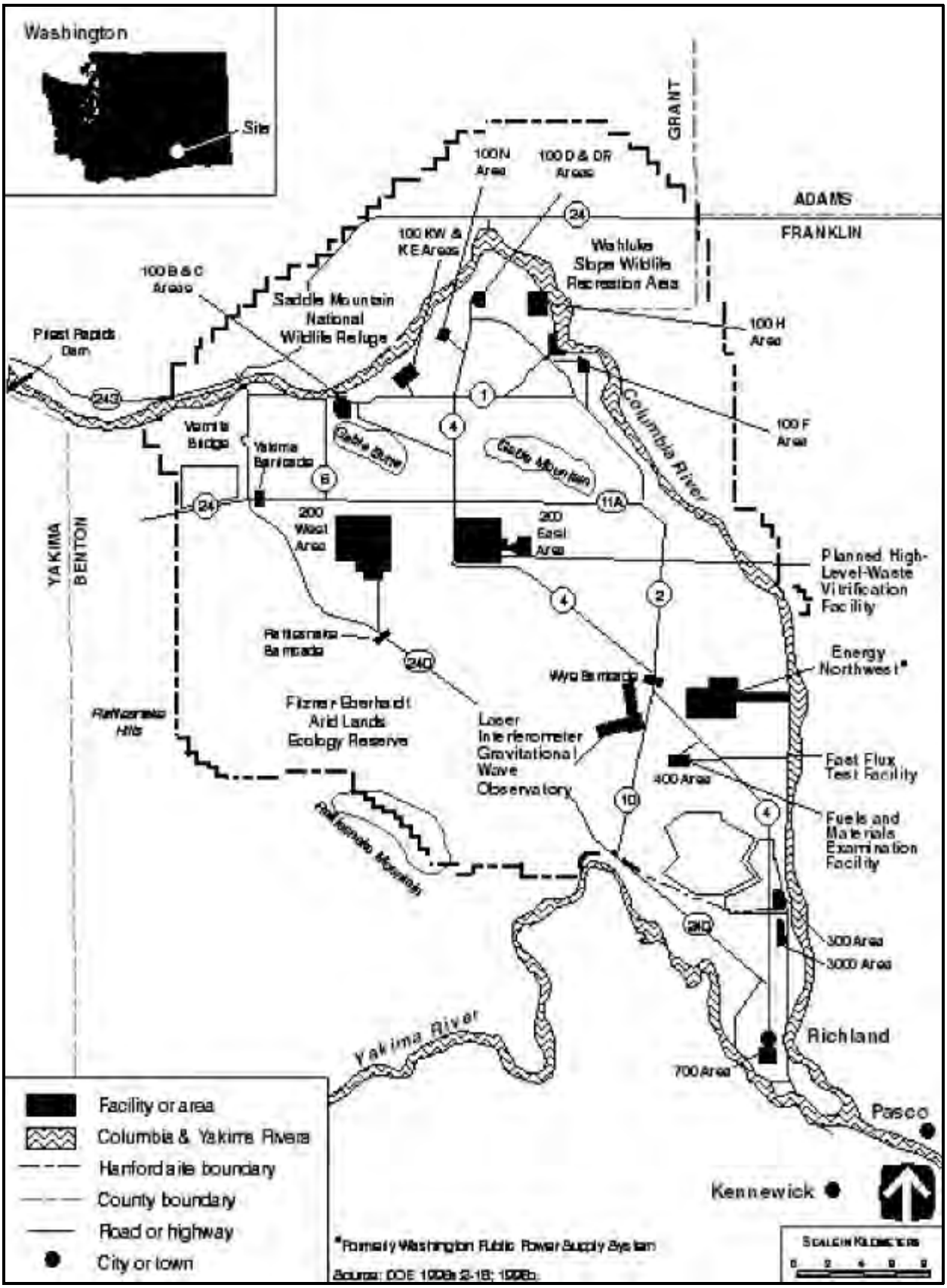
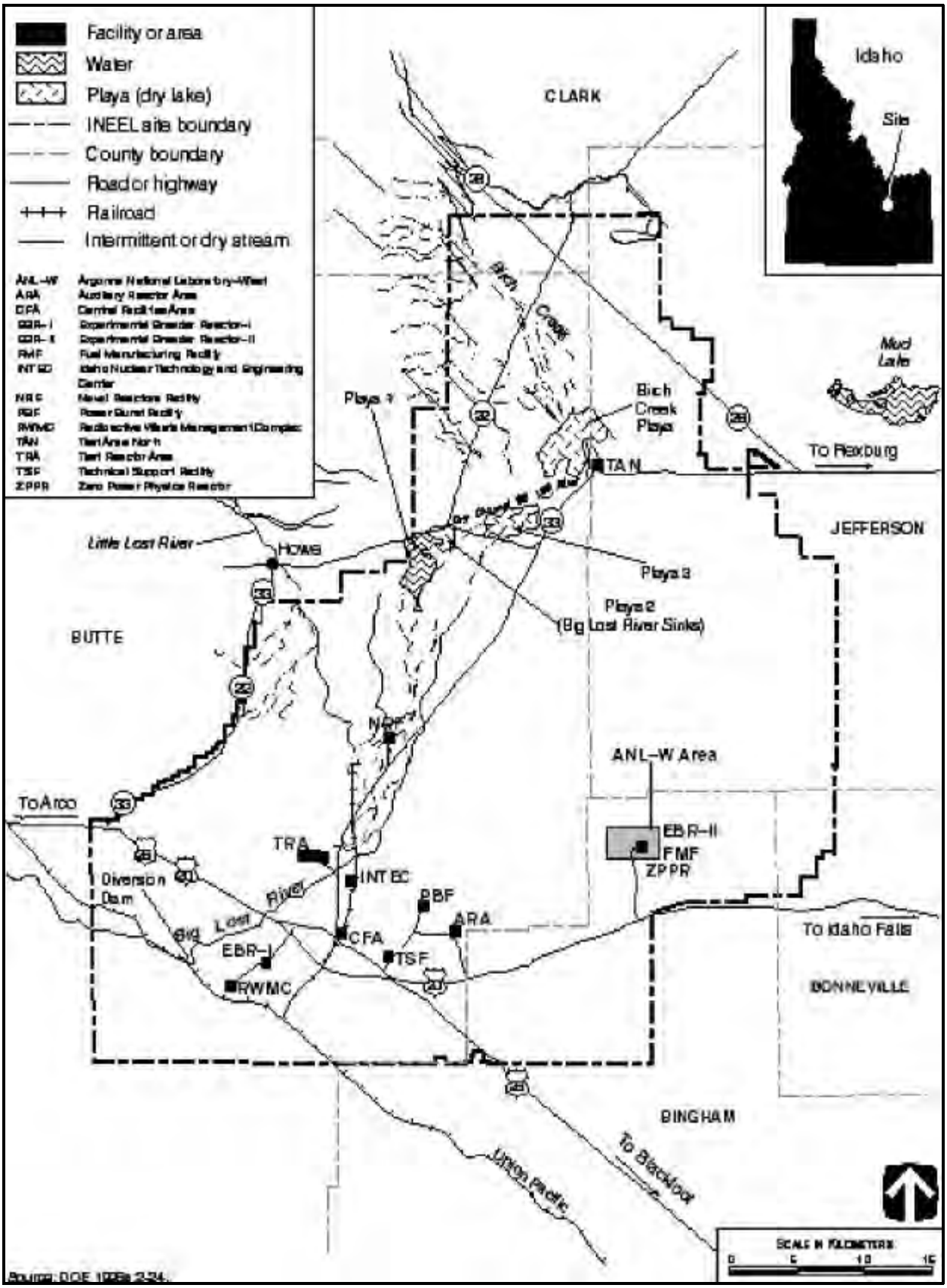


Figure 2–2. Hanford, Washington



Source: DOE 1995a 2-24.

Figure 2–3. INEEL, Idaho

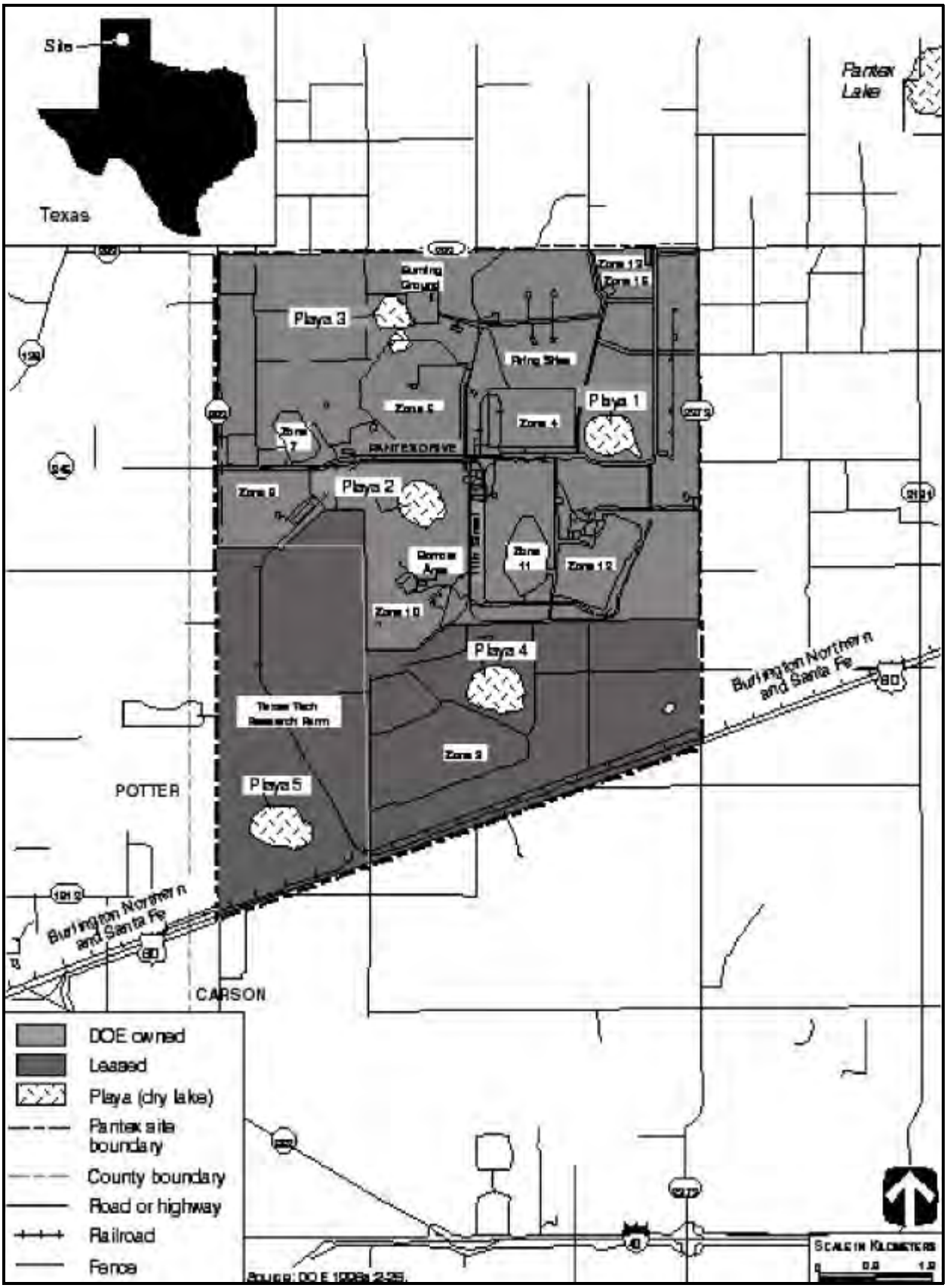


Figure 2–4. Pantex, Texas

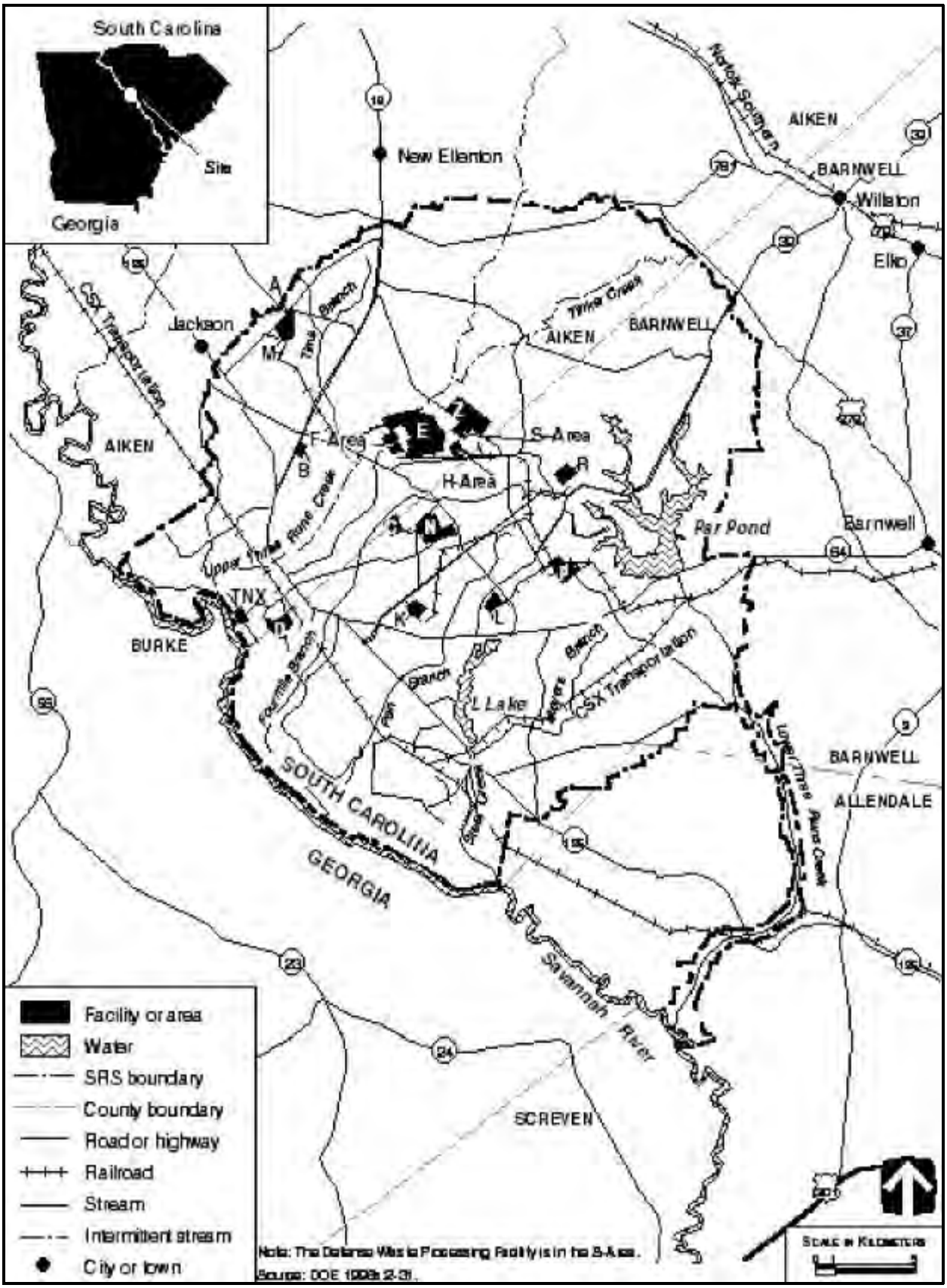


Figure 2–5. SRS, South Carolina

2.1.3 MOX Fuel Fabrication Alternatives

Alternatives that involve the manufacture of MOX fuel include the use of the fuel in existing domestic, commercial reactors. The environmental impacts of using MOX fuel in these reactors are evaluated generically in the *Storage and Disposition PEIS*. When the SPD Draft EIS was published, the specific reactors were not known; therefore, that generic analysis was incorporated by reference in the SPD Draft EIS, summarized in Section 4.28, and included in the discussion of the integrated impacts of the MOX fuel alternatives presented in Section 2.18.3. This was done with the understanding that by the time the SPD Final EIS would be published, the specific reactors would have been identified and reactor-specific analyses would replace the generic analysis.

[Text deleted.] In May 1998, DOE initiated a procurement process to obtain MOX fuel fabrication and irradiation services. The Request for Proposals (RFP) defined limited activities that may be performed prior to issuance of the SPD EIS ROD. These activities include non-site-specific work primarily associated with the development of the initial conceptual design for the fuel fabrication facility; and plans (paper studies) for outreach, long lead-time procurements, regulatory management, facility quality assurance, safeguards, security, fuel qualifications, and deactivation. In compliance with its National Environmental Policy Act (NEPA) regulations at 10 CFR 1021.216, DOE requested that each offeror provide, as part of its proposal, environmental information specific to its proposed MOX facility design and the domestic, commercial reactors proposed to be used for irradiation of the fuel. That information was analyzed by DOE to identify potential environmental impacts of the proposals and documented in an Environmental Critique prepared pursuant to 10 CFR 1021.216(g). That analysis was considered by the selection official as part of the award decision.

DOE awarded a contract to the team of Duke Engineering & Services, COGEMA Inc., and Stone & Webster (DCS) in March 1999 to provide the requested services. These services include design, licensing, construction, operation, and eventual deactivation of the MOX facility as well as irradiation of the MOX fuel in six domestic, commercial reactors at three sites. The reactors proposed by DCS are Duke Power Company's Catawba Nuclear Station, Units 1 and 2; McGuire Nuclear Station, Units 1 and 2; and Virginia Power Company's North Anna Power Station, Units 1 and 2. No facility construction or MOX fuel fabrication or irradiation of MOX fuel is to occur until the SPD EIS ROD is issued. Additionally, no MOX fuel is to be irradiated until NRC amends the operating license of each selected reactor prior to the specific reactor receiving the MOX fuel. Such site-specific activities, and DOE's exercise of contract options to allow those activities, would be contingent on decisions in the ROD.

As provided in 10 CFR 1021.216(h), an Environmental Synopsis (Synopsis), based on the Environmental Critique, was provided to

"216 Process"

DOE's NEPA Implementing Regulations (10 CFR Part 1021) include special provisions to enable a source selection official to consider, as part of the procurement decision, the environmental impacts of the offerors' proposals. As provided in 10 CFR 1021.216, DOE may require that offerors submit environmental data and analyses as a discrete part of the offeror's proposal. DOE will then:

- independently evaluate and verify the submitted information;
- prepare an environmental critique (subject to confidentiality requirements of the procurement process) for offers in the competitive range, addressing environmental issues pertinent to a decision on the proposals; and
- prepare a publicly available environmental synopsis, based on the environmental critique, to document consideration given to environmental factors in the selection process.

After a selection has been made, the environmental synopsis shall be filed with EPA, made publicly available, and incorporated in an EIS prepared for the action.

If the NEPA process is not completed before the award, the contracts shall be made contingent on completion of the NEPA process. DOE shall phase subsequent contract work to allow the NEPA review process to be completed in advance of a go/no-go decision.

the U.S. Environmental Protection Agency (EPA), made available to the public, and incorporated as Appendix P to this SPD EIS. In addition, Section 3.7 was added to describe the affected environment at the three reactor sites, Section 4.28 was revised to include the reactor-specific analyses, and the relevant sections of Chapters 2 and 4 were revised as necessary to incorporate information provided by DCS about the proposed MOX facility, where different from that presented in the SPD Draft EIS. Sections of this SPD EIS that were revised or added to include reactor-specific information, including the new Appendix P presenting the Synopsis, were also distributed as the *Supplement to the SPD Draft EIS*.[2] A Notice of Availability was published in the Federal Register on May 14, 1999 (EPA 1999), providing a 45-day public comment period on the *Supplement*. This *Supplement* was distributed to interested parties in the local communities surrounding the Catawba, McGuire, and North Anna reactor sites; stakeholders who received the SPD Draft EIS; and others as requested. Comments are addressed in Volume III, the Comment Response Document, and, where appropriate, revisions were made to this SPD EIS.

Under the hybrid alternatives, DOE could produce up to 10 MOX fuel assemblies for testing in domestic, commercial reactors before commencement of full-scale MOX fuel irradiation, although it is likely that only 2 lead assemblies would be needed.[3] These lead assemblies would be available for irradiation to support U.S. Nuclear Regulatory Commission (NRC) licensing and fuel qualification efforts. Potential impacts of MOX fuel lead assembly fabrication are analyzed for three of the candidate sites for MOX fuel fabrication (Hanford, Argonne National Laboratory–West [ANL–W] at INEEL, and SRS), and two additional sites, Los Alamos National Laboratory (LANL) in New Mexico, and Lawrence Livermore National Laboratory (LLNL) in California. Pantex was not considered for lead assembly fabrication because it does not currently have any facilities capable of MOX fuel fabrication. Postirradiation examination of the lead assemblies, if required to support NRC licensing activities, would be conducted. Two potential sites for postirradiation examination are discussed in this SPD EIS: ANL–W and Oak Ridge National Laboratory (ORNL). These two sites are currently the only sites that have the capability to conduct postirradiation examination activities without major modifications to facility and processing capabilities; only minor modifications for receipt of materials would be required. Other potential facilities, either within the DOE complex or in the commercial sector, would require significant modifications to meet expected requirements. As discussed in Section 1.6, DOE's preferred locations for lead assembly fabrication and postirradiation examination are LANL and ORNL, respectively.

2.2 MATERIALS ANALYZED IN THIS SPD EIS

As discussed in the following graphic, there are eight general categories used to describe the 50 t (55 tons) of surplus plutonium, which represent the physical and chemical nature of the plutonium. Two of the categories—clean metal (including pits) and clean oxide—could either be fabricated into MOX fuel or immobilized. The remaining six categories of material—impure metals, plutonium alloys, impure oxides, uranium/plutonium oxides, alloy reactor fuel, and oxide reactor fuel—would be immobilized.

[2] On June 15, 1999, DOE held a public hearing in Washington, D.C., to solicit comments on the *Supplement to the SPD Draft EIS*.

[3] The potential impacts of fabricating 10 lead assemblies and irradiating 8 of them were analyzed in this SPD EIS. As discussed in Sections 2.18.2 and 4.27, should fewer lead assemblies than analyzed be fabricated or irradiated, the potential impacts would be lower than those described.

DESCRIPTION OF SURPLUS PLUTONIUM BY DISPOSITION FEED CATEGORIES

PLUTONIUM FEED FOR IMMOBILIZATION OR MOX FUEL FABRICATION:

Clean Metal. Pure plutonium metal generally with less than 100 parts per million (ppm) of any given chemical impurity. The metal may have some oxidation or casting residues on the surface. The only major chemical impurities are gallium and radioactive decay products such as americium, neptunium, or uranium. Examples of pure metal items include unalloyed "buttons" of plutonium metal, billets, ingots, castings or rough machined items, finished machined weapon components such as "pits," and other miscellaneous small metal pieces and parts.

Clean Oxide. Plutonium oxides with less than 3 percent by weight of impurities.

FEED FOR IMMOBILIZATION:

Impure Metal. Items with impurities that are more than 100 ppm, but less than 50 percent by weight.

Plutonium Alloys. Plutonium-containing alloys with impurities that are less than 50 percent by weight. Examples of plutonium alloy items include alloyed plutonium "buttons," casting products, machined product items, and ingots.

Impure Oxide. Plutonium oxides with at least 3 but less than 50 percent by weight of impurities. Examples in this category include plutonium oxides containing uranium oxides and plutonium oxides containing neptunium, thorium, beryllium, or zirconium.

Uranium/Plutonium Oxide. Plutonium oxides mixed with enriched uranium oxides. Examples include powders or pellets that have been either low-fired (heated at temperatures below 700 °C) or high-fired (heated at temperatures greater than 700 °C).

Alloy Reactor Fuel and Oxide Reactor Fuel. Plutonium-containing reactor fuel that has been manufactured, but not irradiated in a reactor. The plutonium consists of 12 to 26 percent of plutonium 240 with total plutonium compositions being 13 to 27 percent of the material in the fuel. The fuel can be either alloy reactor fuel or reactor fuel containing plutonium oxide mixed with uranium oxide. The majority of alloy reactor fuel in DOE's plutonium inventory is fuel elements for the Zero Power Physics Reactor at ANL–W. Oxide fuels include experimental capsules, elements, and pins.

Source: DOE, *Feed Materials Planning Basis for Surplus Weapons-Usable Plutonium Disposition*, MD-0009, 1997.

2.3 DEVELOPMENT OF THE ALTERNATIVES

This section describes the development process for those SPD EIS alternatives and technical issues that remained to be finalized after issuance of the *Storage and Disposition PEIS* ROD.

2.3.1 Development of Facility Siting Alternatives

In the ROD for the *Storage and Disposition PEIS*, DOE identified a large number of possible options to locate three disposition facilities at four sites, and limited the immobilization options to Hanford and SRS. In addition to the four different sites for potential facility locations, the options were further increased by considering the use of either existing or new facilities at the sites, and by considering whether disposition would occur by the hybrid approach (both MOX fuel and immobilization) or only through immobilization. The following equally weighted screening criteria were used to reduce the large number of possible facility and site combinations to the range of reasonable alternatives:

- *Worker and public exposure to radiation.* This criterion was used to exclude the site combinations that involve large amounts of handling, packaging, and repackaging of the surplus plutonium for either intersite or intrasite transportation.

- *Proliferation concerns due to transportation of materials.* Application of this criterion eliminated those options that increased the transfers of the surplus plutonium, usually involving three sites.

- *Infrastructure.* This criterion was used to exclude the site combinations where a single disposition facility was located at a site with no benefit for the program or DOE. For example, collocation of two of the three hybrid case disposition facilities at a site would reduce program infrastructure costs such as

those associated with safeguards and security features, whereas locating each facility at a separate site would not allow such functions to be shared.

Over 64 options were evaluated, yielding a range of 20 reasonable alternatives that met all the criteria. Examples of options that were eliminated include all those options placing three facilities at three different sites. In its Notice of Intent (NOI), DOE proposed to collocate the pit conversion and immobilization facilities for the immobilization-only alternatives. However, during the public scoping process, the comment was made that, under all situations, Pantex should be considered as a candidate site for the pit conversion facility because most of the surplus pits are currently stored there. After confirming that they met all the screening criteria, three additional immobilization-only alternatives, which placed the pit conversion facility at Pantex, were included in the range of reasonable alternatives evaluated in the SPD Draft EIS. The number of reasonable alternatives was reduced to 15 in the *Supplement* when DOE determined, as discussed in Section 2.3.2.2 of this SPD EIS, that Building 221–F at SRS was no longer a reasonable location for the immobilization facility.

[Text and table deleted.]

2.3.2 Alternatives Considered but Eliminated From Detailed Study

Technology alternatives for surplus plutonium disposition that were evaluated in the *Storage and Disposition PEIS*, but were not selected in the ROD and, therefore, are not being considered in this SPD EIS are: (1) deep-borehole direct disposition; (2) deep-borehole immobilized disposition; (3) electrometallurgical treatment; (4) MOX fuel irradiation in a partially completed light water reactor; and (5) MOX fuel irradiation in an evolutionary advanced light water reactor. The reasons why these technologies were not selected are explained in the ROD for the *Storage and Disposition PEIS*.

Alternatives considered for inclusion in this SPD EIS but later eliminated from further analysis fall into four categories: amounts of material to be dispositioned, disposition facility siting, feed preparation methods, and immobilization technologies.

2.3.2.1 Amounts of Material to Be Dispositioned

In the *Storage and Disposition PEIS* ROD, DOE committed to immobilizing at least 8 t (9 tons) of surplus, low-purity, nonpit plutonium. Since the ROD was issued, however, DOE has determined that because of the level of impurities and additional processing that would be required to meet MOX fuel specifications, an additional 9 t (10 tons) of low-plutonium-content materials would be immobilized.

2.3.2.2 Disposition Facility Siting Alternatives

In addition to alternatives eliminated by the screening process described earlier, the following facility options were eliminated from further study. Several commentors at the public scoping meetings suggested that DOE consider locating the proposed surplus plutonium disposition facilities at three separate sites. As discussed in Section 2.3.1, DOE is striving to minimize worker and public exposure to radiation, minimize proliferation concerns associated with transportation, and reduce infrastructure cost. These goals would not be met if DOE were to build one facility at each of three candidate sites.

Locating all three proposed facilities in FMEF at Hanford was listed as Alternative 2 in Table 1 of the NOI for preparation of this SPD EIS (DOE 1997b). After further evaluation of space requirements, DOE concluded that the available space in FMEF would not be sufficient to accommodate the efficient operation and maintenance of all three facilities. Therefore, Alternative 2 was modified to collocate only the pit conversion and immobilization facilities in FMEF, with the MOX facility in new construction adjacent to FMEF.

The *Storage and Disposition PEIS* ROD stated that "to accomplish the plutonium disposition mission, DOE will use, to the extent practical, new as well as modified existing buildings and facilities for portions of the disposition mission." The subsequent NOI for the SPD EIS further stated that "construction of these facilities would be on previously disturbed land and could include the modification of existing facilities where practicable, to reduce local environmental impacts, reduce costs, and shorten schedules." As a result, DOE analyzed immobilization alternatives that included Building 221–F at SRS in the SPD Draft EIS. This building was originally built to house operations to chemically separate plutonium from irradiated targets and will be available to support other missions after these activities have been completed. The availability of Building 221–F coincides with the schedule for the proposed surplus plutonium disposition activities.

However, based on revised space requirements for the immobilization facility, the eight alternatives (3B, 5B, 6C, 6D, 7B, 9B, 12B, and 12D) in the SPD Draft EIS that proposed using a portion of Building 221–F for immobilization activities have, as discussed in the *Supplement*, been removed from consideration. These alternatives are no longer considered reasonable because the amount of new construction required for the proposed immobilization facility is now expected to be nearly the same whether the facility were located entirely in a new building or built in addition to using the available portion of Building 221–F. Deletion of the Building 221–F alternatives does not eliminate SRS from any of the immobilization alternatives under consideration. DOE is still evaluating alternatives that involve construction of a new immobilization facility at SRS.

As described in Section 2.7.2 of the SPD Draft EIS, an immobilization facility using portions of Building 221–F was estimated to require approximately 5,300 m^2 (57,000 ft^2) of space in Building 221–F and an additional 1,400 m^2 (15,000 ft^2) of process space in a new annex for a canister-loading facility, for a total of approximately 6,700 m^2 (72,000 ft^2) of space. As discussed in the *Supplement*, and as shown in Section 2.7.1 of this SPD Final EIS, the immobilization facility is now estimated to require approximately 25,000 m^2 (269,000 ft^2) of space. Because only 5,300 m^2 (57,000 ft^2) of this space could be accommodated in Building 221–F, there is no longer expected to be any advantage associated with the use of Building 221–F in terms of reducing the local environmental impacts, reducing costs, or shortening the construction schedule for this facility.

[Text deleted.]

2.3.2.3 Feed Preparation Methods for Immobilization

The homogenous ceramic immobilization facility evaluated in the *Storage and Disposition PEIS* was based on a wet-feed preparation process. Although the ceramic form of the can-in-canister approach evaluated in this SPD EIS could also use a wet-feed process, it would require larger quantities of water and generate greater amounts of waste than would a dry-feed process. For these reasons, wet-feed preparation processes for the ceramic can-in-canister approach were not considered to be reasonable and were not considered further in this SPD EIS.

2.3.2.4 Immobilization Technology Alternatives

DOE considered locating an adjunct melter adjacent to the Defense Waste Processing Facility (DWPF) at SRS. In the adjunct melter, a mixture of borosilicate glass frit and plutonium would be melted together and added directly to borosilicate glass containing high-level waste (HLW) from DWPF. Subsequent evaluations (UC 1997), however, have indicated that the adjunct melter approach would be less technically viable, would take longer to implement, and would cost twice that of the can-in-canister approach. A description of the vitrification process using the adjunct melter is presented in Appendix C, but this approach is not evaluated as a reasonable alternative.

The technology variants for the new immobilization facilities discussed in the *Storage and Disposition PEIS* considered using either radioactive cesium 137 or HLW as a radiation barrier. However, the *Storage and*

Disposition PEIS further identified that, in the can-in-canister approach, the use of HLW to produce a radiation barrier eliminates the need for introducing cesium 137 (from cesium capsules currently in storage at Hanford) into the immobilization process, which in turn reduces radiation shielding requirements and potential exposures to workers and the public. Therefore, this SPD EIS does not include the use of these cesium 137 capsules in the can-in-canister analyses as a reasonable alternative.

2.4 OVERVIEW OF PROPOSED SURPLUS PLUTONIUM DISPOSITION FACILITIES AND TRANSPORTATION

As discussed previously, three facilities are proposed for surplus plutonium disposition: pit conversion, immobilization, and MOX fuel fabrication. The three disposition facilities are proposed for locations where the plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives.[4] Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Security for the facilities would be implemented commensurate with the usability of the material in a nuclear weapon or improvised nuclear device. Each facility would be located at an existing DOE site that has sitewide security measures in place, including access control. In addition to DOE sitewide security services, each facility would have appropriate security features. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed inside are adequately protected. Nuclear material control and accountability would be ensured through a system that monitors storage, processing, and transfers. Closed-circuit television, intrusion detection, motion detection, and other automated material monitoring methods would be employed as part of the material control and accountability program. At any time, the total amount of special nuclear material in each facility, or in any material balance area within a specific facility, would be known. Physical inventories, measurements and inspections of material both in process and in storage would be used to verify inventory records. In addition, each of the three facilities would need to provide space and, to varying degrees, access for international inspection.

Descriptions of the proposed surplus plutonium disposition facilities and process operations are provided in this section. The proposed facility layouts are renderings that show representative equipment layouts that demonstrate functional, but not final designs. These designs are subject to modification during the design and construction process, consistent with any construction project, as may be required to optimize equipment placement and process flow. Sections 2.5 through 2.16 describe, individually, each alternative being considered in this SPD EIS. Because the facilities would be implemented differently at each site and for each alternative, those differences are identified and described. Sections 2.4 through 2.16 were developed using data provided by the Regents of the University of California (UC 1998a–i, 1999a–d). MOX alternatives have also been developed using data provided in the *MOX Fuel Fabrication Facility and Nuclear Power Reactor Data Report* (DOE 1999a) and by ORNL (ORNL 1998, 1999).

Each of the three disposition facility layouts includes accommodations for international inspection. However, the implementation process for international inspection of U.S. and Russian surplus plutonium is not fully defined. Rather, that process is part of ongoing negotiations being conducted to reach a bilateral plutonium disposition agreement between the United States and Russia for their disposition programs in accordance with the *Joint Statement of Principles for Management and Disposition of Plutonium Designated as No Longer Required for Defense Purposes*. This statement was signed by Presidents Clinton and Yeltsin in September 1998

[4] The physical protection and safeguards and security for the MOX facility would be acceptable to NRC. Physical protection and safeguards and security at the domestic, commercial reactors would meet NRC regulations.

(see Appendix A). The agreement could include provisions for bilateral facility inspections or potential multilateral inspections.

Each of the disposition facilities is proposed to operate for about 10 years. However, the operating life of the facilities may vary somewhat, depending on facility startup experiences and international negotiations regarding the pace of disposition. Also, the MOX facility could operate for as long as 13 years to accommodate the fuel cycles of the reactors in which the MOX fuel would be used. Slightly more or less material could be processed in any given year, potentially extending or shortening the operating period of any of the disposition facilities. Also, for the hybrid approach, it may be necessary, based on feed material quality, to process slightly more material by immobilization than currently envisioned. An analysis of how these adjustments could incrementally affect the potential impacts evaluated in this SPD EIS is provided in Section 4.30.

Because the disposition facilities would operate for about 10 years and would meet stringent safety and natural hazard requirements, they could still be used for other programs or activities. As discussed in Section 4.31, after completion of the surplus plutonium disposition mission, equipment would be removed, decontaminated, and either reused at other DOE facilities or disposed of, and the facilities would be stabilized to a condition suitable for reuse. It is expected that this facility deactivation would take 3 years or less to complete. During this time, DOE would perform engineering evaluations, environmental studies, and further NEPA review to assess the consequences of different courses of action with respect to these facilities.

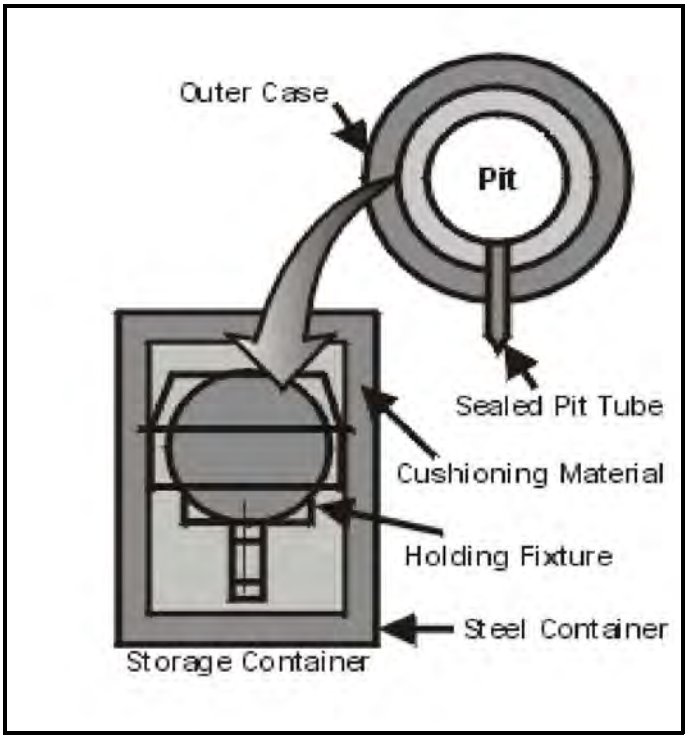


Figure 2–6. Depiction of a Pit

2.4.1 Pit Disassembly and Conversion

Each surplus plutonium disposition action alternative requires a pit conversion facility to produce appropriate plutonium dioxide feed material. That facility would recover plutonium from pits (see Figure 2–6) and process clean plutonium metal (as described in Section 2.2); convert the plutonium to an unclassified (i.e., no longer exhibiting any characteristics that are protected for reasons of national security) oxide; and then transfer the oxide to either the immobilization facility or the MOX facility. This process would include the removal of gallium, beryllium, or other materials that may be considered impurities in plutonium dioxide feed for MOX fuel fabrication. Potential impurities include any of the elements listed in Table 2–2. Given the national security sensitivity of information on pit materials and assembly, pit conversion facility operations

Table 2–2. Potential Impurities in Weapons-Grade Plutonium

Aluminum	Magnesium
Americium	Manganese
Boron	Nickel
Beryllium	Neptunium
Carbon	Silicon
Calcium	Tantalum
Cadmium	Tin
Chromium	Thorium
Copper	Titanium
Gallium	Tungsten
Iron	Uranium
Lead	Zinc

would be classified (i.e., access restricted) through the material-processing steps, and possibly through the final canning stage.

2.4.1.1 Pit Conversion Facility Description

The pit conversion facility would be designed to process up to 3.5 t (3.8 tons) of plutonium metal into plutonium dioxide annually. Facility operations would require a staff of about 400 personnel. The general layout of the pit conversion facility, which approximates how the pit conversion process would be implemented, is presented in Figures 2–7 and 2–8. The specific layout and design of the facility would vary from site to site depending on a number of factors, as discussed in Sections 2.6 through 2.16.

The pit conversion facility would be built in a hardened space of thick-walled concrete that meets all applicable standards for processing special nuclear material. One or possibly both levels of the two-story building would be below grade. Areas of the facility in which plutonium would be processed or stored would be designed to survive natural phenomena such as earthquakes, floods, and tornadoes, as well as potential accidents associated with fissile and radioactive materials. Ancillary buildings would be required for support activities.

Activities involving radioactive materials or externally contaminated containers of radioactive materials would be conducted in gloveboxes. The gloveboxes would be interconnected by a contained conveyor system to move materials from one process step to the next. Gloveboxes would remain completely sealed and operate independently, except during material transfer operations. Built-in safety features would limit the temperature and pressure inside the gloveboxes and ensure that operations remained within criticality safety limits. When dictated by process needs or safety concerns, an inert atmosphere would be maintained in gloveboxes. The exhaust from the gloveboxes would be monitored continuously for radioactive contamination. The atmosphere in the gloveboxes would be kept at a lower pressure than that of the surrounding areas so that any leaks of gaseous or suspended particulate matter would be contained and filtered appropriately. The building ventilation system would include high-efficiency particulate air (HEPA) filters and would be designed to maintain confinement, thus precluding the spread of airborne radioactive particulates or hazardous chemicals within the facility or to the outside environment. Both intake and exhaust air would be filtered, and exhaust gases would be monitored for radioactivity.

Beryllium may be a constituent of some of the pits that would be disassembled in the pit conversion facility. Because inhalation of beryllium dust and particles has been proven to cause a chronic and sometimes fatal lung disease, beryllium is of special interest from a health effects perspective. The process operations in the pit

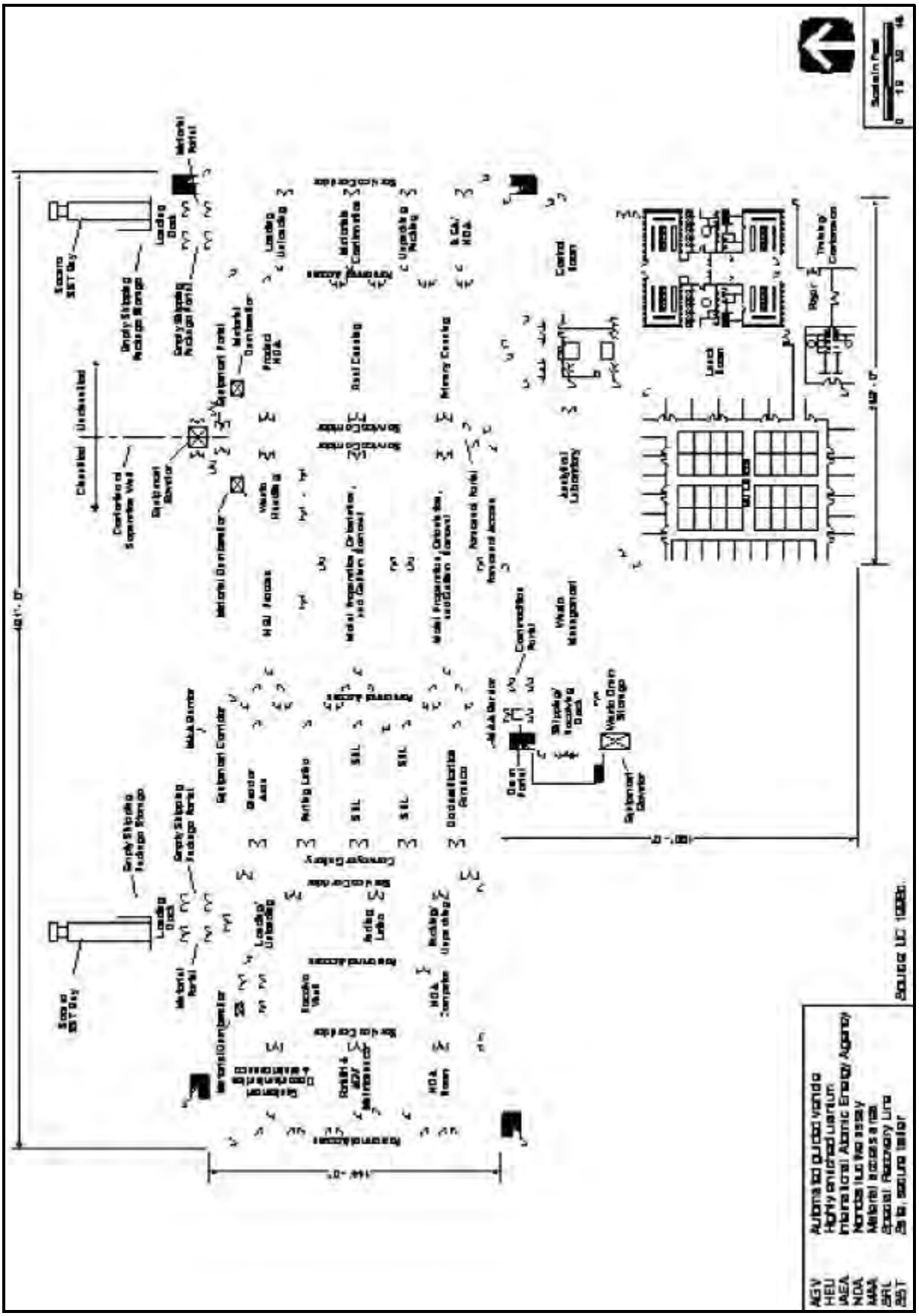
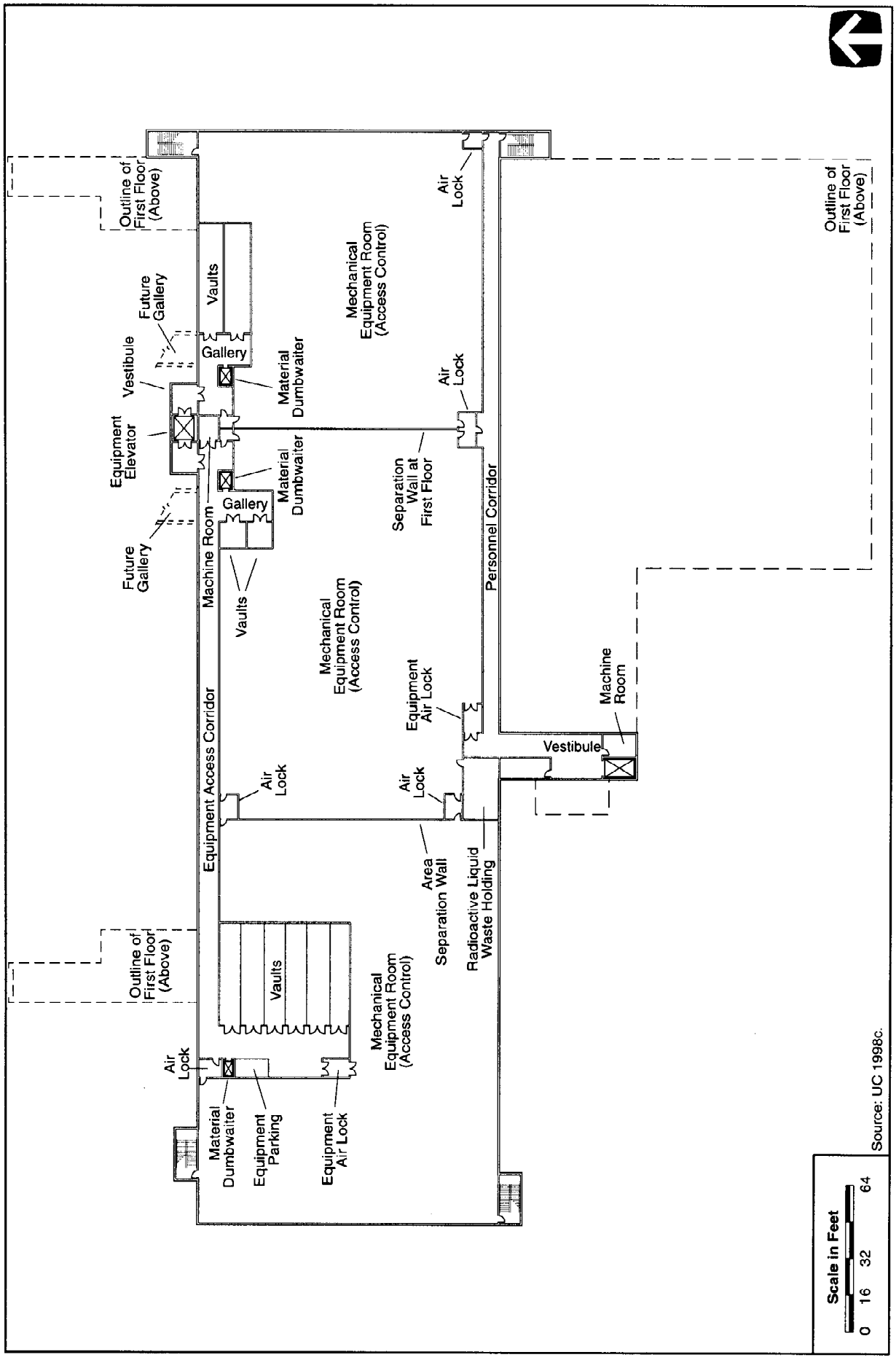


Figure 2–7. General Design of Pit Conversion Facility—Main Processing Level (First Floor)



Source: UC 1998c.

Figure 2–8. General Design of Pit Conversion Facility—Lower (Basement) Level

conversion facility are expected to generate only larger, nonrespirable turnings and pieces of metal, and all work would be performed in gloveboxes. No grinding would be done that could cause small pieces of beryllium to become airborne. The beryllium in solid form would be disposed of as low-level waste (LLW) or transuranic (TRU) waste and has been included in the waste estimates presented in Chapter 4. Therefore, exposure to airborne beryllium is not considered a concern for pit disassembly and conversion operations.

The pit conversion facility would accommodate the following surplus plutonium-processing activities: pit receipt, storage, and preparation; pit disassembly; plutonium conversion; gallium removal; oxide blending and sampling; nondestructive assay; product canning; product storage; product inspection and sampling for international inspection; product shipping; declassification of parts not made from special nuclear materials; highly enriched uranium (HEU) decontamination, packaging, storage, and shipping; tritium capture, packaging, and storage; and waste packaging, sampling, and certification. Additional areas for support activities would be needed, including office space, change rooms, a central control room, a laboratory, mechanical equipment rooms, mechanical shops, an emergency generator to supply power to critical safety systems in the event of a power outage, a warehouse, shipping and receiving areas, waste storage, guard stations, entry portals, and parking. Because these facilities would not contain or process special nuclear materials, they would not be required to be in hardened space and thus could be located in other space available at the candidate sites. Separate truck bays in the hardened facility would accommodate DOE safe, secure trailer/SafeGuards Transport (SST/SGTs).

2.4.1.2 Pit Disassembly and Conversion Process

The pit disassembly and conversion process is depicted in Figure 2–9. At the pit conversion facility, the storage containers would be removed from their overpacks (outer shipping containers), the contents verified, and information regarding the material entered into the facility's material accountability system. Pits and plutonium metal would be placed in a short-term receiving vault, checked for radiological contamination, and transferred to the pit storage vault until processing. Before pits would be fed into the pit disassembly line, they would be segregated based on the potential presence of tritium.[5] Pits without tritium would go into the pit bisector glovebox, and those containing tritium would start in the Special Recovery Line glovebox.

In the pit bisector glovebox, any external structures would be cut away from the pit, and the pit would be cut in half. Nonbonded pits (pits whose components separate easily) would be separated into plutonium metal, HEU, classified metal shapes, and classified nuclear material parts. The plutonium parts would be assayed as part of the material accountability program. HEU would be sent to the HEU-processing station for material accountability, electrolytic decontamination, and packaging; the classified metal shapes and metal shavings to the declassification furnaces; the nuclear material parts to storage at the pit conversion facility; and the plutonium to the hydride-oxidation (HYDOX) station for the next step of the process. Bonded pits, which cannot be separated prior to processing, would be sent to the HYDOX station intact. For these pits, HEU, classified metal shapes, and classified nuclear material parts would be separated from the plutonium metal during the HYDOX process, then sent to the HEU-processing station, declassification furnaces, and storage at the pit conversion facility, respectively. Recovered HEU would be stored in a vault at the pit conversion facility until shipped to the Oak Ridge Reservation (ORR) for declassification, storage, and eventual disposition. The HEU would meet the Y–12 acceptance criteria prior to shipment to ORR.

Pits with tritium would also be bisected, and the HEU, classified metal shapes, and classified nuclear material parts would be separated from the plutonium; this would occur in the Special Recovery Line glovebox. Under normal circumstances, all the tritium associated with a given pit would be captured and recovered during the

[5] Tritium can be used as a boosting fuel in high-energy atomic weapons. Although the operators of the pit conversion facility would know which pits contain tritium, the pit types and the number of surplus pits that contain tritium are classified.

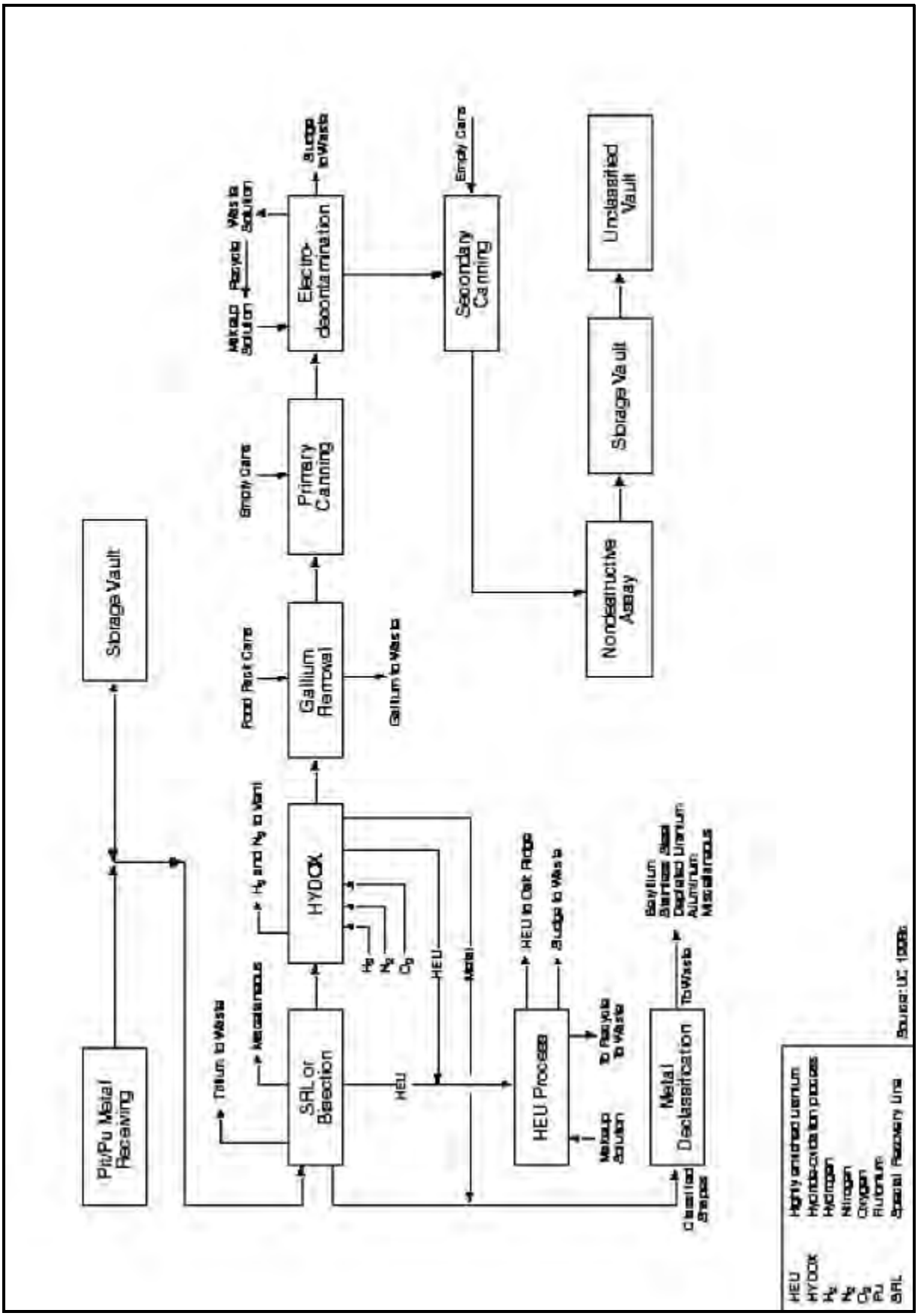


Figure 2–9. Pit Disassembly and Conversion Process

tritium removal process in the Special Recovery Line. It is expected that in a small number of pits, the tritium will have absorbed into the plutonium. For these pits, an additional step would occur in the Special Recovery Line glovebox: the plutonium would be heated in a vacuum furnace to drive off the tritium as a gas. The tritium would then be captured on a catalyst bed and packaged as LLW for treatment and disposal. For purposes of analysis in this SPD EIS, it has been conservatively estimated that 1,100 Ci of tritium would escape to the atmosphere annually through the process building stack. HEU and classified metal shapes would be decontaminated and sent to the HEU-processing station and declassification furnaces, respectively; classified nuclear material parts would be placed in storage at the pit conversion facility. After confirmation that the plutonium metal was free of tritium, the plutonium would be assayed as part of the special nuclear material accountability program and transferred to the HYDOX station. Recovered HEU would be stored in a vault at the pit conversion facility until shipped to the ORR for declassification, storage, and eventual disposition. The HEU would meet the Y–12 acceptance criteria prior to shipment to ORR.

In the HYDOX module, plutonium metal would react with hydrogen, nitrogen, and oxygen at controlled temperatures and pressures in a pressure vessel to produce plutonium dioxide. The plutonium metal would first be reacted with hydrogen gas to form a hydride. Then the vessel would be purged of the hydrogen and the hydride reacted with nitrogen gas to form a nitride. The nitrogen would then be purged and replaced with oxygen for the final reaction forming plutonium dioxide. The plutonium dioxide product would be collected and assayed for the material accountability program to confirm that all the plutonium metal entering the HYDOX process left as an oxide.

Next in this process would be gallium removal. Gallium, a metallic element with a low melting point that is alloyed with plutonium in pits, is considered an impurity in plutonium dioxide feed for MOX fuel fabrication.[6] As currently proposed and analyzed in this SPD EIS, the pit conversion process includes a gallium removal step in which heat would be used in a controlled manner to separate and collect (for disposal as LLW or TRU waste) gallium oxide from plutonium dioxide. Following gallium removal, the plutonium dioxide would be subjected to a series of tests to verify that it met specifications, sealed in a metal can, and sent to the primary canning module.

This gallium removal process was evaluated in the SPD Draft EIS as meeting the needs of the surplus plutonium disposition program. However, as explained in the *Supplement*, based on public comments, and the responses to the procurement discussed in Section 2.1.3 of this SPD Final EIS, the plutonium-polishing process for gallium removal that was evaluated as a contingency in Appendix N of the SPD Draft EIS has been included in the MOX facility evaluated in this SPD Final EIS. Plutonium polishing consists of a small-scale aqueous process to remove gallium (and the other impurities that can affect the use of the plutonium as reactor fuel) to a greater extent than the dry, thermal process proposed for the pit conversion facility. Because the MOX facility would include the plutonium-polishing component, it may not be necessary to subject the plutonium dioxide to the thermal gallium removal step at the pit conversion facility. Both the pit conversion and MOX facilities, however, are being analyzed with their respective gallium (and other impurity) removal processes. Should it be determined that the thermal process is not needed, the impacts of operating the pit conversion facility, in particular, electrical use and waste generation, would be lower than those estimated in this SPD Final EIS.

In the primary canning module, the cans of plutonium dioxide would be placed into a primary storage can made of stainless steel. This can would then be welded shut and leak tested to ensure that the weld was sound. If the can were to fail the leak test, it would be reopened and rewelded. After passing the leak test, the primary can would be sent to the electrolytic decontamination module. After decontamination, each can would be rinsed, dried, and surveyed to verify decontamination, then sent to the secondary canning module.

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[6] Gallium removal would not be necessary for material that would be immobilized.

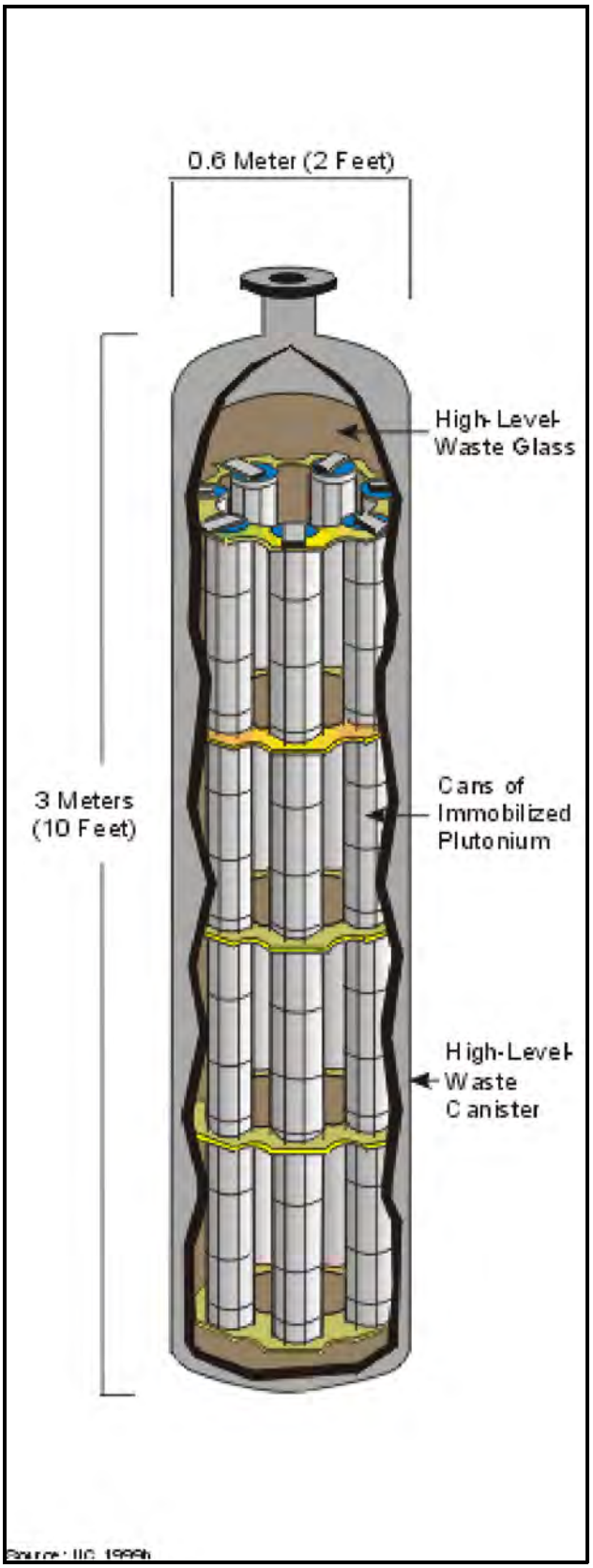


Figure 2–12. Cutaway View of Can-in-Canister Approach

and standby generators would provide backup power for critical systems. This arrangement would ensure that critical systems remain operational during any interruption of offsite power.

2.4.2.2 Plutonium Conversion and Immobilization Process

The plutonium conversion and immobilization process would have the capability to immobilize surplus plutonium material from both pit and nonpit sources. Surplus plutonium derived from pits and already processed by the pit conversion facility would be directly suitable for immobilization, whereas most surplus nonpit plutonium would first have to be converted to a suitable oxide. These oxides would then be incorporated into either a titanate-based ceramic material or a lanthanide borosilicate glass.

The plutonium immobilized in ceramic or glass would be placed inside stainless steel cans, which would be welded shut. The cans would be loaded into an HLW canister (similar to the type currently in use at DWPF at SRS), and filled with HLW to provide a radiation barrier that contributes to the proliferation resistance of the final product. The filled canister, as depicted in Figure 2–12, would then be sealed and stored on the site pending final disposition in a potential geologic repository pursuant to the NWPA. Figure 2–13 provides an overview of the ceramic and glass can-in-canister immobilization processes.

2.4.2.2.1 Plutonium Conversion Process

Plutonium feed materials would be transported in DOE SST/SGTs from the pit conversion facility (if not collocated with the immobilization facility) and the DOE sites storing surplus nonpit plutonium. The shipping containers would be unpacked and the nuclear material assayed at the immobilization facility. Several forms of surplus plutonium materials, all unclassified, would be received by the facility: unirradiated metal reactor fuel in the form of pins and plates clad in stainless steel (from the Zero Power Physics Reactor [ZPPR] at INEEL), unirradiated oxide reactor fuel consisting of fuel pins and bundles (from the Fast Flux Test Facility [FFTF] at Hanford), plutonium alloys, metals, and

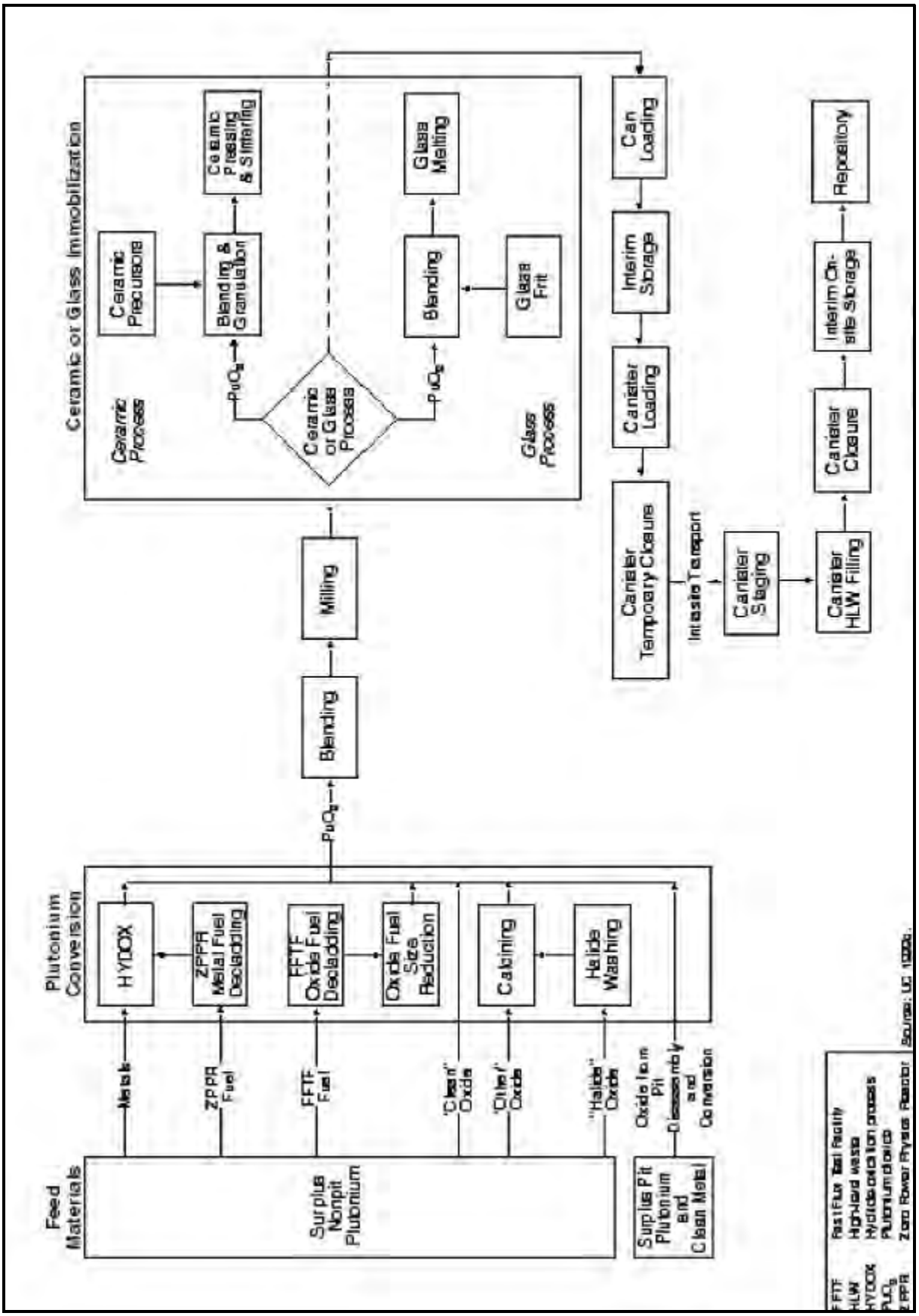


Figure 2–13. Can-in-Canister Process

oxides. Some of these feed materials would also have a uranium component. A feed material storage vault would be available to store up to 6 months of incoming plutonium feed materials. Individual containers would be transferred from the feed material storage vault to a glovebox, unpacked, and inspected to determine the conversion process necessary to render the feed material suitable for immobilization. Metals and alloys would be converted to oxide using the HYDOX process. Metal reactor fuel may require decladding before HYDOX conversion. Oxide reactor fuel would also be decladded, and the individual fuel pellets removed and sorted according to fissile material content. Pellets containing plutonium or enriched uranium would then be ground to an acceptable particle size. Oxides containing moisture or impurities would undergo a calcining process; oxides containing significant concentrations of halide impurities would be "washed" with water to remove the halides before calcining could take place.

Following these conversion processes, the plutonium materials would be stored in the in-process storage vault. Clean oxides—in particular, oxides received from the pit conversion facility, if the decision were made to immobilize all the surplus plutonium—would not require conversion and would be transferred directly to the vault.

2.4.2.2.2 Immobilization Process

Ceramic Process. The ceramic immobilization process would be conducted in a series of glovebox operations that would incorporate the plutonium oxide into ceramic disks, stack the disks inside stainless steel cans, and load the cans into an HLW canister.

In the feed-blending step, plutonium dioxide feed materials would be selected from in-process storage for blending with depleted uranium dioxide. Uranium dioxide would be added to generate a consistent product and reduce criticality concerns, and neutron absorbers (for example, the elements gadolinium or hafnium) would be added to provide criticality safety in the ceramic product. As explained in Section 1.5, uranium dioxide made from depleted uranium hexafluoride in storage at the gaseous diffusion plants previously operated by DOE, such as the Portsmouth Gaseous Diffusion Plant, would be used for this purpose.

After blending, each batch of feed material would be milled to reduce the size of the oxide powder, then blended with ceramic precursors. This mixture would then be granulated with an organic binder to produce a pourable feed that would hold together adequately when compacted into disks. In the press and sinter step, the mixture would be fed into a hydraulic press to form disks, which in turn would be baked in a furnace for reactive sintering to produce the desired mineral phases in the ceramic form. The final product would consist of homogeneous disks about 6.3 cm (2.5 in) in diameter by 2.5 cm (1 in) in height, containing about 10 weight-percent plutonium and 20 weight-percent uranium. These disks would then be stacked and sealed inside stainless steel cans. The cans would be leak tested, assayed, loaded into magazines, and stored in the product vault until removed for canister-filling operations.

As needed, magazines of canned ceramic disks would be removed from storage and inserted and locked into a framework inside an HLW canister. A temporary closure plug would be installed, and following leak testing, the canister would be loaded into a shielded transportation box for intrasite shipment from the main process building to the HLW vitrification facility in a specialized canister transport vehicle.

Glass Process. The glass immobilization process would be conducted in a series of glovebox operations that would incorporate the plutonium oxide into molten lanthanide borosilicate glass, pour it into stainless steel cans, and load the cans into an HLW canister.

In the feed-blending step, plutonium oxide feed materials would be selected from in-process storage for blending to produce individual batches with the desired isotopic composition. Each batch would be milled to reduce the

size of the oxide powder to achieve faster dissolution during the melting process. The milled oxide would then be blended with glass frit (small glass pebbles) containing neutron absorbers (e.g., gadolinium and hafnium) to form a mixture of about 8 weight-percent plutonium and 3 to 8 weight-percent uranium.

This mixture would be fed at a controlled rate into electrically heated melters operating at about 1,500 °C (2,732 °F) to melt the frit and dissolve the plutonium oxide. The homogenous glass melt would be drained into stainless steel cans, which in turn would be sealed, leak tested, assayed, loaded into magazines, and stored in the product vault. As needed, these magazines would be removed from storage and inserted and locked into a framework inside an HLW canister. A temporary closure plug would be installed, and following leak testing, the canister would be loaded into a shielded transportation box for intrasite shipment from the main process building to the HLW vitrification facility in a specialized canister transport vehicle.

Canister Filling. Canister filling, the last major step of the immobilization process, would occur at the HLW vitrification facility. The canisters received from the main process building would be moved individually through an inspection area to the HLW melt cell. In the melt cell, molten, vitrified HLW would be poured into the canister around the stainless steel cans of immobilized plutonium. After removal of any contamination from its outside surface, the canister would be plugged and welded closed. Following inspection and verification that the exterior of the canister was free of contamination, the canister would be transported to an onsite storage vault for interim storage pending final disposition at a potential geologic repository pursuant to the NWPA.

The HLW canisters would measure 0.6 m (2 ft) in diameter by 3 m (10 ft) in height, and, when filled, would weigh up to 2,500 kg (5,500 lb).[10] As each canister of plutonium immobilized in ceramic would contain about 28 kg (61 lb) of plutonium,[11] about 1,820 of these canisters would be required to process all 50 t (55 tons) of surplus plutonium. In the ceramic process, the cans, magazines, and internal framework within each canister would displace approximately 15 percent (by volume) of HLW glass. This would result in 272 canisters more than otherwise planned for the DOE HLW vitrification program. Each canister of plutonium immobilized in glass would contain about 26 kg (58 lb) of plutonium.[11] As such, about 1,900 canisters would be required to vitrify the 50 t (55 tons) of surplus plutonium. Because the cans, magazines, and internal framework used in the glass process would displace approximately 21 percent (by volume) of HLW glass, this would result in 395 canisters more than otherwise planned for the DOE HLW vitrification program. For the hybrid alternatives, about 670 canisters of plutonium immobilized as a ceramic or 690 canisters of vitrified plutonium would be produced. This would result in 101 or 145 additional canisters, depending on whether the immobilized form were ceramic or glass, respectively, than otherwise planned for the DOE HLW vitrification program.

2.4.3 MOX Fuel Fabrication

The MOX facility would produce completed MOX fuel assemblies for use in domestic, commercial reactors. Feed materials would be the plutonium dioxide from the pit conversion facility and uranium dioxide made from either the DOE stockpile of depleted uranium hexafluoride at a representative DOE site (i.e., the Portsmouth Gaseous Diffusion Plant) or another source selected by the fuel fabricator (DCS) and approved by DOE. MOX fuel fabrication involves blending the plutonium dioxide with uranium dioxide; forming the mixed oxide into pellets; loading the pellets into fuel rods; and assembling the fuel rods into fuel assemblies. Once assembled, each of the fuel assemblies would be transported in SST/SGTs to one of the domestic, commercial reactors for

[10] Consistent with the *Storage and Disposition PEIS* and the WM PEIS, the DWPF HLW canister has been used as the reference canister design for the surplus plutonium immobilization program. Although DOE is considering the possibility of using a larger canister for the Hanford HLW vitrification program, the analyses in this SPD EIS also assume that a DWPF-type canister would be used at Hanford.

[11] Plutonium loading in the final design specification and between individual canisters may vary slightly.

use as fuel. Following irradiation, the MOX fuel would be removed from the reactor and managed at the reactor site as spent fuel. Final disposition would be at a potential geologic repository pursuant to the NWPA.

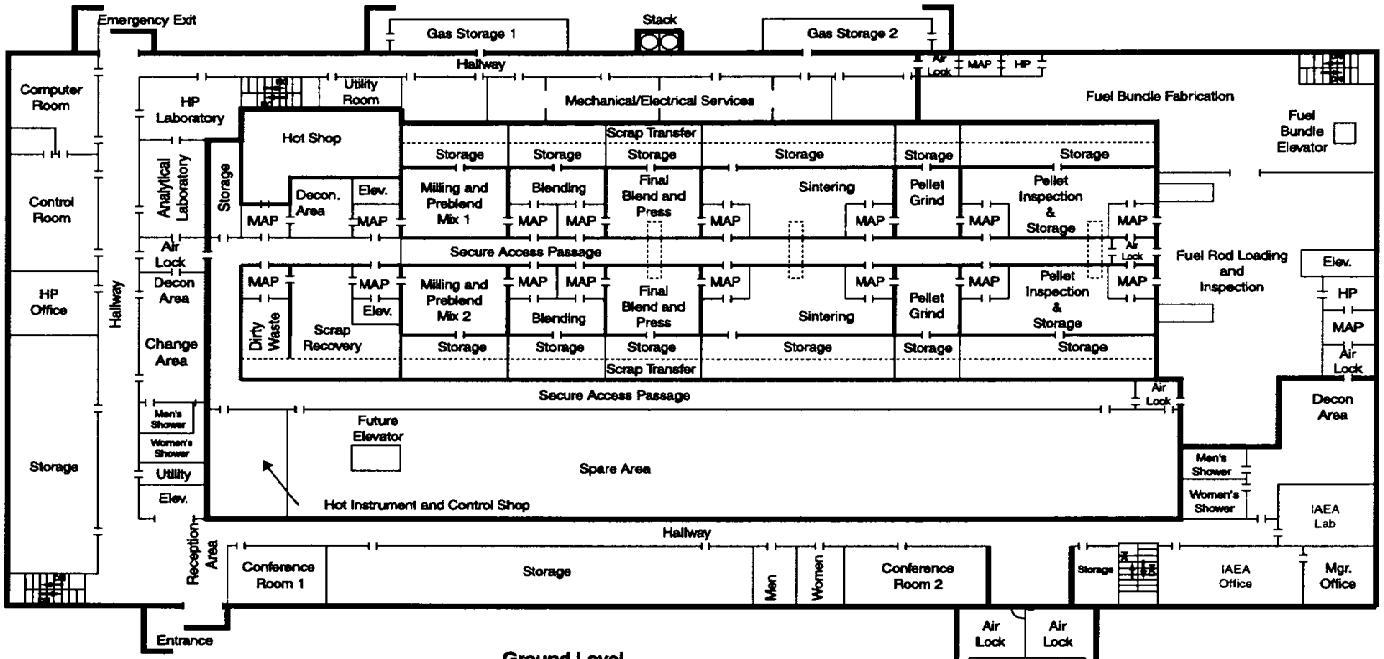
The proposed MOX facility would also include plutonium polishing (a small-scale aqueous process) to remove impurities,[12] in particular gallium, from the plutonium dioxide feed prior to MOX fuel fabrication. This initial plutonium-polishing process would be essentially that described in Appendix N of the SPD Draft EIS, and would add approximately 2,500 m^2 (27,000 ft^2) of process space and about 315 m^2 (3,400 ft^2) of nonhardened space for support functions to the MOX facility. However, the MOX facility layout depicted in Figures 2–14 and 2–15 has not been revised to show this process. This layout approximates how the MOX fuel fabrication process would be implemented. It is a conceptual design that would be updated in subsequent design phases should DOE choose the hybrid approach for surplus plutonium disposition in the ROD. If so, during the design process, the plutonium-polishing component would be integrated into the MOX facility design. The potential impacts of the MOX facility, including plutonium polishing, are evaluated in Chapter 4 and would be the same regardless of where the plutonium-polishing equipment would be located within the MOX facility.

2.4.3.1 MOX Facility Description

The MOX facility would be designed to process up to 3.5 t (3.8 tons) of surplus plutonium (as plutonium dioxide from the pit conversion facility) annually. Facility operations would require a staff of about 385 personnel. The MOX facility has been increased in size from about 11,000 m^2 (120,000 ft^2) in the SPD Draft EIS to about 20,000 m^2 (215,000 ft^2) to include the plutonium-polishing component and additional space proposed by DCS (DOE 1999a). However, about 2,000 m^2 (21,000 ft^2) of administrative space have been relocated from support facilities to the MOX facility, so the net increase in space needed to implement the MOX option is about 7,000 m^2 (75,000 ft^2). As depicted in Figures 2–14 and 2–15, the MOX facility would be a two-story, hardened, reinforced-concrete structure with a below-grade basement and an at-grade first floor. The facility would meet all applicable standards for processing special nuclear material. The walls, floors, and roof of the building would be constructed of about 46 cm (18 in) thick reinforced concrete. Areas of the facility in which plutonium would be processed or stored would be designed to survive natural phenomena such as earthquakes, floods, and tornadoes, as well as potential accidents associated with processing fissile and radioactive materials. Ancillary buildings would be required for support activities.

The fuel fabrication areas, two parallel process lines, would be at ground level. To accommodate the potential for fabricating a different type of fuel, the MOX facility would have sufficient unused space for the installation of another production-scale MOX fuel line. An inert atmosphere would be maintained in gloveboxes where dictated by process needs or safety concerns. The exhaust from the gloveboxes would be monitored continuously for radioactive contamination. The atmosphere in the gloveboxes would be kept at a lower pressure than that of the surrounding areas so that any leaks of gaseous or suspended particulate matter would be contained and filtered appropriately. The building ventilation system would include HEPA filters, and would be designed to maintain confinement, thus precluding the spread of airborne radioactive particulates or hazardous chemicals within the facility and to the outside environment. Both intake and exhaust air would be filtered, and exhaust gases would be monitored for radioactivity. Power would be supplied to the MOX facility by two independent offsite power supplies. An uninterruptible power supply and standby generators

[12] Table 2–2 lists the potential impurities.



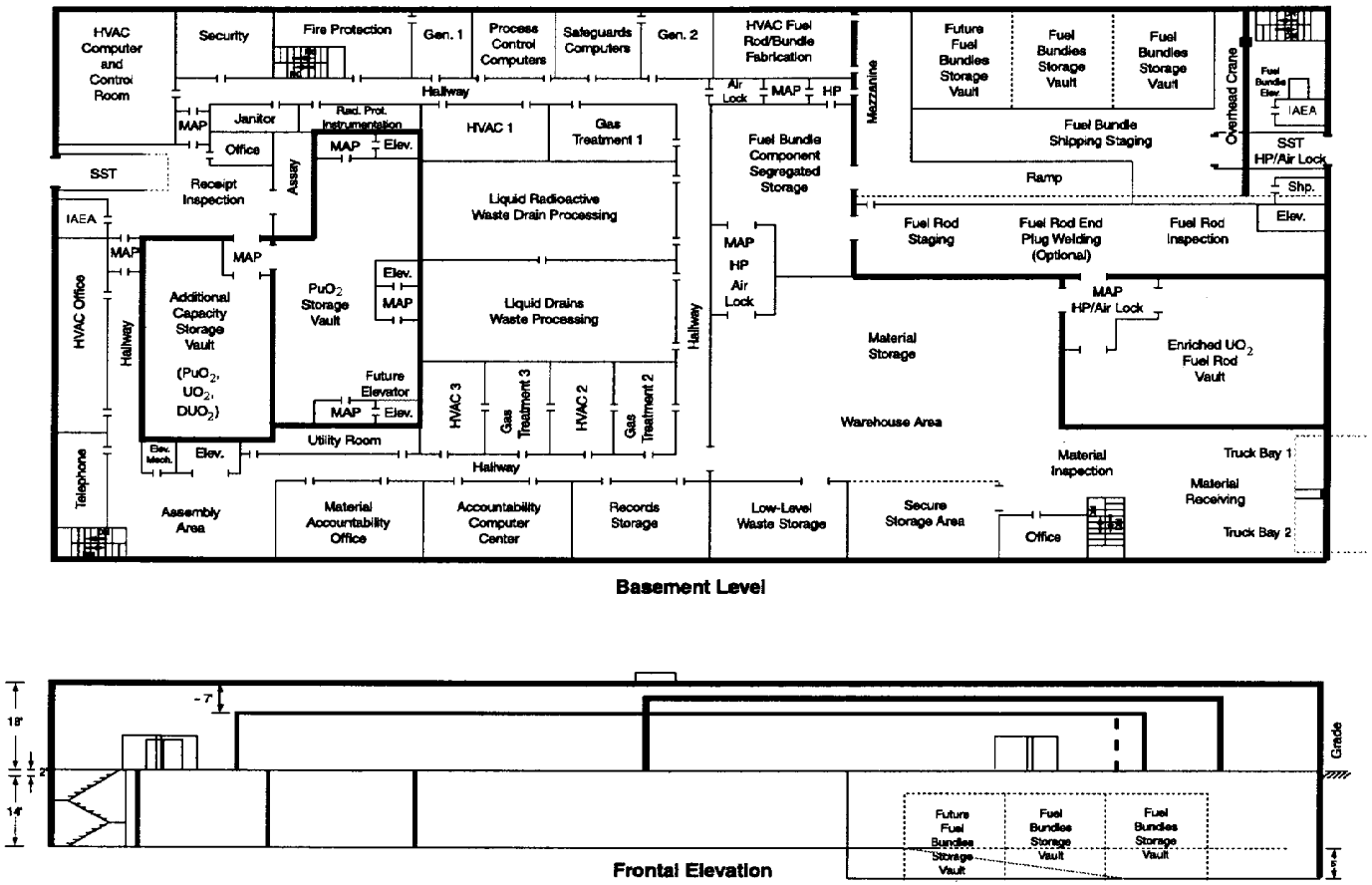
Notes:

1. Not Shown, 10,000–20,000 square foot office facility for related MOX mission support (e.g., training, scheduling, engineering, personnel), 20,000 square foot warehouse area for storage of shipping containers, and layout of plutonium polishing process.
2. Category 1 building.
3. Additional security facilities may be required.
4. Room/area sizes are approximate; actual arrangement will vary.

Decon	Decontamination
Elev	Elevator
HP	Health physics
HVAC	Heating, ventilation, and air conditioning
IAEA	International Atomic Energy Agency
Lab	Laboratory
MAP	Materials Accountability Program and safeguards and security functions (actual arrangement may vary)
Mgr	Manager's
▬	Structurally hardened wall
—	Shield wall

Source: UC 1998g.

Figure 2–14. General Design of MOX Facility—Ground Level



DUO_2	Depleted uranium dioxide	Mech	Mechanical
Elec	Electrical	Prot	Protection
Elev	Elevator	PuO_2	Plutonium dioxide
Gen	Generator	Rad	Radiation
HP	Health physics	Shp	Shipping
HVAC	Heating, ventilation, and air conditioning	SST	Safe, secure trailer
IAEA	International Atomic Energy Agency	UO_2	Uranium dioxide
MAP	Materials Accountability Program and safeguards and security functions (actual arrangement may vary)	▬	Structurally hardened wall
		—	Shield wall

Source: UC 1998g.

Notes:
1. Not Shown, 10,000–20,000 square foot office facility for related MOX mission support (e.g., training, scheduling, engineering, personnel), 20,000 square foot warehouse area for storage of shipping containers, and layout of plutonium polishing process.
2. Category 1 building.
3. Additional security facilities may be required.
4. Room/area sizes are approximate; actual arrangement will vary.

Figure 2–15. General Design of MOX Facility—Basement Level and Frontal Elevation

would provide backup power for critical systems. This arrangement would ensure continued operation of critical systems during any interruption of offsite power.

The basement level of the MOX facility would contain areas for support activities, including special nuclear material vault areas; general shipping and receiving docks; a general warehouse area; radioactive waste storage; assay facilities; emergency generators; heating, ventilation, and air-conditioning equipment; process gas and waste processing and treatment areas; the fuel rod fabrication area; and the fuel bundle assembly, storage, and shipping areas. Separate truck bays would be designed to accommodate the DOE SST/SGTs that would be used to transport the plutonium dioxide powder and the unirradiated fuel assemblies. Access control, office space, and warehouse facilities have been proposed for areas outside the secure MOX facility building. Facilities to support international or bilateral inspection and oversight activities would also be provided. Existing DOE site security and emergency services and environmental monitoring would support the MOX fuel fabrication mission.

MOX fuel is made from a mixture of plutonium dioxide and uranium dioxide. The uranium dioxide would be received from a commercial, NRC-licensed conversion facility. Conversion services for low-enriched uranium hexafluoride are commercially available in the United States at five facilities. As explained in Sections 2.4.4.2 and 2.4.4.3, for purposes of the analyses in this SPD EIS, the Portsmouth Gaseous Diffusion Plant near Piketon, Ohio, was analyzed as the representative facility for the source of depleted uranium hexafluoride to be converted into uranium dioxide.[13] An NRC-licensed commercial nuclear fuel fabrication facility in Wilmington, North Carolina, was used as a representative conversion facility.

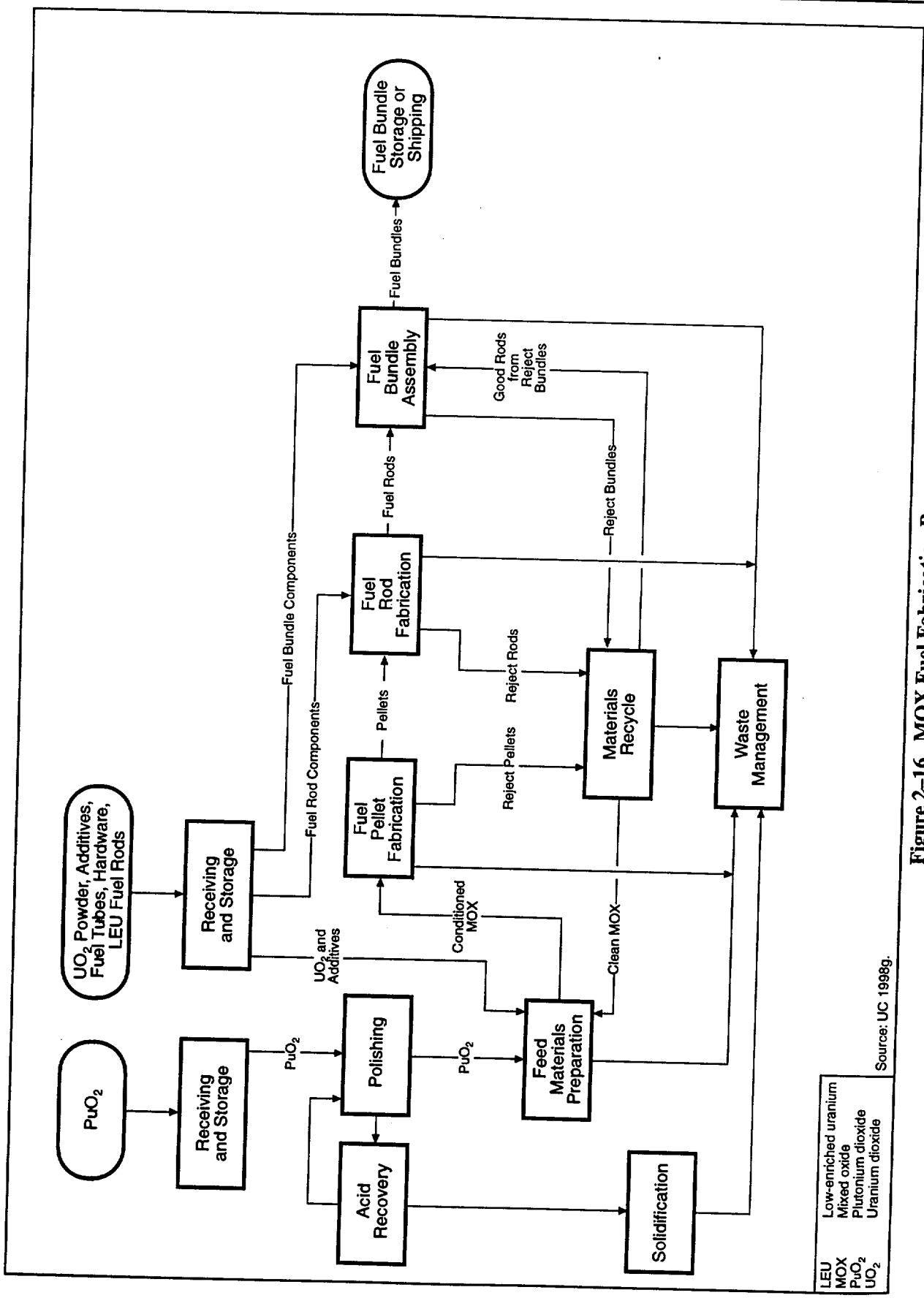
2.4.3.2 MOX Fuel Fabrication Process

Figure 2–16 provides an overview of the MOX fuel fabrication process. The vast majority of the MOX fuel matrix, about 95 percent, is uranium dioxide. MOX fuel fabrication is essentially the same process that is used to produce low-enriched uranium fuel for commercial nuclear power reactors, once the plutonium and uranium dioxide powders are blended together into a mixed oxide. Processing of feed materials would begin with the plutonium-polishing process to remove gallium, but the process would also remove other impurities, including americium, aluminum, and fluorides. This process would include three elements: dissolution of the plutonium in nitric acid, removal of impurities by chemical separation (solvent extraction), and conversion of the plutonium back to an oxide powder by precipitation. Acid recovery steps, by which nearly all the nitric acid would be recovered and reused in the process, would also be included.

To begin the process, plutonium dioxide feedstock would be dissolved in near-boiling nitric acid with a silver nitrate catalyst. This solution would then be transferred to the solvent extraction process. Following solvent extraction, the plutonium would be converted from a nitrate solution back to an oxide powder through an oxalate precipitation, filtration, and calcination process. The resulting plutonium dioxide, verified to meet fabrication requirements, would then be transferred into containers for storage until needed, or transferred directly to the MOX fuel fabrication steps.

MOX fuel fabrication would begin with blending and milling the plutonium dioxide powder to ensure general consistency in enrichment and isotopic concentration. The uranium and plutonium powders would be blended and milled together to ensure uniform distribution of the plutonium in the MOX, and to adjust the particle size of the MOX powder. The MOX powder would then be made into pellets by pressing the powder into shape, sintering (baking at high temperature) the formed pellets, and grinding the sintered pellets to the proper

[13] In July 1999, DOE submitted its *Final Plan for the Conversion of Depleted Uranium Hexafluoride* to Congress and is finalizing a request for proposals for, among other depleted uranium hexafluoride management activities, construction and operation of a depleted uranium hexafluoride conversion facility at one or more gaseous diffusion plants.



Source: UC 1998g.

Figure 2–16. MOX Fuel Fabrication Process

dimensions. Materials and pellets would be inspected at each stage, and any rejected materials would be returned to the process for reuse. Most operations would be performed in sealed gloveboxes with inert atmospheres. Sintering furnaces would also be sealed, and offgases would be filtered and monitored prior to release to the atmosphere.

The finished pellets would be moved to the fuel rod fabrication area, where they would be loaded into empty rods. The rods would be sealed, inspected, and decontaminated, then bundled together to form fuel assemblies. Fuel assemblies would consist of only MOX rods or a mixture of MOX and low-enriched uranium rods. Low-enriched uranium rods used in fuel assembly fabrication would be fabricated at another of the fuel fabricator's facilities and brought to the MOX facility for final assembly with the MOX rods. Any rejected fuel bundles would be disassembled, and the materials recycled. Usable rods would be reassembled into new fuel assemblies. Pellets from rods not meeting final product specifications would be crushed and returned to the fabrication process, and decontaminated tubes and hardware would be recycled offsite as scrap metal. Storage for 2 years' production of fuel assemblies would be provided at the MOX facility. Individual fuel assemblies could be stored for that long prior to shipment to the designated domestic, commercial reactor, although production is anticipated to closely follow product need.

The plutonium-polishing process would produce aqueous waste containing the separated impurities (e.g., gallium, americium, aluminum, and fluorides). The liquid wastes from the various impurity removal processes would be transferred to a waste feed tank for evaporation and chemical treatment as required. The evaporator condensate would be treated to produce concentrated acid and acidified water for reuse. The evaporator concentrate would be chemically denitrated, and the offgas from the denitrator scrubbed to produce concentrated nitric acid for reuse. The impurities removed during these processes would be concentrated and solidified for disposal as TRU waste.

Solid wastes generated from process operations would include glovebox gloves, equipment, tools, wipes, and glovebox and HEPA filters. These materials would be removed from the process glovebox lines and transferred to a waste packaging glovebox. Nonprocess materials would be decontaminated to remove residual plutonium. The plutonium would be returned to the dissolution step, and the waste materials would be packaged, assayed, and disposed of as either TRU or LLW, as appropriate.

2.4.4 Transportation Activities

The plutonium disposition alternatives examined in this SPD EIS would require DOE to ship surplus plutonium-bearing materials from their current storage locations, shown in Figure 1–1, to the proposed disposition facility locations for processing. Table 2–3 is an overview of the different types of shipments that would be required for each proposed disposition facility and the vehicles in which the shipments would be made.

The overland transportation of any commodity involves a risk to both the transportation crew and members of the public. The risk results directly from transportation-related accidents and indirectly from the increased levels of pollution from vehicle emissions, regardless of the cargo. The transportation of hazardous or radioactive materials poses an additional risk due to the unique nature of the material being transported. Chapter 4 and Appendix L discuss the risks associated with the transportation of these materials and the steps that would be taken to mitigate these risks as they relate to this SPD EIS.

Table 2–3. Facility Transportation Requirements

Required Shipment	Vehicle[a, b]
Pit Conversion Facility	
Intersite shipment of surplus pits and clean metal to the pit conversion facility	SST/SGT
Recovered HEU from the pit conversion facility to ORR	SST/SGT
[Text deleted.]	
Plutonium dioxide to the immobilization or MOX facility	SST/SGT
Immobilization Facility	
Under Alternatives 11B and 12B, plutonium dioxide from the pit conversion facility[c]	SST/SGT
Surplus nonpit plutonium to the immobilization facility[d]	SST/SGT
Depleted uranium hexafluoride from one of DOE's sites at a gaseous diffusion plant to a conversion facility (ceramic immobilization option only)[e]	Commercial truck
Uranium dioxide from the conversion facility to the immobilization facility (ceramic immobilization option only)	Commercial truck
Immobilized plutonium from immobilization facility to the HLW vitrification facility (intrasite transport)	Special transport vehicle
Vitrified HLW with immobilized plutonium to a potential geologic repository	Commercial truck
MOX Facility[f]	
Under Alternatives 4 and 5, plutonium dioxide from the pit conversion facility[g]	SST/SGT
Depleted uranium hexafluoride from one of DOE's sites at a gaseous diffusion plant to a commercial conversion facility[e]	Commercial truck
Uranium dioxide from the conversion facility to the MOX facility	Commercial truck
Uranium fuel rods from a commercial fuel fabrication facility to the MOX facility[h]	Commercial truck
MOX fuel bundles to selected domestic, commercial reactors	SST/SGT
MOX spent fuel from domestic, commerical reactors to a potential geologic repository[i]	Commercial truck
Lead Assembly Fabrication Facility	
Plutonium dioxide from LANL to a lead assembly facility at a location other than LANL	SST/SGT
For lead assembly fabrication at LANL, intrasite movement of plutonium materials	Special transport vehicle
Depleted uranium hexafluoride from one of DOE's sites at a gaseous diffusion plant to a commercial conversion facility[e]	Commercial truck
Uranium dioxide from the conversion facility to the lead assembly facility	Commercial truck
Uranium fuel rods from a commercial fuel fabrication facility to the lead assembly facility	Commercial truck
MOX fuel bundles to the selected domestic, commercial reactor	SST/SGT
Irradiated lead assemblies or rods from the reactor to an examination site	Commerical truck
Spent fuel from an examination site to INEEL for storage[j]	Commercial truck
Spent fuel from INEEL to a potential geologic repository[i]	Commercial truck

[a] All containers and vehicles will meet Department of Transportation requirements.
[b] Commercial trucks will be driven by drivers certified to meet all radioactive materials transportation requirements.
[c] Under Alternatives 11A and 12A, the two facilities would be collocated; therefore, the transfer of the plutonium dioxide would not require any over-the-road transportation.
[d] For cases where the surplus nonpit plutonium requires offsite transportation.
[e] DOE is considering building one or more facilities at the gaseous diffusion plant(s) to convert depleted uranium hexafluoride to an oxide form.
[f] Some equipment for the MOX facility may be manufactured in Europe and shipped to the United States. No nuclear or radiologically contaminated materials would be transported. Any such shipments would be made by commercial vessel, and no impacts other than those occurring from routine commercial shipping would be expected.
[g] Under Alternatives 2, 3, 6A, 6B, 7, 8, 9, and 10, the two facilities would be collocated; therefore, the transfer of the plutonium dioxide would not require any over-the-road transportation.
[h] For cases where the fuel assemblies are a combination of MOX and low-enriched uranium fuel rods.
[i] Shipments of spent fuel are analyzed in the *Draft EIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*.
[j] Shipments of spent fuel within the DOE complex are analyzed in the *DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final EIS*.

Key: HEU, highly enriched uranium; HLW, high-level waste; LANL, Los Alamos National Laboratory; ORR, Oak Ridge Reservation; SST/SGT, safe, secure trailer/SafeGuards Transport.

2.4.4.1 Pit Conversion Transportation Requirements

To implement any of the disposition alternatives being considered in this SPD EIS, clean plutonium metal and surplus pits would need to be shipped from current storage locations around the DOE complex to the proposed location of the pit conversion facility. Due to the attractiveness of these materials for use in constructing nuclear weapons, all intersite shipments would be made in DOE SST/SGTs.[14] In the alternatives that include locating the pit conversion facility at Pantex, where surplus pits are stored, the transfer of the surplus pits from onsite storage to the pit conversion facility would be made in specially designed transport vehicles that are routinely used to transport pits around the site. This would reduce the number of intersite trips and the distance that would have to be traveled to transport pits to the pit conversion facility. Also, as discussed in Appendix L, the dose associated with transferring the pits from storage to the pit conversion facility at Pantex could be reduced because the pits would be transferred from current storage locations to the pit conversion facility without being repackaged into the shipping containers that would be required for intersite transport.

After conversion, the plutonium from the pit conversion facility would be in the form of plutonium dioxide. For most of the alternatives, this material would be transferred from the pit conversion facility to either the immobilization or MOX facility through a secure underground tunnel. In Alternatives 6B and 11A, where the pit conversion facility is collocated in the same building with another disposition facility, the plutonium dioxide would be transferred within the building. However, several alternatives (4A, 4B, 5, 11B, and 12B) locate the pit conversion facility at Pantex and immobilization and/or MOX facilities at another site. The reason for including these alternatives is that the vast majority of the surplus pits are stored at Pantex. Less intersite transportation would be required to move these pits to the pit conversion facility, and the doses associated with repackaging pits into shipping containers at Pantex would be avoided. Under these alternatives, the plutonium dioxide from the pit conversion facility would be shipped in SST/SGTs to the other proposed disposition facilities.

HEU recovered during the pit disassembly process would be shipped via SST/SGT to ORR for declassification, storage, and eventual disposition.[15] The HEU would be decontaminated at the pit conversion facility, and would meet Y–12 acceptance criteria prior to shipment.

2.4.4.2 Immobilization Transportation Requirements

Figure 2–17 shows the transportation requirements for the proposed immobilization disposition activities. Surplus nonpit plutonium in various forms would be moved from current storage locations (i.e., Hanford, INEEL, LLNL, LANL, the Rocky Flats Environmental Technology Site [RFETS], and SRS) to the proposed immobilization facility location, either Hanford or SRS. The quantity of plutonium contained in these materials dictates that they be subjected to the same safeguards and security requirements as materials that could be used in nuclear weapons. Therefore, intersite shipments would be made in SST/SGTs.

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[14] The SST/SGT is a specially designed component of an 18-wheel tractor-trailer vehicle. Although the details of the vehicle enhancements are classified, key characteristics are not, and include: enhanced structural supports and a highly reliable tie-down system to protect cargo from impact; heightened thermal resistance to protect the cargo in case of fire; deterrents to protect the unauthorized removal of cargo; couriers who are armed federal officers and receive rigorous training and are closely monitored through DOE's Personnel Assurance Program; an armored tractor to protect the crew from attack and advanced communications equipment; specially designed escort vehicles containing advance communications and additional couriers; 24-hr-a-day real-time monitoring of the location and status of the vehicle; and significantly more stringent maintenance standards.

[15] Shipments would be in accordance with the *Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above the Maximum Historical Storage Level at the Y–12 Plant, Oak Ridge, Tennessee* (DOE/EA-0929, September 1994; FONSI, September 1995). Storage would be in accordance with the ROD for the *Storage and Disposition PEIS*; disposition would be in accordance with the ROD for the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (61 FR 40619, August 5, 1996).

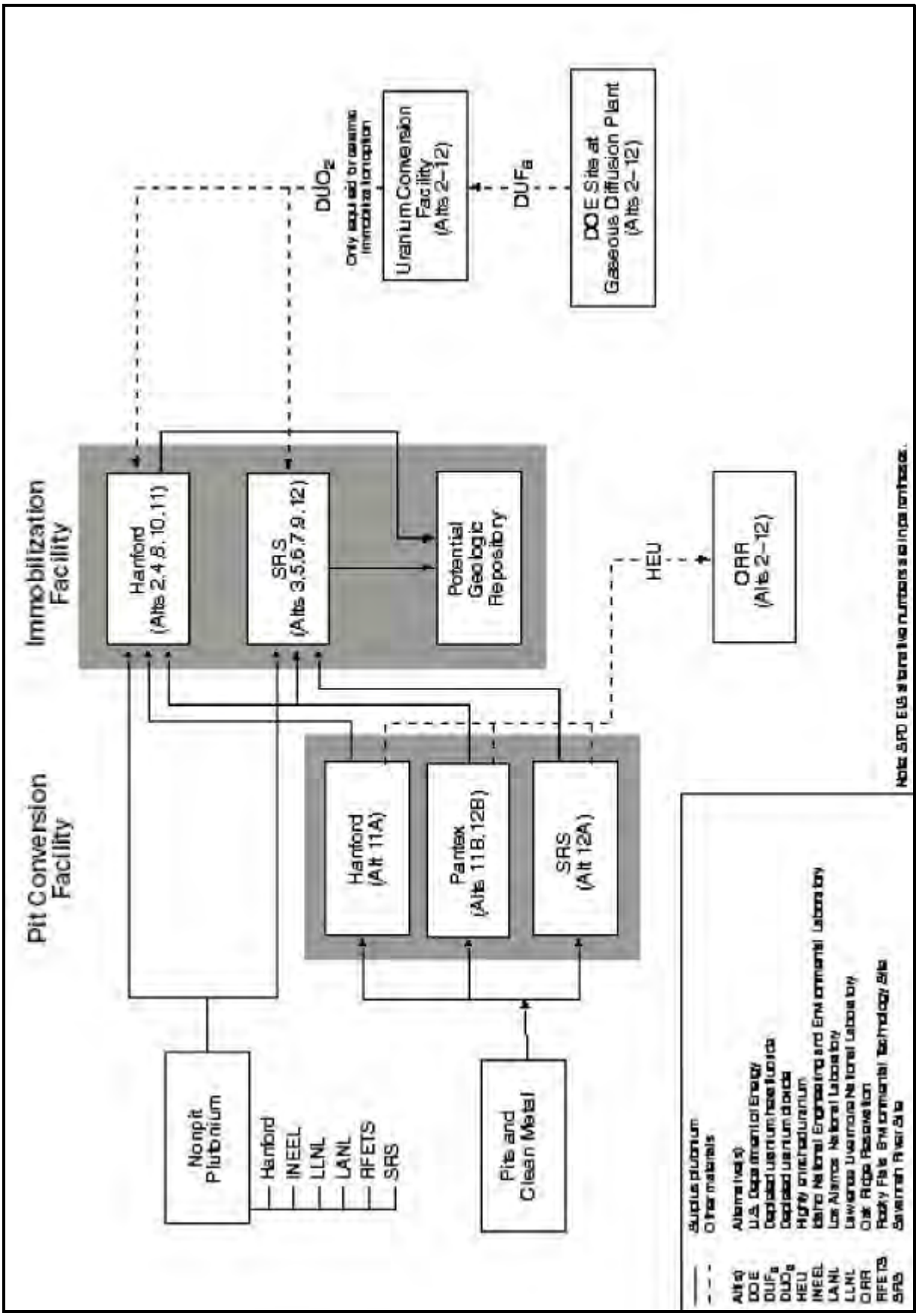

Figure 2–17. Transportation Requirements for Plutonium Conversion and Immobilization

For Alternatives 11 and 12, where all the surplus plutonium would be immobilized, the plutonium dioxide from the pit conversion facility would also be transferred to the immobilization facility. For Alternative 11A, both facilities would be collocated in FMEF and the transfer would take place within the same building. For Alternative 12A, the transfer would be made between the two facilities at SRS through a secure underground tunnel and would not require any vehicular transportation. [Text deleted.] However, as discussed in Section 2.4.4.1, for Alternatives 11B and 12B, the plutonium dioxide would be shipped from the pit conversion facility at Pantex to the immobilization facility at either Hanford or SRS in SST/SGTs.

Surplus plutonium destined for immobilization would be immobilized in either a ceramic or glass form, placed in small stainless steel cans and then into HLW canisters at the immobilization facility. The canisters would then be transported in specially designed intrasite transport vehicles to an HLW vitrification facility (either DWPF at SRS, or the planned HLW vitrification facility at Hanford). In keeping with the current practice at these sites for this type of shipment, this intrasite transportation could require roads at Hanford or SRS to be closed temporarily while the material would be transported from one area of the site to another. This practice would provide all needed security measures and mitigate potential risk to the public, without requiring the use of SST/SGTs for intrasite transfers.

Immobilization alternatives at Hanford could involve the transfer of plutonium between FMEF and the immobilization annex. This transfer would occur either through an underground tunnel or by surface vehicle within the protected security zone.

Immobilization of the plutonium as a ceramic material also requires a small amount of depleted uranium dioxide (i.e., less than 10 t/yr [11 tons/yr]) as discussed in Section 2.4.2.2.2. This depleted uranium dioxide could be produced by shipping depleted uranium hexafluoride from one of DOE's storage areas at a gaseous diffusion plant in Kentucky, Ohio, or Tennessee via commercial truck to a commercial site for conversion to depleted uranium dioxide. Possible sites for this conversion include nuclear fuel fabrication facilities in Missouri, North Carolina, South Carolina, or Washington, or a uranium conversion facility in Illinois. After conversion at one of these sites, the uranium dioxide would be shipped on a commercial truck to either Hanford or SRS for use in the immobilization facility. Because the risks associated with transporting either depleted uranium hexafluoride or depleted uranium dioxide are extremely low, the shipments could be made to or from any of the locations discussed above and not significantly affect the overall risks associated with the transportation required in this SPD EIS. For the purposes of quantifying the transportation analysis in this SPD EIS, it was assumed that the depleted uranium hexafluoride would be shipped from the DOE facility at the Portsmouth Gaseous Diffusion Plant near Piketon, Ohio, to an NRC-licensed commercial nuclear fuel fabrication facility in Wilmington, North Carolina, for conversion.

After the immobilized plutonium would be encased by HLW at the HLW vitrification facility, it would eventually be shipped to a potential geologic repository for ultimate disposal. Because the cans of immobilized plutonium would displace some of the HLW that would otherwise fill the canister, additional canisters would have to be filled over the life of the immobilization program to address this displaced HLW. It is estimated that up to 395 additional canisters of HLW would result from the decision to immobilize all 50 t (55 tons) of surplus plutonium. The *Draft Environmental Impact Statement for* a *Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (*Yucca Mountain Draft EIS*), (DOE 1999b) analyzed a number of different options for the shipment of these canisters using either trucks or trains. The analysis in the *Yucca Mountain Draft EIS* indicated that the risks would be lower if the canisters were shipped by train. However, no ROD has been issued regarding these shipments. To bound the risks, this SPD EIS has taken the most conservative analytical approach (i.e., the approach that results in the highest risk to the public) and assumed that all of these shipments would be made by truck to the potential geologic repository, with one canister being loaded on each truck.

2.4.4.3 MOX Transportation Requirements

To implement the MOX disposition alternatives being considered in this SPD EIS, plutonium dioxide from the pit conversion facility would have to be transferred to the MOX facility. Under all the MOX alternatives except Alternatives 4A, 4B, and 5, the pit conversion and MOX facilities would be located at the same site. Figure 2–18 shows the transportation requirements for the proposed MOX disposition activities. ForAlternative 6B, the transfer would take place within the same building (FMEF). Under Alternatives 2, 3, 6A, 7 , 8, 9, and 10, current designs assume that facility materials would be transferred between the two facilities through a secure, underground tunnel. No vehicular transportation over public roads would be required for any of these alternatives. However, as discussed in Section 2.4.4.1, for Alternatives 4A, 4B, and 5, the plutonium dioxide would be shipped in SST/SGTs from the pit conversion facility at Pantex to the MOX facility at either Hanford or SRS.

MOX fuel fabrication also requires uranium dioxide. Depleted uranium dioxide could be produced by shipping depleted uranium hexafluoride from one of DOE's storage areas at a gaseous diffusion plant in Kentucky, Ohio, or Tennessee via commercial truck to a commercial site for conversion to depleted uranium dioxide. Possible sites for this conversion include nuclear fuel fabrication facilities in Missouri, North Carolina, South Carolina, or Washington, or a uranium conversion facility in Illinois. After conversion at one of these sites, the uranium dioxide would be shipped on a commercial truck to Hanford, INEEL, Pantex, or SRS for use in the MOX facility. Because the radiological risks associated with transporting either depleted uranium hexafluoride or depleted uranium dioxide are extremely low, the shipments could be made from or to any of the locations discussed above and not significantly change the overall risks associated with the transportation required in this SPD EIS. For the purposes of quantifying the transportation analysis in this SPD EIS, representative sites for obtaining the depleted uranium dioxide were chosen. The Portsmouth Gaseous Diffusion Plant near Piketon, Ohio, represents the source of the depleted uranium hexafluoride and an NRC-licensed commercial nuclear fuel fabrication facility in Wilmington, North Carolina, represents the conversion facility.

After conversion, the depleted uranium dioxide would be shipped on a commercial truck from the conversion facility to the MOX facility. After fabrication, the MOX fuel would be shipped to Catawba, McGuire, or North Anna where it would be inserted into the reactor and irradiated. These shipments would be made in SST/SGTs because unirradiated MOX fuel in large enough quantities is subject to security concerns similar to those associated with weapons-grade plutonium. [Text deleted.]

It is also possible that some equipment for the MOX facility may be manufactured in Europe and shipped to the United States. No nuclear or radiologically contaminated materials would be transported. Any such shipments would be made by commercial vessel, and no impacts other than those occurring from routine commercial shipping would be expected.

2.4.4.4 Lead Assembly and Postirradiation Examination Transportation Requirements

To implement the MOX disposition alternatives being considered in this SPD EIS, MOX fuel assemblies would be fabricated, irradiated, and tested before the actual production of MOX fuel. Figure 2–19 shows the transportation requirements for the proposed lead assembly activities. As described in Section 2.17, plutonium dioxide from the Pit Disassembly and Conversion Demonstration Project at LANL would be shipped in SST/SGTs to one of four candidate DOE facilities (Hanford, ANL–W, LLNL, or SRS), or remain at LANL, for fabrication into lead assemblies. If the lead assemblies were to be fabricated at LANL, the plutonium dioxide would be transferred from the pit conversion demonstration to the lead assembly fabrication area within the same plutonium processing building (PF–4), in Technical Area 55 (TA–55), for MOX pellet production. Any intrasite transfers of plutonium outside of TA–55 would be in special vehicles in accordance

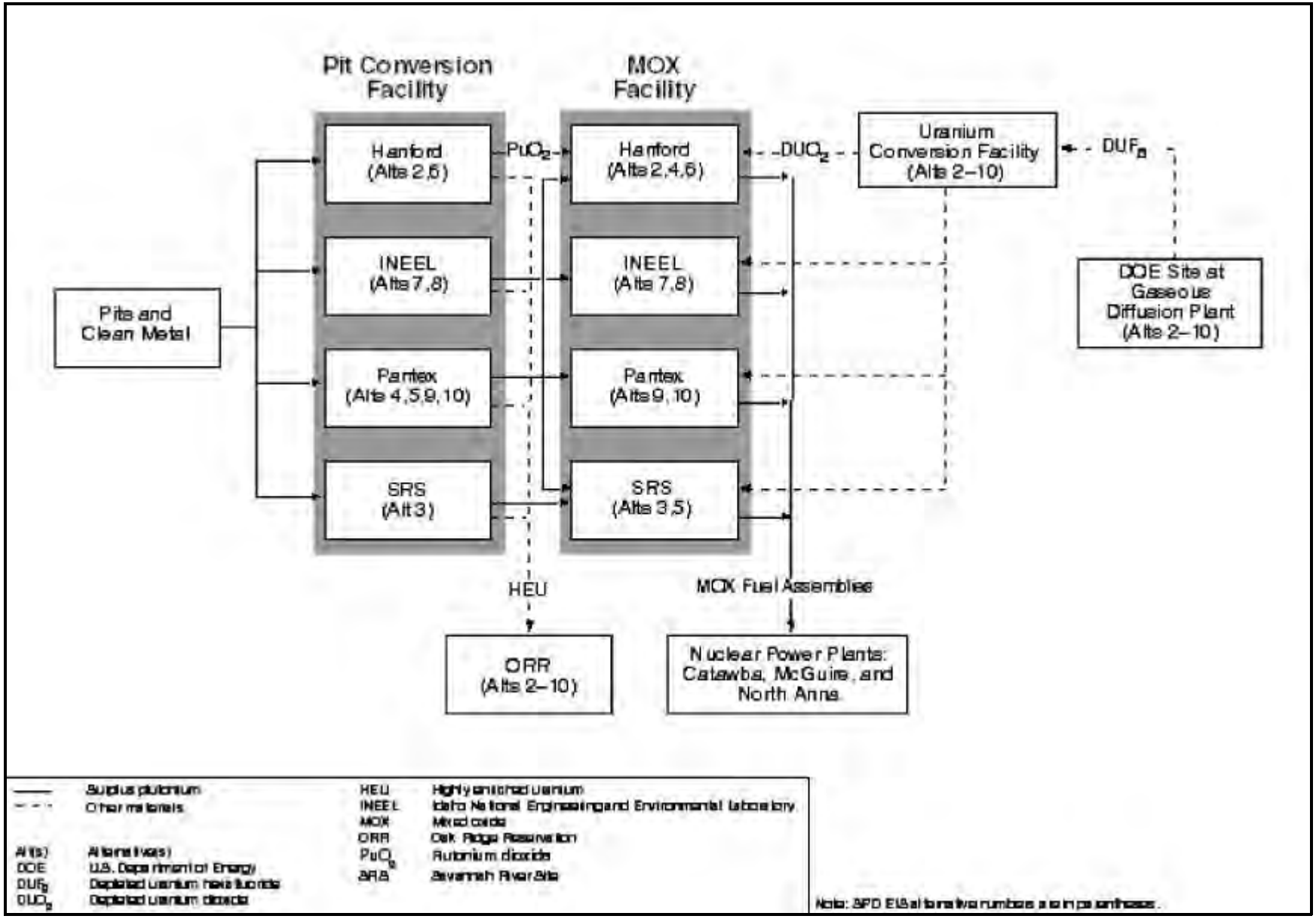

Figure 2–18. Transportation Requirements for MOX Fuel Fabrication

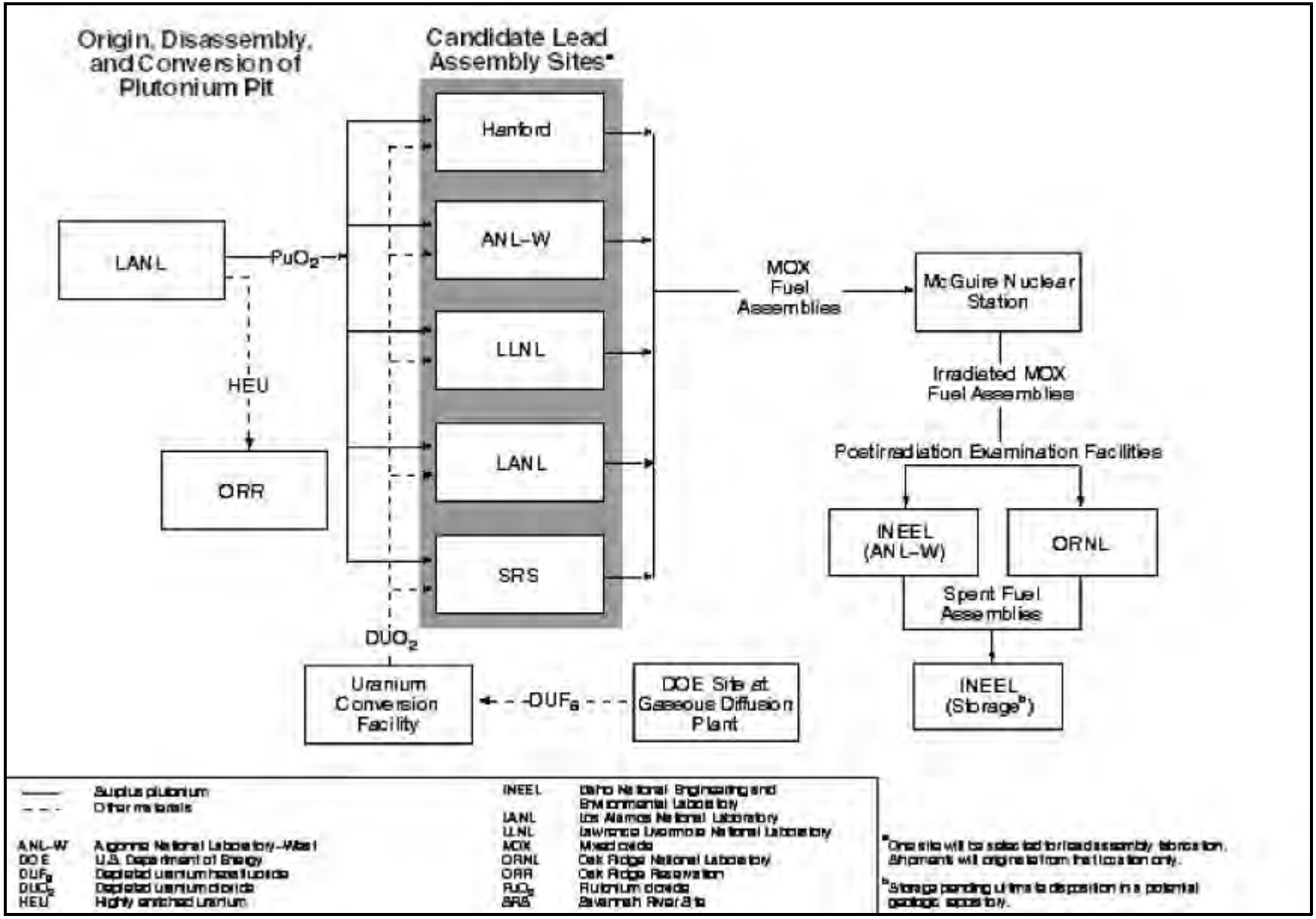

Figure 2–19. Transportation Requirements for Lead Assembly Fabrication

with site practices for this type of shipment. This intrasite transportation could require temporary road closures while the material would be moved from one area of the site to another. This practice would provide all needed security and mitigate potential risk to the public, without requiring the use of SST/SGTs for intrasite transfers.

The depleted uranium needed to support this effort is assumed to be shipped from one of DOE's storage areas at the Portsmouth Gaseous Diffusion Plant near Piketon, Ohio, to the nuclear fuel fabrication facility in Wilmington, North Carolina, for conversion, and then to the lead assembly fabrication site. All the transportation associated with depleted uranium would be via commercial truck.

After fabrication, the lead assemblies would be shipped to McGuire Nuclear Station[16] near Huntersville, North Carolina, for irradiation. These shipments would be made in SST/SGTs because unirradiated MOX fuel in large enough quantities is subject to security concerns similar to those associated with weapons-grade plutonium. Although the Preferred Alternative would fabricate lead assemblies at LANL, the lead assemblies could be fabricated as far away from McGuire as Hanford. Because transportation impacts are proportional to distance, the transportation analysis assumes, in order to evaluate the maximum potential impact, that the reactor will be 5,000 km (3,100 mi) from the lead assembly fabrication facility, the approximate distance between Hanford and McGuire. Transportation impacts would be proportionally less for other sites closer to McGuire.

After irradiation, the lead assemblies may be shipped from the reactor site to a postirradiation examination facility for analysis. Postirradiation examination, if required, would occur at one of two DOE sites, ANL–W or ORNL. As discussed in Section 2.1.3, these are the only two sites that have the capability to conduct postirradiation examination without major modifications to facility and processing capabilities. These shipments would be via commercial truck because the MOX fuel would be irradiated, thereby removing the proliferation concerns associated with plutonium. Because the actual postirradiation facility that would be used has not been selected (ORNL has been identified as the preferred location), the transportation analysis assumes that it will be 4,000 km (2,500 mi) from the reactor site where the lead assemblies were irradiated. This is the approximate distance between McGuire and ANL–W, the maximum distance that the irradiated lead assemblies would be transported. Any postirradiation examination activities and shipments of spent fuel remaining after postirradiation examination would comply with the Consent Order and Settlement Agreement in Public Service Company of Colorado v. Batt and all other applicable agreements and orders, including provisions concerning removal of the material from the applicable examination site and limits on the number of truck shipments to the site.

2.4.4.5 Other Transportation Requirements

All the alternatives being considered in this SPD EIS require some overland transportation of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities. The proposed action does not result in a large increase in waste generation at any of the candidate sites, and transportation would be handled in the same manner as other site waste shipments. In addition, the shipments would not represent any new, different, or additional risks beyond those associated with existing waste shipments at these sites, as analyzed in the WM PEIS. The possible exceptions are the alternatives that consider siting disposition facilities at Pantex and the alternative that considers placing the lead assembly fabrication facility at LLNL. Because Pantex does not currently generate any TRU waste and does not have any TRU waste in storage, the WM PEIS did not consider TRU waste being shipped from Pantex to the Waste Isolation Pilot Plant (WIPP). Therefore, a small number of shipments of TRU waste to WIPP via commercial truck have been included in the transportation analysis in this SPD EIS. In addition, the projected amount of LLW generated by the proposed action would represent a large percentage of this waste type at both Pantex and LLNL, as analyzed in the WM PEIS. Because these sites ship

[16] Based on information provided by DCS, DOE has identified McGuire as its preference for irradiating lead assemblies.

LLW to the Nevada Test Site (NTS) for disposal, the transportation analysis in this SPD EIS includes a small number of shipments of LLW from Pantex and LLNL to NTS via commercial carrier.

2.5 ALTERNATIVE 1: NO ACTION

In the No Action Alternative, surplus weapons-usable plutonium materials in storage at various DOE sites shown in Figure 1–1 would remain at those locations. The vast majority of pits would continue to be stored at Pantex, and the remaining plutonium in various forms would continue to be stored at Hanford, INEEL, LLNL, LANL, RFETS, and SRS. The No Action Alternative would not satisfy the purpose and need for the proposed action because DOE's disposition decisions in the *Storage and Disposition PEIS* ROD would not be implemented. The ROD announced that, consistent with the Preferred Alternative in the *Storage and Disposition PEIS*, DOE had decided to reduce, over time, the number of locations where the various forms of plutonium are stored, through a combination of storage and disposition alternatives. Implementation of much of this decision requires the movement of surplus materials to disposition facility locations. Pits that have been moved from RFETS to Pantex would be relocated in accordance with the *Storage and Disposition PEIS* ROD, as amended.[17] Other surplus materials would continue to be stored indefinitely at their current locations, with the exception that DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage.[18] An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

2.6 ALTERNATIVE 2: ALL FACILITIES AT HANFORD

Pit Conversion in FMEF; Immobilization in FMEF and the HLW Vitrification Facility; MOX Fuel Fabrication in New Construction

This alternative would involve locating the three proposed surplus plutonium disposition facilities in the 400 Area at Hanford, combining the use of an existing building, FMEF, with new construction (see Figure 2–20). Canister filling would be accomplished at the planned HLW vitrification facility in the 200 East Area[19] (see Figure 2–21), about 24 km (15 mi) northwest of the 400 Area. FMEF, completed in 1984, is a reinforced concrete process building with an attached mechanical equipment wing on the west side, and an entry wing with administrative space across the south side. The building has six levels, two of which are below grade. FMEF was designed and constructed to fabricate fast breeder reactor fuel, but it has not been used for any major projects to date. The building has been modified since 1984, and the utility systems and support systems, including the ventilation system, have been completed. Designed to handle highly radioactive materials, FMEF includes a number of thick-walled cells surrounded by corridors. Space for offices,

[17] Recent studies have indicated that cost savings could be realized from the transfer of nonpit materials from RFETS and Hanford to SRS earlier than specified in the *Storage and Disposition PEIS* ROD. A Supplement Analysis was prepared, and based on this analysis, DOE determined that a supplemental PEIS would not be needed; an amended ROD was issued in August 1998 (63 FR 43386) and included decisions to accelerate shipment of all nonpit surplus plutonium from RFETS to SRS and to relocate all Hanford surplus plutonium to SRS, should SRS be selected as the immobilization disposition site.

[18] Should the No Action Alternative be chosen, the ROD pursuant to this SPD EIS would also address movement of the remaining surplus nonpit plutonium from RFETS in support of its planned closure in 2006.

[19] The planned HLW vitrification facility is described in the *Tank Waste Remediation System Final Environmental Impact Statement* and is currently scheduled to be available in a timeframe that would meet the needs of the surplus plutonium disposition program.

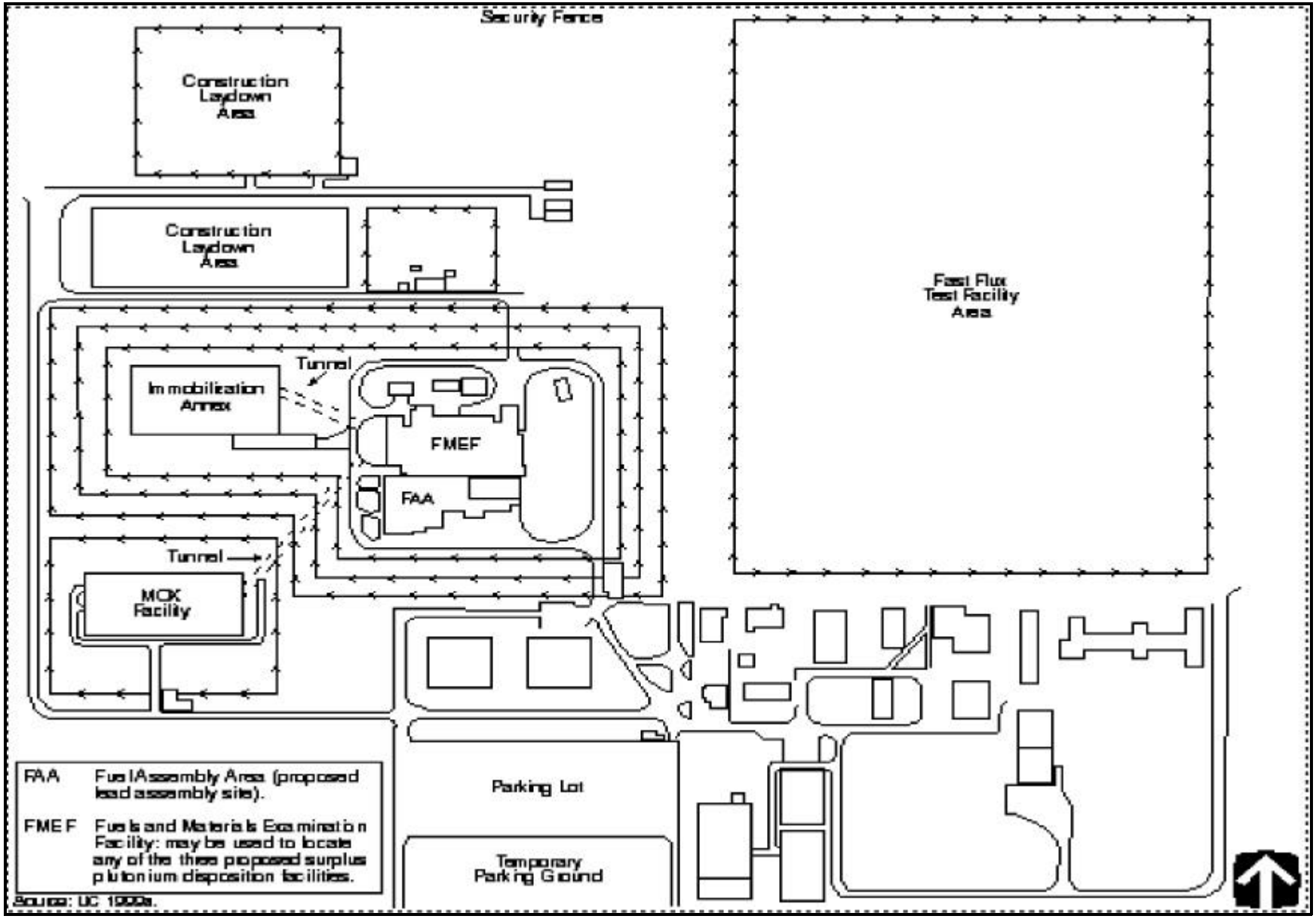

Figure 2–20. Proposed Facility Locations in the 400 H-Area at Hanford (Hybrid Alternative Shown)

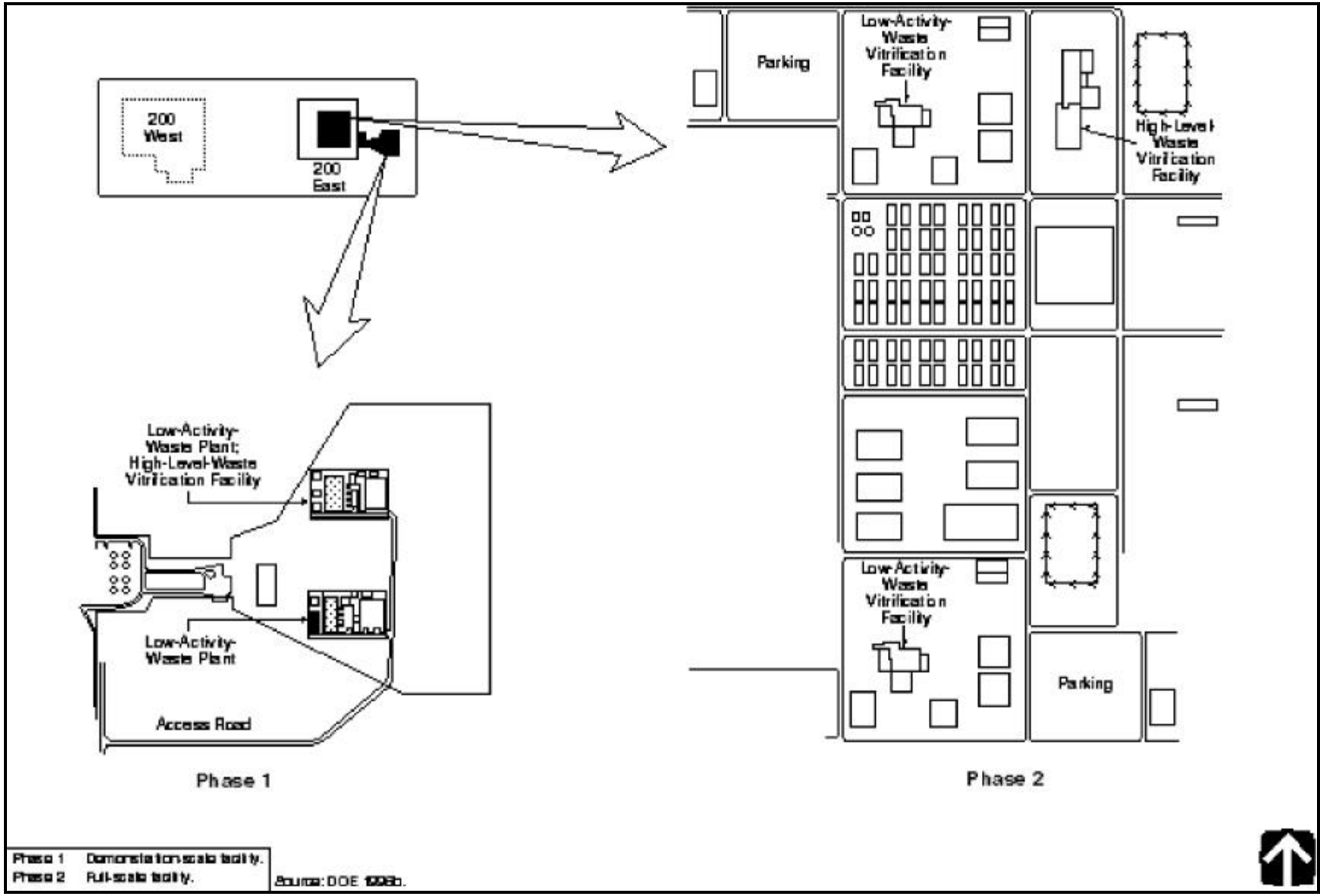

Figure 2–21. Location of Planned HLW Vitrification Facility in the 200 Area at Hanford (Proposed Location of Canister-Filling Operations)

laboratories, control rooms, utilities, and other activities is available around the interior perimeter of the building. Modification to the interior spaces would be required to use the building for surplus plutonium disposition activities. No radioactive materials have been introduced into the building, so the modification would neither generate radioactive waste nor contribute radiological dose to the construction workforce. The building is large enough to house facilities for only two of the three proposed disposition activities. Therefore, this alternative calls for collocation of the pit conversion and immobilization facilities in FMEF, and the construction of a new building close to FMEF to house the MOX facility.

In this alternative, the pit conversion facility would occupy the lower floors of FMEF, and the immobilization facility, the upper two floors. About 13,000 m^2 (140,000 ft^2) of space on the −35-ft, −17-ft, ground, and +21-ft levels would be modified to support pit disassembly and conversion activities. Not all the space on every floor would be required for pit disassembly and conversion activities, but the floors would be predominately associated with that process.

Plutonium conversion and immobilization activities would primarily occupy the +42- and +70-ft levels. While a portion of the +42-ft level would be shared by the two facilities, most of the floor would be dedicated to the immobilization facility, which would occupy about 17,000 m^2 (183,000 ft^2). Both facilities would share utilities, loading docks, and security assets. The large shipping and receiving area of FMEF would allow for housing a number of SST/SGTs.

The immobilization facility would also require the construction of a two-story annex northwest of FMEF. This building would provide approximately 4,600 m^2 (49,000 ft^2) of space for canister-loading activities and some analytical laboratory operations. The security fence surrounding FMEF would be extended to include this additional area. Material movement between FMEF and the annex would occur either by surface vehicle or through an underground tunnel between the two facilities within the protected security zone.

For the MOX facility, a new two-story building of about 20,000 m^2 (215,000 ft^2) would be constructed west of FMEF. A secure underground tunnel would connect the two buildings for special nuclear material transfers. This tunnel would be locked and alarmed under normal operating conditions and subject to the same security measures on both sides as the building perimeters, both to ensure the protection of the special nuclear materials and to maintain the independence of the MOX facility. The tunnel would be opened in accordance with safeguards and security procedures for the transfer of plutonium dioxide from the pit conversion facility to the MOX facility, and would be closed immediately upon completion of transfer activities. Other than being joined to it by this tunnel, the MOX facility would be independent of FMEF, and would be inside its own fenced security area. Various nonhardened support buildings totaling about 2,300 m^2 (25,000 ft^2) would be needed to support the MOX mission. The proposed facilities would use such existing Hanford services as sitewide security (although there would be additional security assigned to each of the three disposition facilities), emergency services, environmental monitoring, and waste management.

Construction would begin in about 2001, with modifications to FMEF for the pit conversion facility, and would continue through completion of the MOX facility in about 2006. Operations would commence in about 2004 with pit disassembly and conversion, and would continue until about 2019 when the MOX and immobilization facilities have completed their missions. Operation of the MOX facility would not begin until the pit conversion facility had been operating for a year, so that feed material would be available for MOX fuel fabrication.

2.7 ALTERNATIVE 3: ALL FACILITIES AT SRS

Pit Conversion and MOX Fuel Fabrication in New Construction; Immobilization in New Construction and DWPF

2.7.1 [Section heading deleted.]

This alternative would involve locating the three proposed surplus plutonium disposition facilities in newly constructed buildings near the area currently designated for APSF in F-Area at SRS (see Figure 2–22). In addition, the canister receipt area at DWPF in S-Area, about 6 km (3.7 mi) east of F-Area (see Figures 2–5 and 2–23), would be modified as described in Section 2.4.2.1 to accommodate receipt and processing of the canisters transferred from the immobilization facility for filling with vitrified HLW. [Text deleted.]

In the SPD Draft EIS, alternatives that considered locating the disposition facilities in new construction at SRS used the proposed APSF as a receiving facility for SST/SGT shipments; storage vaults for plutonium dioxide and metal; and for the pit conversion and immobilization facilities, nondestructive assay facilities. Therefore, the SPD Draft EIS analyzed somewhat smaller disposition facilities at SRS than at the other candidate sites. DOE has recently decided to delay the construction of APSF. Because the schedule for APSF is uncertain, this SPD Final EIS has been modified to disregard any benefit to the proposed facilities as a result of APSF being present at SRS. This SPD EIS now presents the environmental impacts that would be associated with construction and operation of disposition facilities at SRS that are stand-alone and include no reliance on APSF for storage space or other functions. Throughout this SPD EIS, references to APSF have been qualified by the phrase “if built” or a similar phrase, and no credit has been taken in the environmental analyses for the use of APSF.

The pit conversion facility now analyzed at SRS is identical to that proposed in the Pantex alternatives, where it has always been considered a stand-alone facility. In the current immobilization facility design, some space would be available to partially offset the use of APSF for functions such as storage or accountability measurements. However, without APSF, construction of truck bays and other minor modifications (up to approximately 980 m^2 [10,500 ft^2]) would be necessary. The MOX facility proposed for SRS has also been replaced with the larger stand-alone facility that has been proposed for the other candidate sites. Should DOE decide to collocate all three disposition facilities at SRS, as indicated in the Preferred Alternative (see Section 1.6), the final design of these facilities would coordinate potential common functions among the facilities to the extent practical as a means to reduce space requirements and the associated environmental impacts.

As shown in Figure 2–22, the immobilization facility would be east of the area currently designated for APSF, the pit conversion facility due south of the immobilization facility, and the MOX facility due south of the pit conversion facility.[20] To accommodate all three disposition facilities at this location, it would be necessary to move the F-Area fence line to incorporate more area. These facilities would be connected to each other by material transfer tunnels. These tunnels would be locked and alarmed under normal operating conditions and subject to the same security measures on both sides as the building perimeters, both to ensure the protection of the special nuclear materials and to maintain the independence of the MOX facility. The tunnels would be opened in accordance with safeguards and security procedures for the transfer of special nuclear materials and would be closed immediately upon completion of transfer activities. Other than being joined by the tunnel, the MOX

[20] As discussed in Section 4.26.4.4.1, facility construction would avoid any cultural resource areas eligible or potentially eligible for nomination to the National Register of Historic Places.

facility would be independent of the other plutonium disposition facilities and would be inside its own fenced security area.

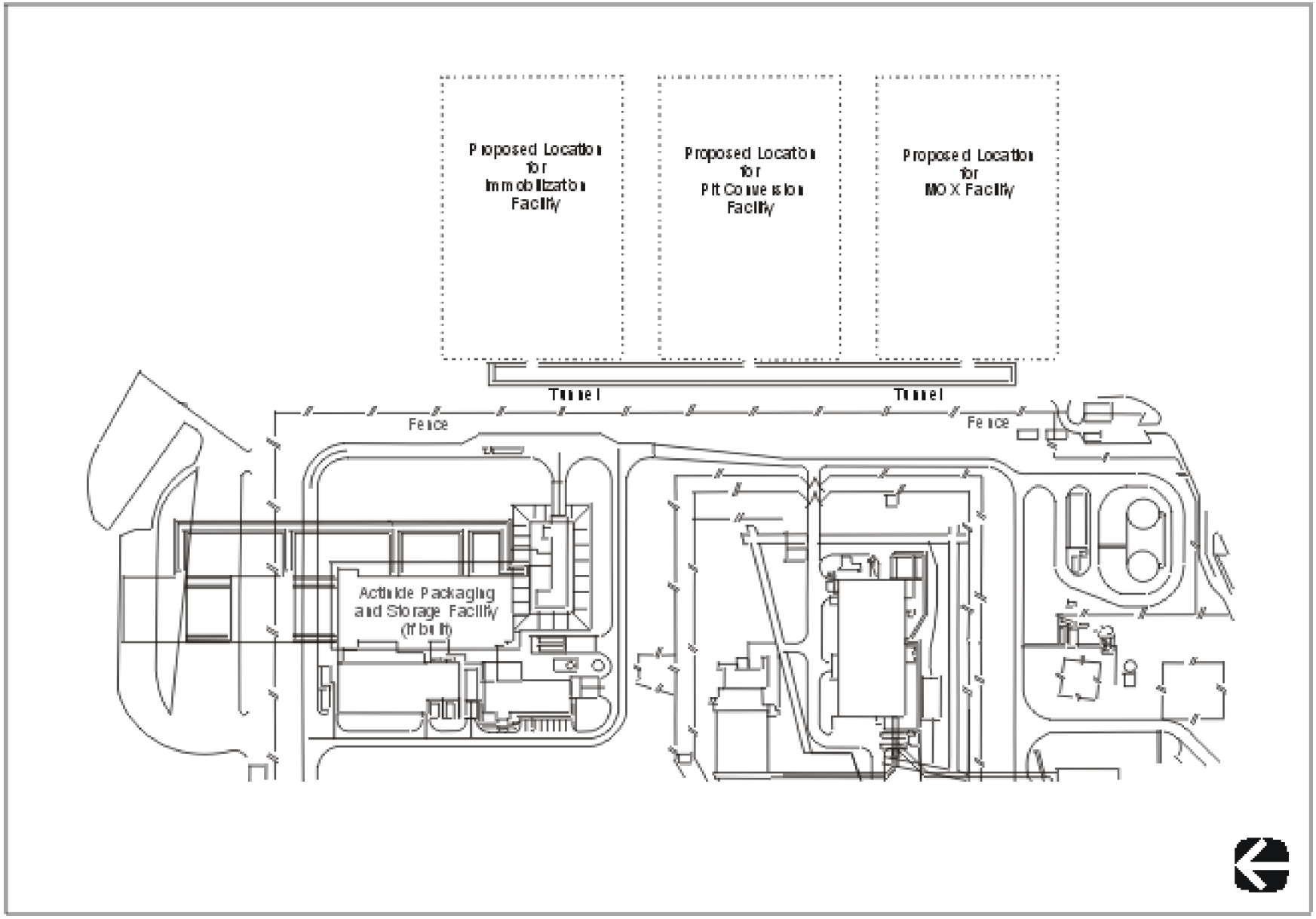

Figure 2–22. Proposed Facility Locations in F-Area at SRS

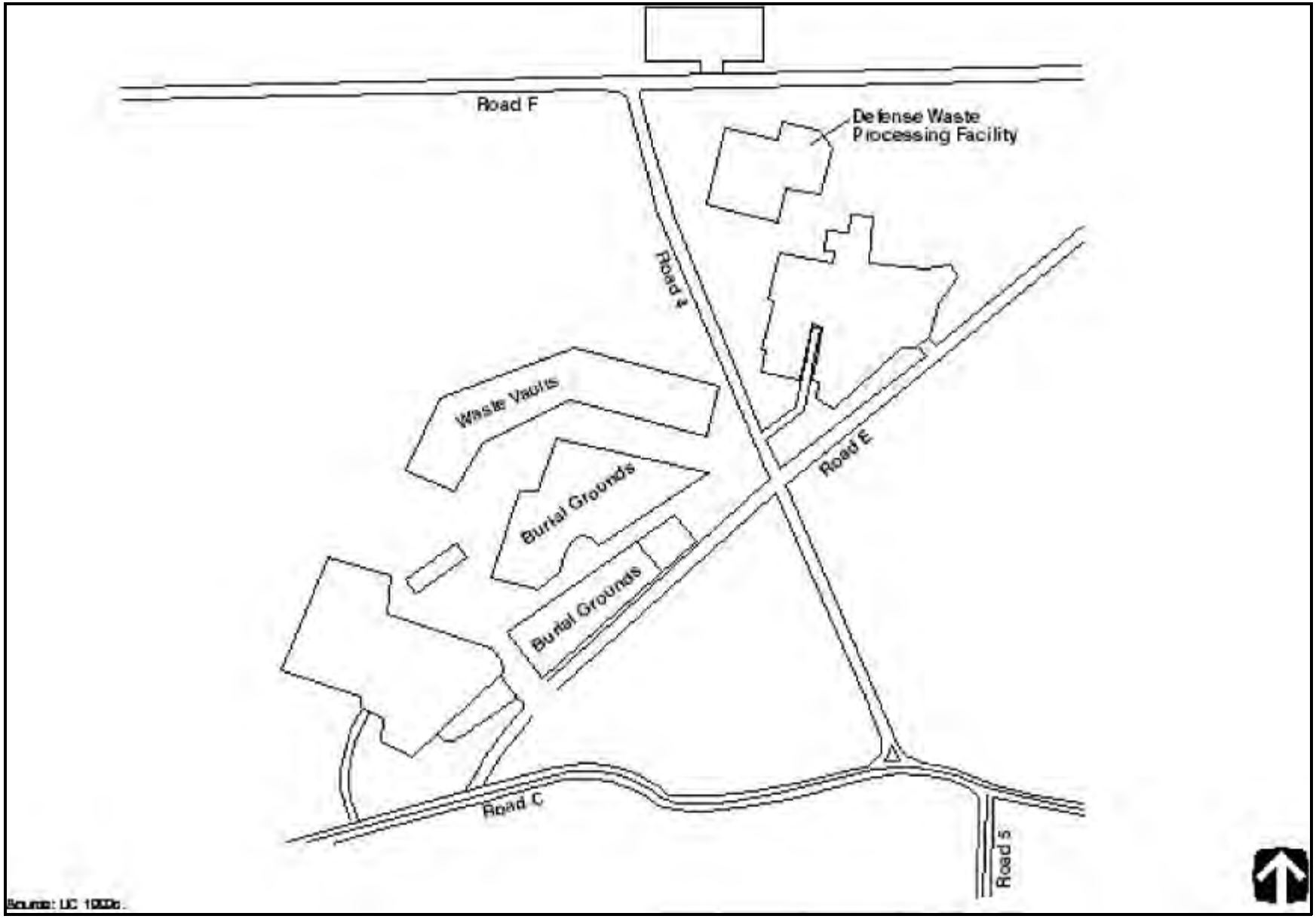

Figure 2–23. Location of DWPF in S-Area at SRS (Proposed Location of Canister-Filling Operations)

The pit conversion facility would occupy about 18,600 m^2 (200,000 ft^2) on two levels, one or both of which may be below grade. Another 2,400 m^2 (26,000 ft^2) would be required for a utility building, standby generator, and an electrical substation in F-Area. The total space required for the immobilization facility would be about 25,000 m^2 (269,000 ft^2). Of that, 23,000 m^2 (248,000 ft^2) would be in new facilities in F-Area; the remainder would be space in existing facilities that would not require further modification. The immobilization facility would have four levels, three of which would be above grade. The main process area would be at grade level, below which a small basement level would contain transfer corridors and a fire-water collection facility. The third level would house support equipment such as heating, ventilation, and air-conditioning systems, and electrical and mechanical utilities. In the center of the facility, a core "stack" or shaft would extend from the main processing level up to the small fourth level for vertical processing of materials. Two smaller, two-level structures immediately adjacent and connected to the main processing building would serve as entry control and provide administrative space. The MOX facility would occupy about 20,000 m^2 (215,000 ft^2) on two levels, one below grade. Another 2,300 m^2 (25,000 ft^2) would be required for new support buildings in F-Area. The proposed facilities would use such existing SRS services as sitewide security (although there would be additional security assigned to each of the three disposition facilities), emergency services, environmental monitoring, and waste management.

Construction would commence in about 2001 with the pit conversion facility, and would continue through completion of the MOX facility in about 2006. Operations would commence in about 2004 with pit conversion, and would continue until about 2019, when the MOX and immobilization facilities have completed their missions. Operation of the MOX facility would not begin until the pit conversion facility had been operating for a year, so that feed material would be available for MOX fuel fabrication.

2.7.2 [Section deleted because alternative deleted.]

2.8 ALTERNATIVE 4: PIT CONVERSION AT PANTEX; MOX FUEL FABRICATION AND IMMOBILIZATION AT HANFORD

2.8.1 Alternative 4A

Pantex: Pit Conversion in New Construction
Hanford: MOX Fuel Fabrication in New Construction; Immobilization in FMEF and HLW Vitrification Facility

This alternative would involve locating the pit conversion facility at Pantex and the immobilization and MOX facilities at Hanford. The pit conversion and MOX facilities would be in new construction, and FMEF would be modified to house the immobilization facility. Canister filling would be accomplished at the planned HLW vitrification facility scheduled for construction in the 200 East Area, about 24 km (15 mi) northwest of the 400 Area (see Figures 2–20 and 2–21).

At Pantex, the pit conversion facility would be in a new building in Zone 4 West, with some support facilities to the west of, and adjacent to, Zone 4 West (see Figure 2–24). Utilities and storage vaults would be on the ground floor of the pit conversion facility; and the main processing and loading areas, offices, and support areas, in a below-grade basement. The building would occupy about 18,600 m^2 (200,000 ft^2). New buildings totaling 5,300 m^2 (57,000 ft^2) would have to be constructed to support the pit conversion facility. Additional space in existing buildings in Zone 4 West would be used for administration, access control, warehousing, and other services. New or upgraded electrical, water, and gas supply lines would be constructed from existing trunk lines. The proposed pit conversion facility would use such existing Pantex services as sitewide security (although there would be an additional security assigned to the facility), emergency services, environmental monitoring, and waste management. TRU waste storage would be provided in the main pit conversion facility

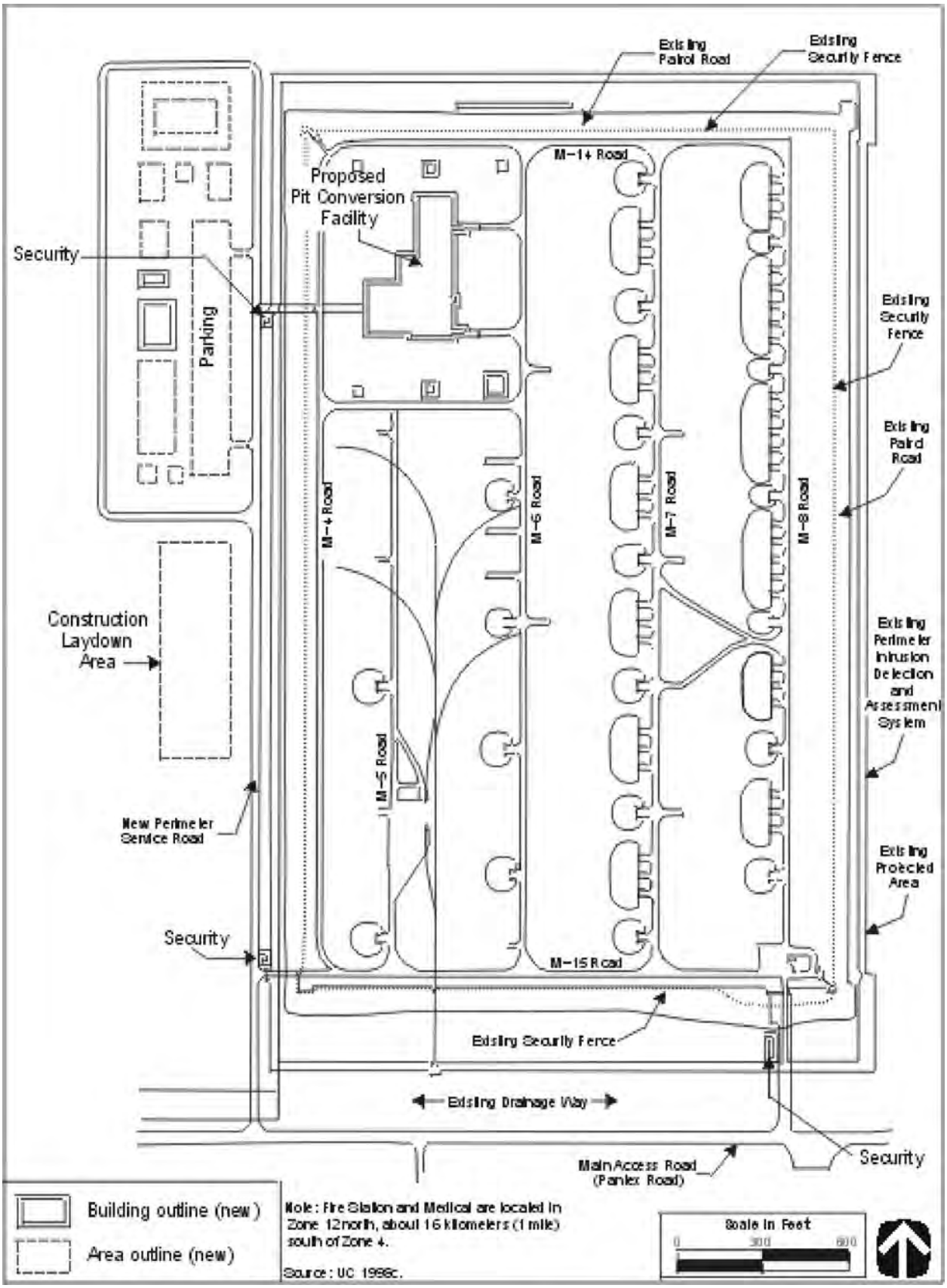

Figure 2–24. Proposed Pit Conversion Facility Location in Zone 4 West at Pantex

or in ancillary facilities. Construction would commence in about 2001 and continue through about 2003. Operations would commence in about 2004 and continue until about 2014.

Facilities at Hanford would be in the 400 Area, the immobilization facility in the FMEF and the MOX facility in new construction near FMEF. Immobilization would be concentrated on the +42- and +70-ft levels of FMEF, although process support functions would be conducted on all six floors of the building. The total space required for the immobilization facility would be about 20,000 m^2 (215,000 ft^2); the remainder of FMEF would be available for other missions.

For the MOX facility, a new two-story building of about 20,000 m^2 (215,000 ft^2) would be constructed west of FMEF. This facility would be independent of FMEF and inside its own fenced security area. In addition to the main process building, the MOX facility would require 2,300 m^2 (25,000 ft^2) of new support buildings throughout the 400 Area. The proposed disposition facilities would use such existing Hanford services as sitewide security (although there would be additional security assigned to each of the disposition facilities), emergency services, environmental monitoring, and waste management.

Modification and new construction at Hanford would commence in about 2002 and continue through about 2006. The immobilization facility would commence operations in about 2005; the MOX facility, in about 2006. The MOX facility would operate until about 2019; the immobilization facility until 2016. Operation of the MOX facility would not begin until the pit conversion facility had been operating for at least a year, so that feed material would be available for MOX fuel fabrication.

2.8.2 Alternative 4B

Pantex: Pit Conversion in New Construction
Hanford: Plutonium Conversion and Immobilization in FMEF and HLW Vitrification Facility; and MOX Fuel Fabrication in FMEF

This alternative would involve locating the pit conversion facility in new construction at Pantex and the immobilization and MOX facilities in FMEF at Hanford. Canister filling would be accomplished at the planned HLW vitrification facility scheduled for construction in the 200 East Area, about 24 km (15 mi) northwest of the 400 Area. At Pantex, the pit conversion facility would be the same as the one described for Alternative 4A in Section 2.8.1. This alternative differs from Alternative 4A in that the MOX facility would be located in FMEF rather than in new construction.

At Hanford, FMEF would be modified to contain both the MOX and immobilization facilities. While these facilities would share the building, they would be totally separate from each other to accommodate NRC regulation of the MOX facility. The immobilization facility would occupy about 14,000 m^2 (150,000 ft^2), primarily on the ground and +21-ft levels. Only the receiving area would be shared by the two facilities, but the area would be modified to physically separate the two sides and provide independent access to the two facilities.

The immobilization facility would also require the construction of a two-story annex northwest of FMEF. This building would provide approximately 6,700 m^2 (72,000 ft^2) of space for canister-loading activities and most analytical laboratory operations. The security fence surrounding FMEF would be extended to include this additional area. Material movement between FMEF and the annex would occur either by surface vehicle or through an underground tunnel between the two facilities within the protected security zone.

To implement the MOX mission at FMEF, the building would be remodeled and annexes added to accommodate the functions and processes required for MOX fuel fabrication. The MOX facility would occupy about 8,200 m^2 (88,000 ft^2) on the ground, +42-ft, and +70-ft levels of FMEF. New annex areas on the north and east sides of

the building for utilities and an entrance area with office space would add another 1,900 m^2 (20,000 ft^2) to the FMEF structure. Partition walls and other isolation mechanisms would be used to completely segregate the MOX portion of the building from the other portions. In addition to the main process building, the MOX facility would require 4,200 m^2 (45,000 ft^2) of new support buildings throughout 400 Area. The proposed disposition facilities would use such existing Hanford services as sitewide security (although there would be additional security assigned to each of the disposition facilities), emergency services, environmental monitoring, and waste management.

Modification of FMEF would commence in about 2002 and continue through about 2006. The immobilization facility would commence operations in about 2005; the MOX facility, in about 2006. The MOX facility would operate until about 2019; the immobilization facility until 2016. Operation of the MOX facility would not begin until the pit facility had been operating for at least a year, so that feed material would be available for MOX fuel fabrication.

2.9 ALTERNATIVE 5: PIT CONVERSION AT PANTEX; MOX FUEL FABRICATION AND IMMOBILIZATION AT SRS

Pantex: **Pit Conversion in New Construction**
SRS: **MOX Fuel Fabrication in New Construction; and Immobilization in New Construction and DWPF**

2.9.1 [Section heading deleted.]

This alternative would involve locating the pit conversion facility at Pantex and the immobilization and MOX facilities in new construction near the area currently designated for APSF at SRS. In addition, the canister receipt area at DWPF in S-Area would be modified as described in Section 2.4.2.1 to accommodate receipt and processing of the canisters transferred from the immobilization facility for filling with vitrified HLW. At Pantex, the pit conversion facility would be the same as the one described for Alternative 4A in Section 2.8.1.

As shown in Figure 2–22, the immobilization facility would be east of the area currently designated for APSF, and the MOX facility south of the immobilization facility. (The pit conversion facility, shown on this map, would not be located at SRS.) To accommodate both the immobilization and MOX facilities, it would be necessary to move the F-Area fence line to incorporate more area. These facilities would be constructed as described for Alternative 3 in Section 2.7.

Construction at SRS would commence in about 2002 and continue through about 2006. The immobilization facility would commence operations in about 2005; the MOX facility, in about 2006. The MOX facility would operate until about 2019; the immobilization facility until 2016. Operation of the MOX facility would not begin until the pit facility had been operating for at least a year, so that feed material would be available for MOX fuel fabrication.

2.9.2 [Section deleted because alternative deleted.]

2.10 ALTERNATIVE 6: PIT CONVERSION AND MOX FUEL FABRICATION AT HANFORD; IMMOBILIZATION AT SRS

2.10.1 Alternative 6A

Hanford: Pit Conversion in FMEF; MOX Fuel Fabrication in New Construction
SRS: Immobilization in New Construction and DWPF

This alternative would involve locating the pit conversion and MOX facilities at Hanford, in FMEF and new construction, respectively; and the immobilization facility in new construction near the area currently designated for APSF at SRS. In addition, the canister receipt area at DWPF in S-Area would be modified as described in Section 2.4.2.1 to accommodate receipt and processing of the canisters transferred from the immobilization facility for filling with vitrified HLW. In this alternative, the pit conversion facility would occupy about 13,000 m^2 (140,000 ft^2) of space on the −35-ft, −17-ft, ground, and +21-ft levels of FMEF, as described in Section 2.6; the remainder of FMEF would be available for other missions. A new two-story building would be constructed for the MOX facility, as described in Section 2.6. The proposed disposition facilities would use such existing Hanford services as sitewide security (although there would be additional security assigned to each of the disposition facilities), emergency services, environmental monitoring, and waste management.

Construction would commence in about 2001, with modifications to FMEF for the pit conversion facility, and would continue through completion of the MOX facility in about 2006. The pit conversion facility would commence operations in about 2004; the MOX facility, in about 2006. Operations would continue until about 2019, when the MOX facility has completed its mission. Operation of the MOX facility would not begin until the pit conversion facility had been operating for at least a year, so that feed material would be available for MOX fuel fabrication.

The new immobilization facility at SRS would be east of the area currently designated for APSF, as described in Section 2.7. The total space required for that facility would be about 25,000 m^2 (269,000 ft^2). Of that, 23,000 m^2 (248,000 ft^2) would be in new facilities; the remainder would be space in existing facilities that would not require further modification. To accommodate the immobilization facility, it would be necessary to move the F-Area fence line out to incorporate more area. The immobilization facility would use such existing SRS services as sitewide security (although there would be an additional security assigned to the facility), emergency services, environmental monitoring, and waste management. Construction would commence in about 2002 and continue through about 2005. Operations would commence in about 2005 and continue until about 2016.

2.10.2 Alternative 6B

Hanford: Pit Conversion and MOX Fuel Fabrication Collocated in FMEF
SRS: Immobilization in New Construction and DWPF

This alternative would involve locating both the pit conversion and MOX facilities in FMEF at Hanford, and the immobilization facility in new construction near the area currently designated for APSF at SRS. In addition, the canister receipt area at DWPF in S-Area would be modified as described in Section 2.4.2.1 to accommodate receipt and processing of the canisters transferred from the immobilization facility for filling with vitrified HLW. In this alternative, the immobilization facility would be constructed and operated at SRS as described for Alternative 6A in Section 2.10.1.

FMEF would be modified to contain both the pit conversion and MOX facilities. While these facilities would share the building, they would be totally separate from each other to accommodate NRC regulation of the MOX facility. The pit conversion facility would occupy about 13,000 m^2 (140,000 ft^2) of space on the −35-ft, −17-ft,

ground, and +21-ft levels of FMEF, as described in Section 2.6. Plutonium dioxide would be moved from the pit conversion facility to the MOX facility in a secure elevator.

To implement the MOX mission at FMEF, the building would be remodeled and annexes added to accommodate all the functions and processes required for MOX fuel fabrication. The MOX facility would occupy about 8,200 m^2 (88,000 ft^2) on the ground, +42-ft, and +70-ft levels of FMEF. The new annex areas on the north and east sides of the building for utilities and an entrance area with office space would add another 1,900 m^2 (20,000 ft^2) to the FMEF structure. Partition walls and other isolation mechanisms would be used to completely segregate the MOX portion of the building from the other portions. In addition to the main process building, the MOX facility would require 4,200 m^2 (45,000 ft^2) of new support buildings throughout 400 Area. The proposed disposition facilities would use such existing Hanford services as sitewide security (although there would be additional security assigned to each of the disposition facilities), emergency services, environmental monitoring, and waste management.

Modification of FMEF would commence in about 2001 and would continue through about 2006. The pit conversion facility would commence operations in about 2004; the MOX facility, in about 2006. Operations would cease when the MOX facility has shut down in about 2019. Operation of the MOX facility would not begin until the pit facility had been operating for at least a year, so that feed material would be available for MOX fuel fabrication.

2.10.3 [Section deleted because alternative deleted.]

2.10.4 [Section deleted because alternative deleted.]

2.11 ALTERNATIVE 7: PIT CONVERSION AND MOX FUEL FABRICATION AT INEEL; IMMOBILIZATION AT SRS

INEEL: Pit Conversion in the Fuel Processing Facility; MOX Fuel Fabrication in New Construction
SRS: Immobilization in New Construction and DWPF

2.11.1 [Section heading deleted.]

This alternative would involve locating the pit conversion facility in the Fuel Processing Facility (FPF) and the MOX facility in new construction in the Idaho Nuclear Technology and Energy Center (INTEC) area at INEEL, and the immobilization facility in new construction near the area currently designated for APSF at SRS. In addition, the canister receipt area at DWPF in S-Area would be modified as described in Section 2.4.2.1 to accommodate receipt and processing of the canisters transferred from the immobilization facility for filling with vitrified HLW. The immobilization facility would be implemented at SRS as described for Alternative 6A in Section 2.10.1.

FPF has six levels, three below grade. It is structurally complete, but has never been used. Construction was started in 1986, but discontinued in 1993, leaving essentially a concrete shell with temporary lighting and ventilation. As the building was designed to handle highly radioactive materials, it includes a number of interior thick-walled cells surrounded by corridors and access ways. Building utility areas and office space surround the corridors of the above-grade stories. Modification to the interior spaces would be required to accommodate surplus plutonium disposition activities. No radioactive materials have been introduced into the building, so the modification would neither generate radioactive waste nor contribute a radiological dose to the construction workforce. In this alternative, the pit conversion facility would occupy about 14,000 m^2 (150,000 ft^2) on four levels of FPF. No new support buildings would have to be built, as the facility's needs would be met by existing facilities at INTEC.

A new two-story building of about 20,000 m^2 (215,000 ft^2) would be constructed for the MOX facility. As shown in Figure 2–25, this building would be south of FPF. A secure underground tunnel would connect the two buildings for special nuclear material transfers. This tunnel would be locked and alarmed under normal operating conditions, and subject to the same security measures on both sides as the building perimeters, both to ensure protection of the special nuclear materials and to maintain the independence of the MOX facility. The tunnel would be opened in accordance with safeguards and security procedures for the transfer of plutonium dioxide from the pit conversion facility to the MOX facility, and would be closed immediately upon completion of transfer activities. Other than being joined to it by this tunnel, the MOX facility would be independent of FPF, and would be inside its own fenced security area. In addition to the main process building, the MOX facility would require 2,300 m^2 (25,000 ft^2) of new support buildings throughout the INTEC Area. The proposed disposition facilities would use such existing INEEL services as sitewide security (although there would be additional security assigned to each of the disposition facilities), emergency services, environmental monitoring, and waste management.

Construction would commence in about 2001, with modifications to FPF for the pit conversion facility, and would continue through completion of the MOX facility in about 2006. Operations would commence in about 2004, with pit conversion, and would continue until about 2019, when the MOX facility has completed its mission. Operation of the MOX facility would not begin until the pit conversion facility had been operating for at least a year, so that feed material would be available for MOX fuel fabrication.

2.11.2 [Section deleted because alternative deleted.]

2.12 ALTERNATIVE 8: PIT CONVERSION AND MOX FUEL FABRICATION AT INEEL; IMMOBILIZATION AT HANFORD

INEEL: Pit Conversion in FPF; MOX Fuel Fabrication in New Construction
Hanford: Immobilization in FMEF and HLW Vitrification Facility

This alternative would involve locating the pit conversion facility in FPF and the MOX facility in new construction in the INTEC area at INEEL; and the immobilization facility in FMEF at Hanford. The pit conversion and MOX facilities would be implemented at INEEL as described for Alternative 7 in Section 2.11.

At Hanford, FMEF would be modified to house the immobilization facility as described for Alternative 4A in Section 2.8.1. Canister filling would be accomplished at the planned HLW vitrification facility scheduled for construction in the 200 East Area, about 24 km (15 mi) northwest of the 400 Area. Modification of FMEF would commence in about 2002 and continue through about 2004. Operation of the immobilization facility would commence in about 2005 and continue until about 2016.

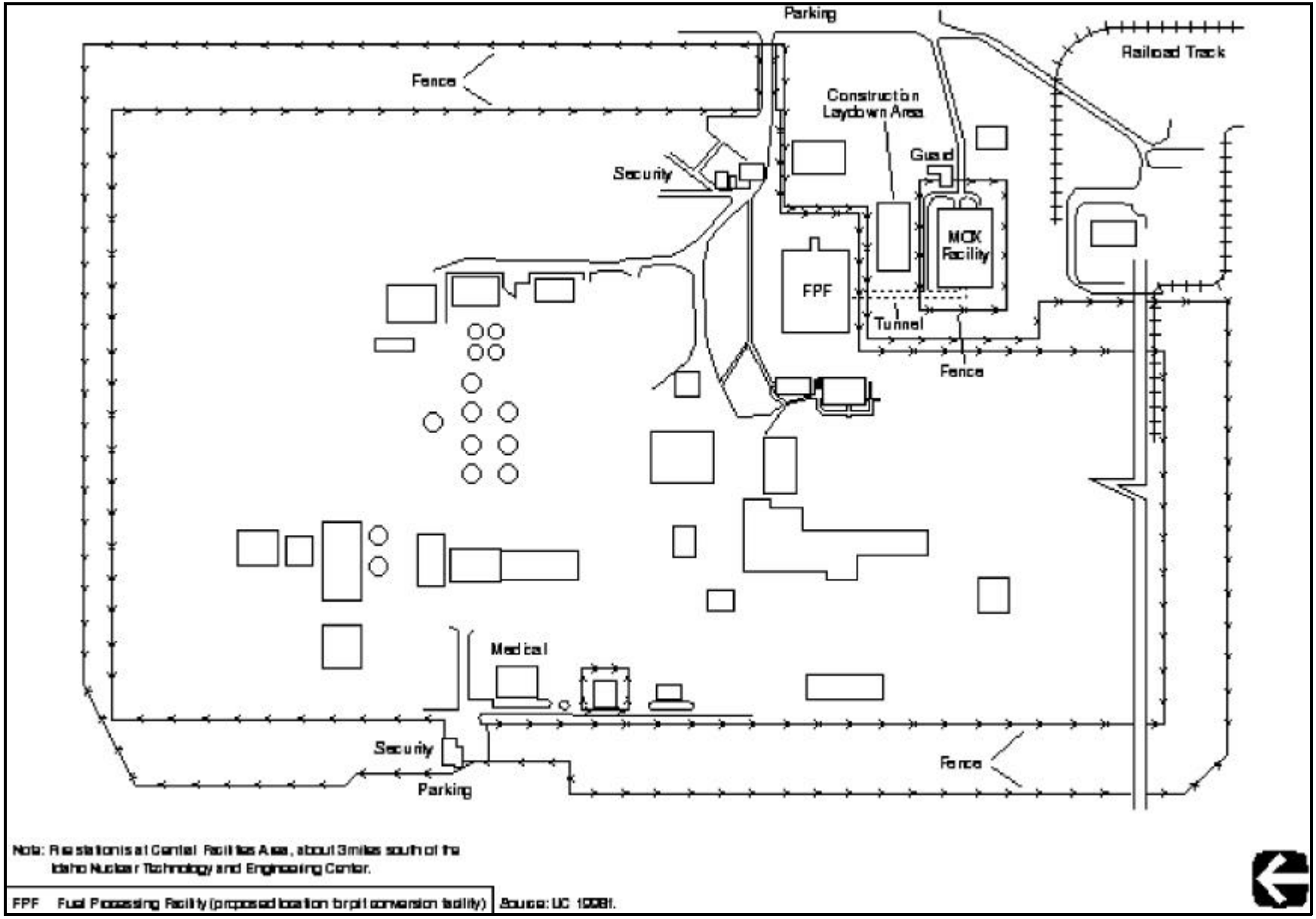

Figure 2–25. Proposed Pit Conversion and MOX Facility Locations in INTEC at INEEL

2.13 ALTERNATIVE 9: PIT CONVERSION AND MOX FUEL FABRICATION AT PANTEX; IMMOBILIZATION AT SRS

Pantex: Pit Conversion and MOX Fuel Fabrication in New Construction
SRS: Immobilization in New Construction and DWPF

2.13.1 [Section heading deleted.]

This alternative would involve locating both the pit conversion and the MOX facilities at Pantex, and the immobilization facility in new construction near the area currently designated for APSF at SRS. In addition, the canister receipt area at DWPF in S-Area would be modified as described in Section 2.4.2.1 to accommodate receipt and processing of the canisters transferred from the immobilization facility for filling with vitrified HLW. The immobilization facility would be as described in Section 2.10.1.

At Pantex, the pit conversion and MOX facilities would be in new construction in Zone 4 West (see Figure 2–26). The pit conversion facility in this alternative would be the same as that described in Section 2.8.1. For the MOX facility, a new two-story building of about 20,000 m^2 (215,000 ft^2) would be constructed south of the pit conversion facility. A secure underground tunnel would connect the two buildings for special nuclear material transfers.[21] This tunnel would be locked and alarmed under normal operating conditions, and subject to the same security measures on both sides as the building perimeters, both to ensure protection of the special nuclear materials and to maintain the independence of the MOX facility. The tunnel would be opened in accordance with safeguards and security procedures for the transfer of plutonium oxide from the pit conversion facility to the MOX facility, and would be closed immediately upon completion of transfer activities. Other than being joined by this tunnel, the MOX facility would be independent of the pit conversion facility, and would be inside its own fenced security area. In addition to the main process building, the MOX facility would require 2,300 m^2 (25,000 ft^2) of new support buildings throughout Zone 4 West. TRU waste storage would be provided in the main pit conversion and MOX facilities or in ancillary facilities. The proposed disposition facilities would use such existing Pantex services as sitewide security (although there would be additional security assigned to each of the disposition facilities), emergency services, environmental monitoring, and waste management.

Construction at Pantex would commence in about 2001 with the pit conversion facility, and continue through completion of the MOX facility in about 2006. Operations would commence in about 2004 with pit conversion, and continue until about 2019, when the MOX facility has completed its mission. Operation of the MOX facility would not begin until the pit conversion facility had been operating for at least a year, so that feed material would be available for MOX fuel fabrication.

2.13.2 [Section deleted because alternative deleted.]

[21] Current facility design includes a tunnel for material transfers. Intrasite transfers of special nuclear materials in accordance with current site practices may be considered in lieu of a tunnel in the facility design.

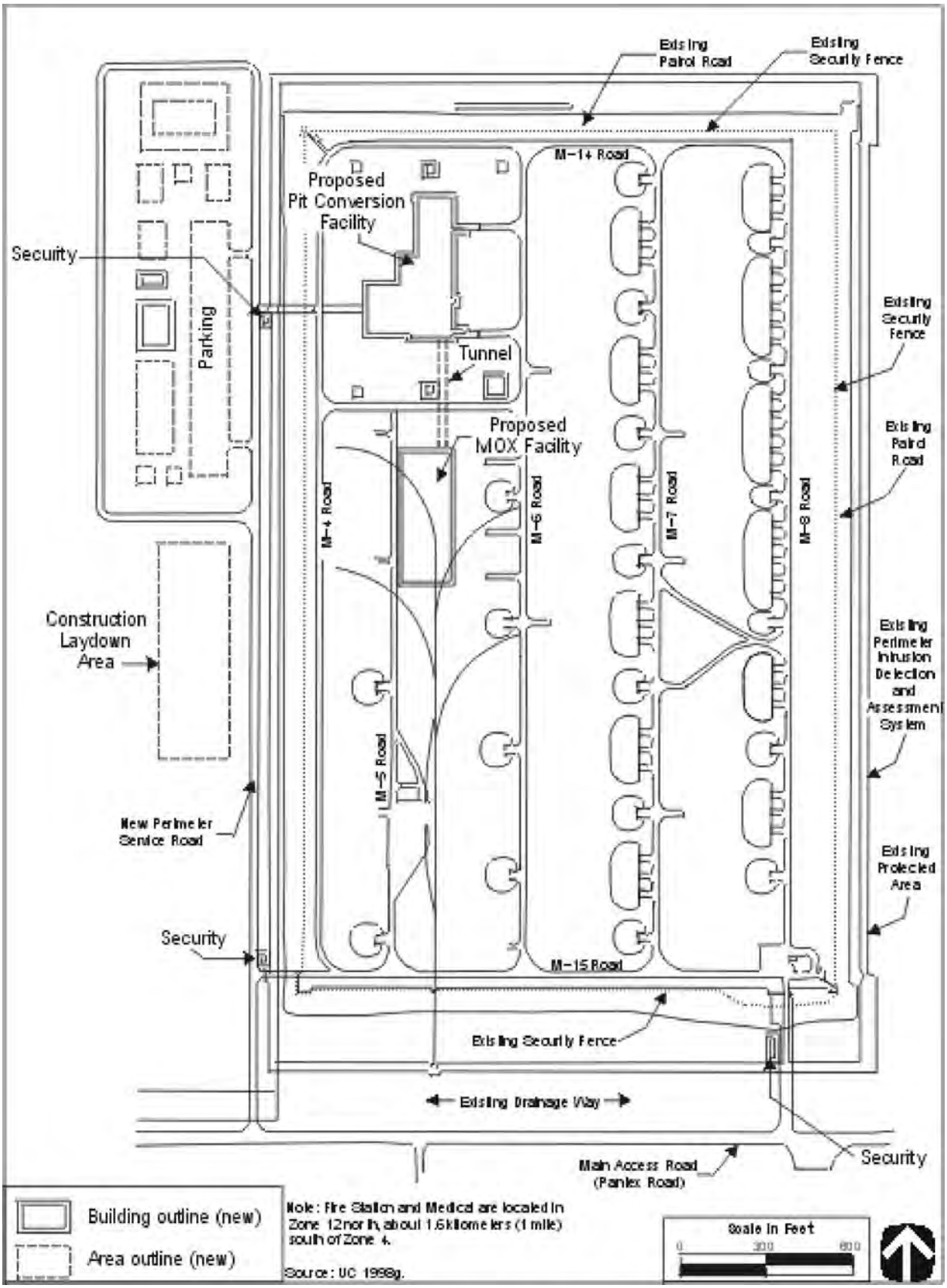

Figure 2–26. Proposed Pit Conversion and MOX Facility Locations in Zone 4 West at Pantex

2.14 ALTERNATIVE 10: PIT CONVERSION AND MOX FUEL FABRICATION AT PANTEX; IMMOBILIZATION AT HANFORD

Pantex: Pit Conversion and MOX Fuel Fabrication in New Construction
Hanford: Immobilization in FMEF and HLW Vitrification Facility

This alternative would involve locating both the pit conversion and MOX facilities in new construction at Pantex, as described for Alternative 9 in Section 2.13. The immobilization facility would be in FMEF at Hanford, and canister filling would be accomplished at the planned HLW vitrification facility scheduled for construction in the 200 East Area, about 24 km (15 mi) northwest of the 400 Area. Immobilization would be implemented as described for Alternative 8 in Section 2.12.

2.15 ALTERNATIVE 11: 50-METRIC-TON IMMOBILIZATION; IMMOBILIZATION AT HANFORD; PIT CONVERSION AT HANFORD OR PANTEX

2.15.1 Alternative 11A

Hanford: Pit Conversion in FMEF; Immobilization in FMEF and the HLW Vitrification Facility

This alternative would involve immobilizing all the nominal 50 t (55 tons) of surplus plutonium at Hanford. Therefore, only two facilities, the pit conversion and the immobilization facilities, would be needed to accomplish the surplus plutonium disposition mission. The pit conversion facility would be collocated with the immobilization facility in FMEF, as described for Alternative 2 in Section 2.6. However, all the plutonium dioxide produced in the pit conversion facility would be transferred to the immobilization facility, which would be operated at a higher throughput (5 t [5.5 tons] rather than 1.7 t [1.9 tons]) to accommodate the additional approximately 33 t (36 tons) of plutonium that would be received from the pit conversion facility. Also, the operating workforce at the immobilization facility would be increased as discussed in Section 4.20.2.3 to process the additional amount of material. Construction would commence around 2001 with the pit conversion facility, and would continue through completion of the modifications to the FMEF for the immobilization facility about 2005. Operations would commence in about 2004 with the pit conversion facility, and continue until about 2016, when the immobilization facility has completed its mission.

2.15.2 Alternative 11B

Pantex: Pit Conversion in New Construction
Hanford: Immobilization in FMEF and the HLW Vitrification Facility

This alternative would involve immobilizing all the nominal 50 t (55 tons) of surplus plutonium. Therefore, only two facilities, the pit conversion facility and the immobilization facility, would be needed to accomplish the surplus plutonium disposition mission. The pit conversion facility would be located at Pantex as described in Alternative 4A, Section 2.8.1, and the immobilization facility would be located at Hanford as described for Alternative 11A, in Section 2.15.1. All the plutonium dioxide produced in the pit conversion facility would be shipped to the immobilization facility, which would be operated as described in Section 2.15.1.

Construction would commence in about 2001 with the pit conversion facility at Pantex, and would continue through completion of the modifications to the FMEF at Hanford for the immobilization facility in about 2005. Operations would commence in about 2004 with the pit conversion facility, and continue until about 2016, when the immobilization facility has completed its mission.

2.16 ALTERNATIVE 12: 50-METRIC-TON IMMOBILIZATION; IMMOBILIZATION AT SRS; PIT CONVERSION AT PANTEX OR SRS

2.16.1 Alternative 12A

SRS: Pit Conversion in New Construction; Immobilization in New Construction and DWPF

This alternative would involve immobilizing all 50 t (55 tons) of surplus plutonium at SRS. Therefore, only two facilities, the pit conversion facility and the immobilization facility, would be needed to accomplish the surplus plutonium disposition mission. Both the pit conversion and immobilization facilities would be in new construction near the area currently designated for APSF in F-Area, as described in Section 2.7. In addition, the canister receipt area at DWPF in S-Area would be modified to accommodate receipt and processing of the canisters transferred from the immobilization facility for filling with vitrified HLW. The pit conversion and immobilization facilities would be the same as those described for Alternative 3 in Section 2.7, except that all the plutonium dioxide produced in the pit conversion facility would be transferred to the immobilization facility. To accommodate the additional 33 t (36 tons) of plutonium that would be received from the pit conversion facility, the immobilization facility would be operated at a higher throughput (5 t [5.5 tons] rather than 1.7 t [1.9 tons]), and the operating workforce at the immobilization facility would be increased as discussed in Section 4.22.2.3.

Construction would commence in about 2001 with the pit conversion facility, and continue through completion of the immobilization facility in about 2005. Operations would commence in about 2004 with the pit conversion facility, and continue until about 2016, when the immobilization facility has completed its mission.

2.16.2 [Section deleted because alternative deleted.]

2.16.3 Alternative 12B[22]

Pantex: Pit Conversion in New Construction
SRS: Immobilization in New Construction and DWPF

This alternative would involve immobilizing all the nominal 50 t (55 tons) of surplus plutonium. Therefore, only two facilities, the pit conversion facility and the immobilization facility, would be needed to accomplish the surplus plutonium disposition mission. The pit conversion facility would be located at Pantex as described in Alternative 4A, Section 2.8.1, and the immobilization facility would be located at SRS as described for Alternative 12A, in Section 2.16.1. All the plutonium dioxide produced in the pit conversion facility would be shipped to the immobilization facility, which would be operated as described in Section 2.16.1.

Construction would commence in about 2001 with the pit conversion facility at Pantex, and continue through completion of the immobilization facility at SRS in about 2005. Operations would commence in about 2004 with the pit conversion facility, and continue until about 2016, when the immobilization facility has completed its mission.

2.16.4 [Section deleted because alternative deleted.]

[22] This alternative was analyzed as Alternative 12C in the SPD Draft EIS; it has been renumbered as Alternative 12B because SPD Draft EIS Alternative 12B has been deleted.

2.17 LEAD ASSEMBLY FABRICATION AND POSTIRRADIATION EXAMINATION

Five sites are proposed for the fabrication of lead assemblies. They are LLNL, LANL, and three of the four candidate sites for the proposed surplus weapons-grade plutonium disposition activities: Hanford, INEEL (ANL–W facilities), and SRS.[23] These sites have the experience and facilities with safeguards Category I[24] and natural phenomenon hazards protection to handle the plutonium for fabricating the lead assemblies. After irradiation at McGuire, the lead assemblies may be examined at either ANL–W or ORNL. Sites considered for lead assembly activities are shown in Figure 2–1. Lead assembly fabrication and postirradiation examination would be implemented only if required to support NRC licensing activities and fuel qualification efforts. If the MOX fuel approach could be implemented without fabricating lead assemblies, or if DOE decides to immobilize all 50 t (55 tons) of surplus plutonium, then these activities would not occur. This section was developed using data provided by ORNL (O'Connor et al. 1998a–e).

2.17.1 Process Description

Lead assembly fabrication would involve the same basic process described for the full-scale fabrication of MOX fuel in Section 2.4.3.2. Although DOE plans to produce only 2 lead assemblies, as many as 10 could be produced at the lead assembly fabrication facility.[25] The fabrication effort would be implemented in existing facilities at the selected location, and the fabrication phase would be completed in about 3 years. Up to 4 fuel assemblies would be produced in any given year, for a maximum of 10 assemblies at the end of the 3-year fabrication phase. At this rate of production, about 100 kg (220 lb) plutonium would be made into MOX fuel each year. Including hot startup, a total of about 321 kg (708 lb) plutonium would be used. The plutonium would come from pits dismantled during the Pit Disassembly and Conversion Demonstration Project or from existing supplies of surplus metal and oxide at LANL. Two extra MOX fuel rods would be fabricated with each lead assembly to be maintained as unirradiated archives. The archived rods would be stored at the lead assembly facility until the completion of all the lead assembly fabrication, irradiation, and testing. The rods would then be shipped to the MOX facility for storage until it was determined that the rods were no longer needed as archived material for fuel qualification purposes. At that time, the archived rods would either be irradiated, or dismantled and the materials reused in the MOX fabrication process.

At the lead assembly fabrication site, plutonium dioxide would be blended with uranium dioxide originating from depleted uranium hexafluoride in DOE storage at, for example, the Portsmouth Gaseous Diffusion Plant, then formed into pellets, sintered, and loaded into rods. After fabrication, the rods would either be assembled into fuel assemblies and transported to the reactor, or transported as rods to the reactor site for insertion into special assemblies prior to irradiation. The lead assemblies would be inserted into the reactor during a refueling outage and left in the reactor for up to three fuel cycles. After removal from the reactor, the irradiated assemblies would be managed at the reactor site as spent fuel while cooling down for approximately 6 months. After the cooldown period, several fuel rods removed from the lead assemblies at the reactor site would be transported to ANL–W or ORNL for postirradiation examination. The rest of the rods would remain in the spent fuel pool and would be managed as spent nuclear fuel.

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[23] Pantex was not considered for lead assembly fabrication because it does not currently have any facilities capable of MOX fuel fabrication.

[24] DOE protects nuclear materials based on the relative attractiveness of the materials in constructing a weapon and/or improvised nuclear device. Category I facilities provide the highest level of safeguards and security.

[25] As discussed in Sections 2.18.2 and 4.27, should fewer lead assemblies than analyzed be fabricated or irradiated, the potential impacts would be lower than those described.

During postirradiation examination, several of the fuel rods would be subjected to a series of nondestructive and destructive tests to evaluate the physical and chemical changes to the fuel material and cladding resulting from irradiation. Activities would be conducted remotely, with the irradiated fuel rods inside a hot cell. Operators would remain outside the hot cell and would be shielded by the walls and windows of that cell. Any postirradiation examination activities and shipments would comply with the Consent Order and Settlement Agreement in Public Service Company of Colorado vs. Batt (if the work were performed at ANL–W) and all other applicable agreements and orders, including provisions concerning removal of the material from the applicable examination site and limits on the number of truck shipments to the site.

The lead assembly fabrication facility would be operational by October 2002, with the first lead assemblies available for insertion by late 2003. After lead assembly fabrication is completed, deactivation would take about 3 years and could involve conversion of the space for another mission or missions.

2.17.2 Lead Assembly Fabrication Siting Alternatives

If required, lead assembly fabrication and postirradiation examination would be conducted at operating DOE sites in facilities that can accommodate the proposed activities with minimal alteration of interior spaces, are authorized to handle plutonium, and are situated in hardened spaces of thick-walled concrete that meet the standards for processing special nuclear material. Areas of the buildings in which plutonium would be handled are designed to survive natural phenomena such as earthquakes, floods, and tornadoes, as well as potential accidents associated with the processing of fissile and radioactive materials.

Security at these facilities, implemented at several levels, would provide maximum protection for the special nuclear materials. Each facility would be on an existing DOE site that has safeguards and security measures in place, including access control. In addition to DOE sitewide security services, each building in which special nuclear materials are handled has physical security and procedures commensurate with the amount and type of material authorized in the area. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (requiring at least two people to be present during work with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels—all ensure that special nuclear materials are adequately protected. Nuclear material control and accountability are ensured through a system for monitoring storage, processing, and transfers. At any time, the total amount of special nuclear material in each facility, or in any material balance area within a facility, would be known. As appropriate, closed-circuit television, intrusion detection, motion detection, and other automated methods are used as part of the material control and accountability program. Physical measurements and inspections of material are used to verify inventory records.

2.17.2.1 Hanford

The Fuel Assembly Area of FMEF, within Hanford's 400 Area (see Figures 2–2 and 2–20) has been proposed as a location for lead assembly fabrication. FMEF, also proposed as a candidate location for the pit conversion, immobilization, and MOX facilities, is described in detail in Section 2.6.

FMEF consists of several connected buildings. Building 427, the main part of the facility, is a six-level processing building with an attached mechanical wing on the west side and an emergency power wing on the northwest corner. The Fuel Assembly Area (Building 4862) is appended to the southeastern end of FMEF. This area is divided into two sections, the entry (administrative) wing, and the lower-level operations portion, the Fuel Assembly Area, designed for the fabrication of fuel assemblies for FFTF. The lower level of the Fuel Assembly Area would be used for fuel rod and assembly fabrication. The upper level contains independent ventilation equipment. Storage of plutonium feed materials would occur in the operating vaults of Building 427, or in reconfigured below-grade storage tubes in the Fuel Assembly Area.

2.17.2.2 ANL–W

ANL–W is in the southeast portion of INEEL (see Figure 2–3). Established in the mid-1950s, the facility had as its primary mission the support of advanced liquid metal reactor research. In 1995, ANL–W began conducting research in the treatment of DOE spent nuclear fuel and in technologies for reactor decontamination and decommissioning. The ZPPR Vault and Workroom (Building 775), ZPPR Reactor Cell (Building 776), Fuel Manufacturing Facility (FMF, Building 704), and Fuel Assembly and Storage Building, (FASB, Building 787) within ANL–W have been proposed to support lead assembly fabrication (see Figure 2–27). As discussed in Sections 2.17.3 and 2.17.3.1, postirradiation examination could also be conducted at ANL–W.

ZPPR began operations at ANL–W in 1969 and was placed on standby in 1989. The facility is large enough to enable core physics studies of full-scale breeder reactors. The principal experimental area has a very thick foundation and thick concrete walls covered with an earthen mound, and a sand/gravel/HEPA filter roof. FMF, adjacent to the ZPPR facility, is buried under an earthen mound similar to that of ZPPR. This facility is currently supporting a furnace and glovebox operation for the dismantlement of damaged ZPPR fuel plates and the packaging of recovered plutonium oxide for shipment. FMF is also used as a test site for the development of safeguards and security systems. ZPPR and FMF share security assets, including a common security area surrounded by security fences, perimeter intrusion detection, and alarm systems. ZPPR and FMF are both Safeguards Category I, hardened buildings which meet natural phenomenon protection requirements currently approved for handling special nuclear materials.

The ZPPR Workroom has been proposed for fuel manufacture and storage, and the ZPPR Reactor Cell, as the high-bay fuel assembly and inspection area. Space within FMF would be used for fuel storage. The FASB would also be used for lead assembly fabrication. This facility was constructed to provide space, equipment, and services for manufacturing fuel elements and components for an experimental breeder reactor. A metallurgical laboratory is housed in the building's west end. The FASB would provide controlled vault storage for special nuclear materials, including fuel assemblies.

2.17.2.3 SRS

SRS is in the southern portion of South Carolina, approximately 19 km (12 mi) south of Aiken (see Figure 2–5). Chemical processing facilities are situated within the F- and H-Canyon areas at SRS. Their primary mission was to separate special nuclear materials from spent reactor fuels and irradiated targets. A portion of the 221–H Canyon facility, located within the H-Area, has been proposed for the fabrication of lead assemblies (see Figure 2–28). This unused space originally constructed for the Uranium Solidification Facility (USF), was never completed. The 221–H facility is entirely within a protected safeguards and security area. Existing USF utilities, access control, administrative and laboratory space, and waste management systems would also be used for the proposed lead assembly fabrication activities.

2.17.2.4 LANL

LANL, in northern New Mexico, was established in 1943 to design, develop, and test nuclear weapons (see Figure 2–29). Its mission has expanded from the primary task of designing nuclear weapons to include nonnuclear defense programs and a broad array of nondefense programs. Current programs include research and development of nuclear safeguards and security, medium-energy physics, space nuclear systems, biomedicine, computational science, and lasers. As discussed in Section 2.17.1, the plutonium dioxide feed material for the lead assembly fabrication effort is expected to be produced at LANL.

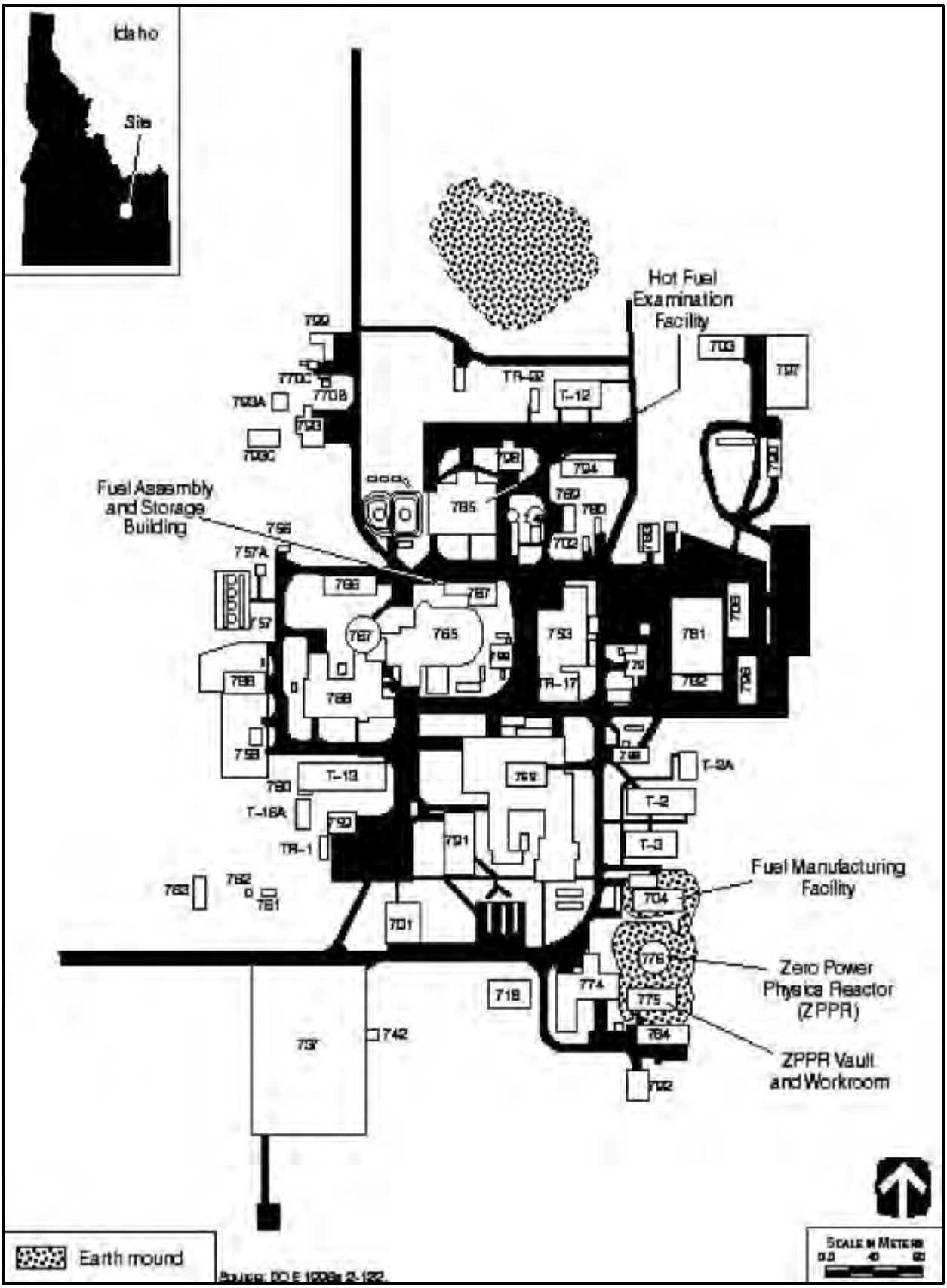

Figure 2–27. Proposed MOX Fuel Lead Assembly Fabrication Facilities, ANL–W at INEEL

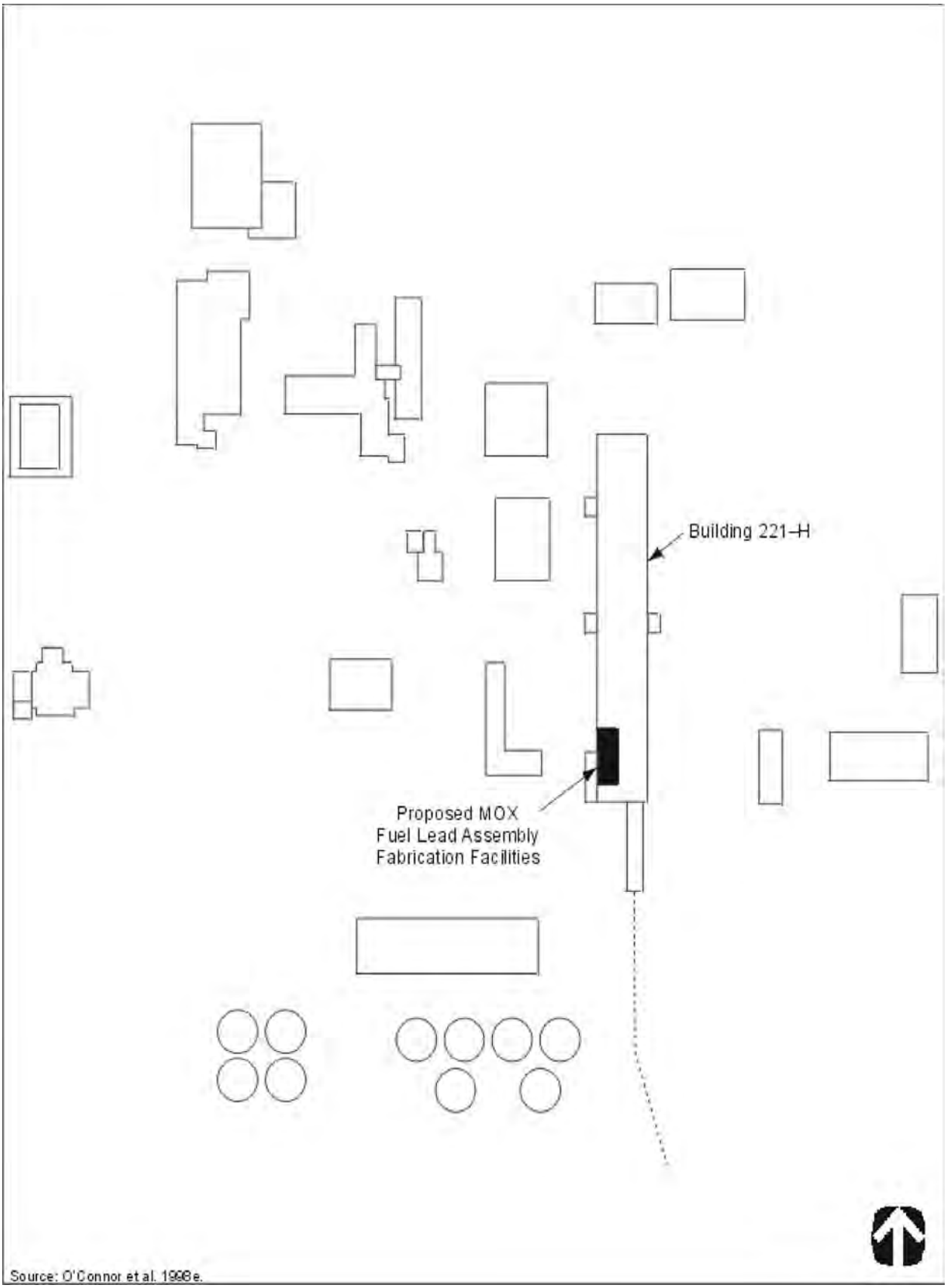

Figure 2–28. Proposed MOX Fuel Lead Assembly Fabrication Facilities, H-Area at SRS

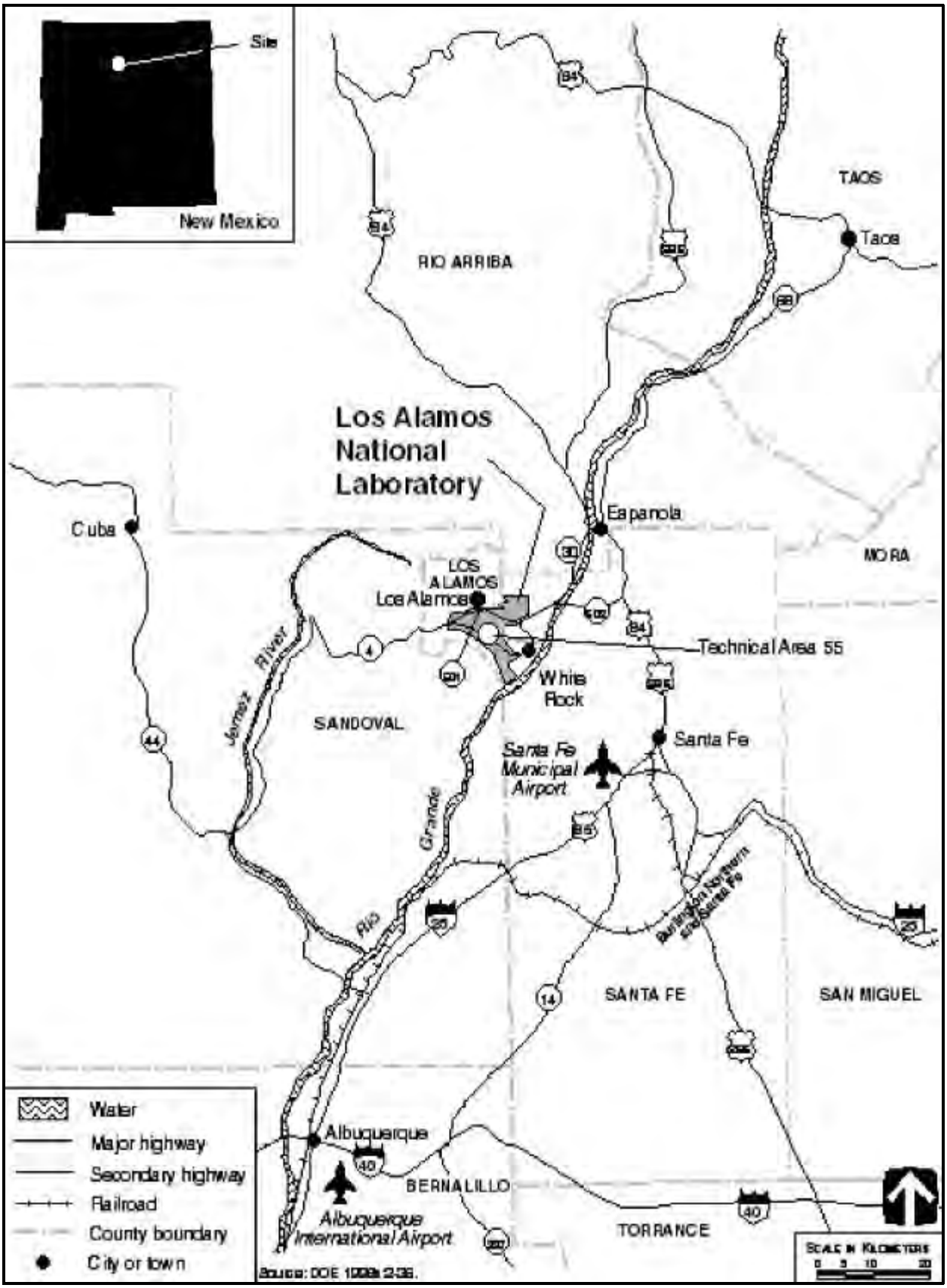

Figure 2–29. LANL, New Mexico

LANL consists primarily of Technical Areas, of which 49 are actively in use. With the exception of the bundle assembly and inspection activities proposed for the Radioactive Materials Research, Operations and Demonstration Facility in TA–50, the facilities proposed for lead assembly fabrication and storage of archived fuel rods are in Building PF–4 within TA–55 (see Figure 2–30). Most of TA–55, including the main complex, is inside a restricted area surrounded by a double security fence. In addition to Building PF–4, the TA–55 main complex consists of the Administration Building (PF–1), Support Office Building (PF–2), Support Building (PF–3), Warehouse (PF–5), and other miscellaneous support buildings.

Fuel fabrication activities have been proposed for currently operational fuel fabrication laboratories in Building PF–4, which became operational in 1978 for conducting state-of-the-art plutonium processing. Current activities in the building include plutonium recovery, fabrication of plutonium components, weapons disassembly, plutonium 238 and actinide processing, and fabrication of ceramic-based reactor fuels.

2.17.2.5 LLNL

The main LLNL site, originally a naval air training station, is approximately 80 km (50 mi) east of San Francisco and 6.4 km (4 mi) from downtown Livermore (see Figure 2–31). LLNL was established in 1952 to conduct nuclear weapons research. Its current mission is research, testing, and development focusing on national defense and security, energy, the environment, and biomedicine. Within recent years, LLNL's mission has broadened to include global security, ecology, and mathematics and science education.

Buildings 332, 334, and 335 are the three primary facilities proposed to support fabrication of lead assemblies. The Plutonium Facility (Building 332) is inside LLNL's Superblock, a 500-ft by 700-ft protected area surrounded by an alarmed double security fence (see Figure 2–32). Building 332 comprises several buildings constructed over the past three decades, including the Plenum Building, an office structure, plutonium-handling laboratories, mechanical shops, office space, a small nonradioactive materials laboratory, two plutonium storage vaults, and a cold machine shop. Current activities in the Plutonium Facility include the receipt, storage, and shipping of special nuclear materials; plutonium and fissile uranium operations and experiments; special nuclear material control and accountability; scrap recovery; and waste operations. For the lead assembly fabrication effort, Building 332 would be used to receive and store bulk plutonium dioxide powder, fabricate MOX pellets, and assemble fuel rods.

Building 334, adjacent to Building 332 in the Superblock, can handle maximum quantities of encapsulated special nuclear materials. This three-floor facility comprises the Engineering Test Bay (ETB) and the Radiation Measurements Facility (RMF). The ETB is used to conduct thermal and dynamic tests on weapon components; the RMF, located in the Intrinsic Radiation (INRAD) bay, to make intrinsic radiation measurements of various components. The INRAD and ETB bays provide primary and secondary confinement of radioactive material. For the proposed lead assembly fabrication, the ETB would be used for assembling, storing, packaging, and shipping fuel assemblies. Building 334 also contains analytical, metallography, scrap recovery, and other equipment to support the proposed activities.

Building 335, also adjacent to Building 332, is used as a staging area for nonradioactive equipment and systems being readied to move into Building 332. There are also areas for training, document storage, and change rooms, as well as access into the radioactive materials area of Building 332. For the lead assembly fabrication effort, Building 335 would be used for assembly and testing of equipment, storage of spare parts and supplies, and electrical and mechanical shop areas. The proposed activities can be accomplished within LLNL's administrative limits for uranium and plutonium inventory as identified in the *Supplement Analysis for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore* (DOE 1999c).

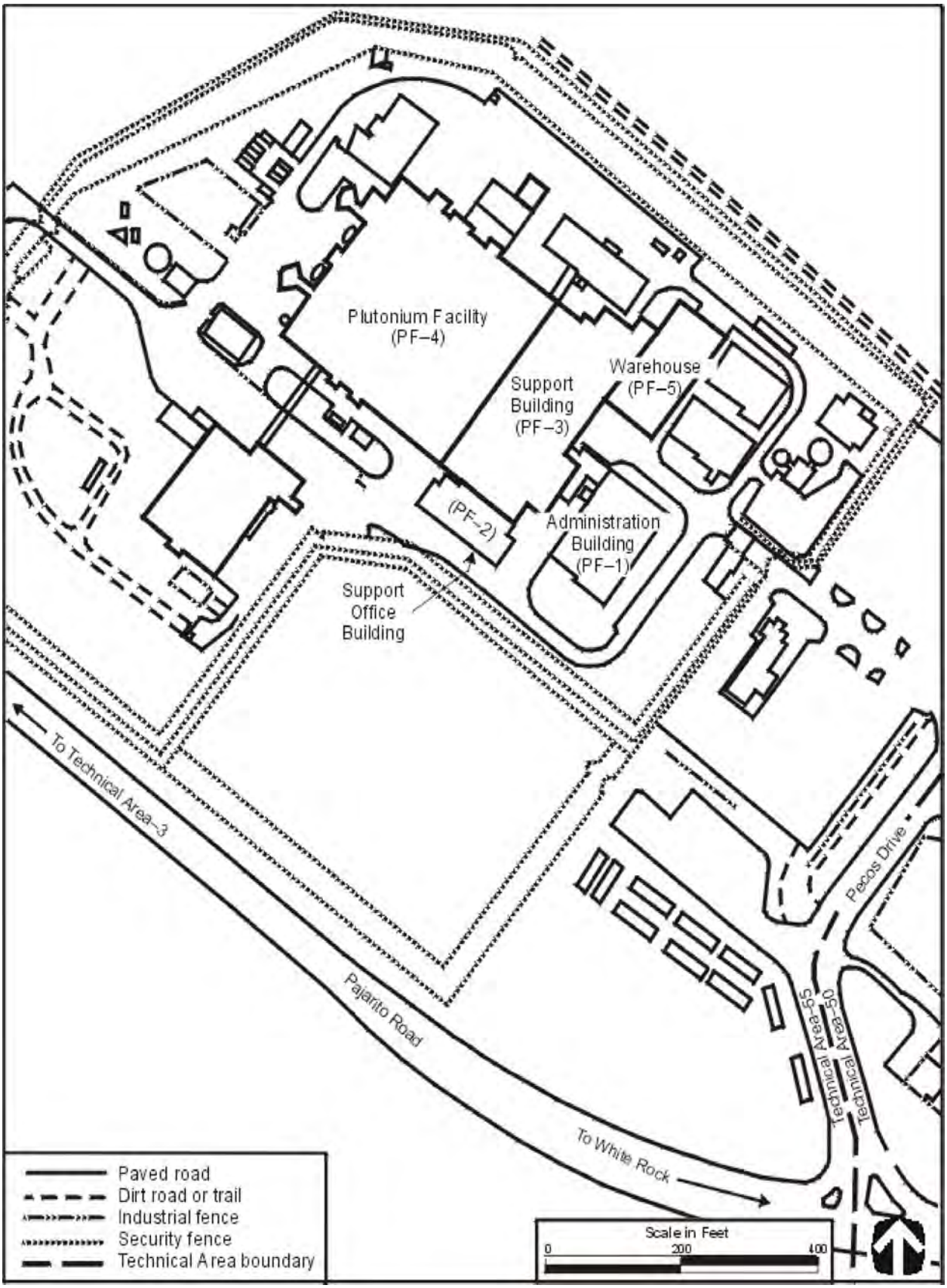

Figure 2–30. Proposed MOX Fuel Lead Assembly Fabrication Facilities, TA–55 at LANL

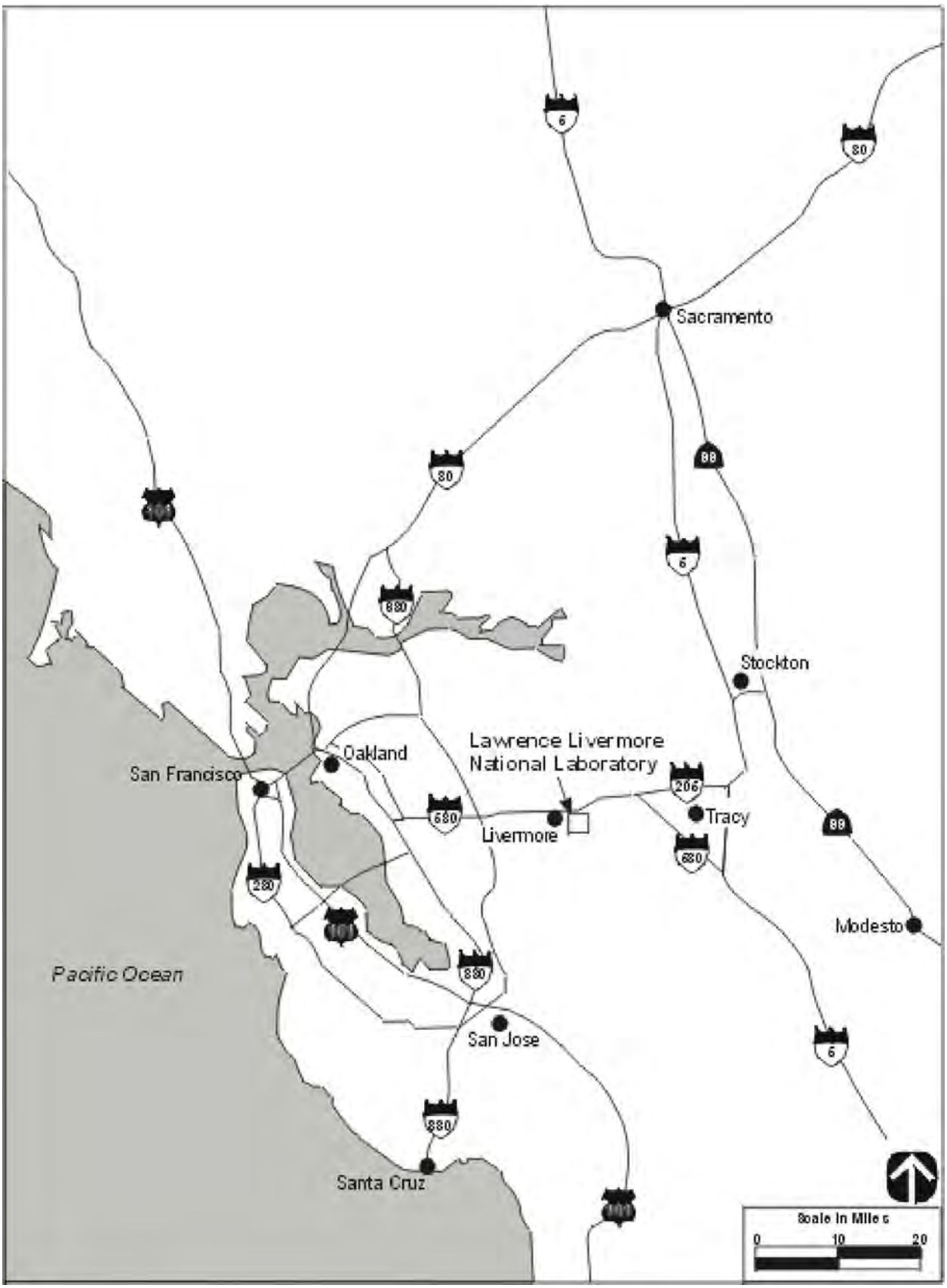

Figure 2–31. LLNL, California

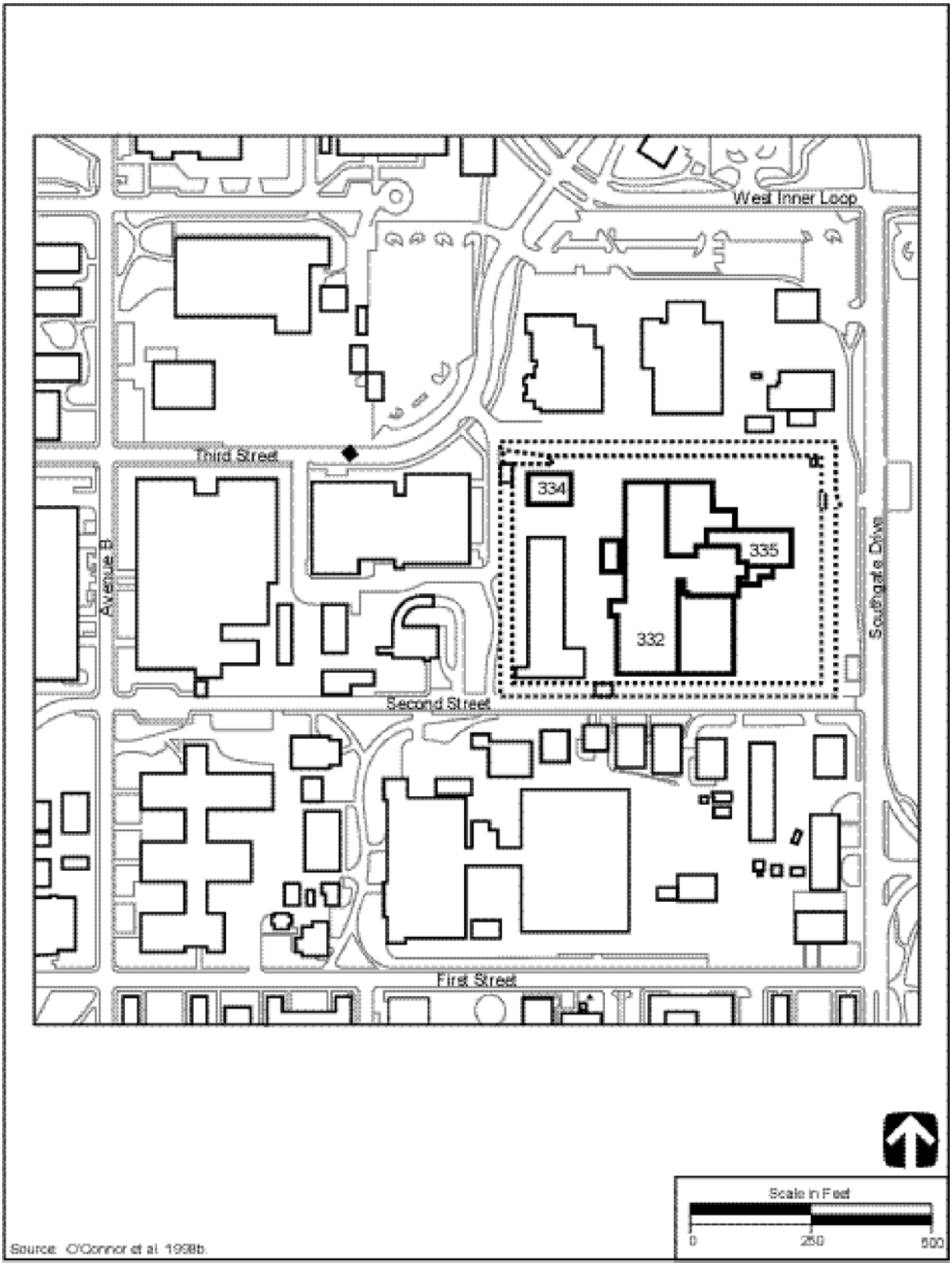

Figure 2–32. Proposed MOX Fuel Lead Assembly Fabrication Facilities, Superblock at LLNL

2.17.3 Postirradiation Examination Siting Alternatives

Postirradiation examination is used to collect information about fuel assemblies after irradiation. Tests on the lead assemblies would begin with remote nondestructive examination, which typically involves a visual examination of the fuel rods to detect signs of damage or wear, as well as the measurement of physical parameters such as length, diameter, and weight. The nondestructive tests would continue with more rigorous tests such as ultrasonic tests, x- or gamma spectroscopy, and neutron radiography. After completion of the nondestructive testing, which does not compromise the integrity of the material being examined, the rods would be subjected to destructive testing: they would be punctured to collect contained gases, then cut into segments for metallurgical and ceramographic testing, chemical analysis, electron microscopy, and other physical testing. Such tests, standard industry and research activities, would provide information on how the fuel material and the cladding responded to being inside the operating reactor. DOE proposes to conduct any required postirradiation examination at either ANL–W or ORNL because these facilities have hot cells (special facilities which are heavily shielded and have remote-handling equipment for working with highly radioactive materials) and testing equipment that are routinely required for these activities. Both sites currently process materials equivalent to those that would be handled during postirradiation examination of these lead assemblies. At either site, only minimal modifications to existing equipment would be required for acceptance of commercial-sized, full-length fuel rods.

Waste generated by destructive testing of the lead assemblies would be managed at the postirradiation examination site as TRU waste. Irradiated fuel rods sent to the postirradiation examination facility that are not destroyed in testing would be managed at the postirradiation examination site as spent fuel, in accordance with the site's spent fuel program. This spent fuel from the lead assembly program may be stored at the postirradiation examination site until transported to INEEL, where it would remain in storage pending disposition at a potential geologic repository pursuant to the NWPA.[26]

2.17.3.1 ANL–W

The Hot Fuel Examination Facility (HFEF) is a hot cell complex for the preparation and examination of irradiated experiments and the characterization and testing of waste forms from conditioning of spent fuel and waste. HFEF is located in a double-fenced compound on the ANL–W site at INEEL (see Figure 2–27). HFEF consists of two adjacent shielded hot cells, a shielded metallographic loading box, an unshielded Hot Repair Area and a Waste Characterization Area. The building is a three-story structure with a basement support area, and has a gross floor area of about 5,200 m^2 (56,000 ft^2).

The HFEF main cell is 21 m (70 ft) long by 9 m (30 ft) wide by 7.5 m (25 ft) high, and has an argon gas atmosphere. The cell is serviced by two electro-mechanical manipulators rated for 340 kg (750 lb) and two 5-ton bridge cranes. There are 15 workstations, each equipped with two master/slave manipulators.

The primary program at HFEF, since October 1994, has been the support of the Experimental Breeder Reactor II (EBR–II) defueling and decommissioning. HFEF was responsible for receiving all the fuel and blanket material from EBR–II and preparing the material for storage in the Radioactive Scrap and Waste Facility.

In addition to the handling of the EBR–II fuel, HFEF is the examination facility for both the metal and ceramic waste form experiments from the Fuel Conditioning Facility. In addition, equipment is being installed and

[26] Transportation and storage at INEEL would be in accordance with decisions made in the ROD for the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Environmental Impact Statement*.

processes tested for the disposal of the plutonium and fission product waste from the conditioning of EBR–II fuel. The testing and characterization of the ceramic waste forms will be performed in HFEF.

HFEF is presently being modified to accept commercial-sized fuel assemblies. All the examination equipment in the cell and the cask handling systems are being modified to handle commercial sized casks and fuel rods for examination. These modification are expected to be complete in mid-1999.

2.17.3.2 ORNL

The Irradiated Fuels Examination Laboratory (IFEL), Building 3525, has been used for fuel research and examination. It is part of ORNL approximately 14 km (8 mi) southwest of the city of Oak Ridge, Tennessee. Over a period of three decades, this facility has handled a wide variety of fuels including aluminum clad research reactor fuel, both stainless and zircaloy clad LWR fuel, coated-particle gas cooled reactor fuel, and numerous one of a kind fuel test specimens. In addition, the facility has also done iridium isotope processing and irradiated capsule disassembly.

The IFEL contains a large horseshoe-shaped array of hot cells which are divided into three work areas. The hot cells are constructed of 3-ft thick concrete walls with oil-filled lead glass viewing windows. The inside of surfaces of the cell bank are lined with stainless steel to provide containment of particulate matter and to facilitate decontamination. Special penetrations are provided for the sealed entry of services such as instrument lines, lights, and electrical power. A pair of manipulators are located at each of 15 window stations for remote cell operations and periscopes allow for magnified views of in-cell objects. Heavy objects within each cell bank can be moved by electromechanical manipulators or a 3-ton crane. Fuel materials enter and leave the cells through three shielded transfer stations provided at the rear face of the North cell.

2.18 SUMMARY OF IMPACTS OF CONSTRUCTION AND OPERATION OF THE PROPOSED SURPLUS PLUTONIUM DISPOSITION FACILITIES

This section summarizes the potential impacts associated with the activities necessary to implement DOE's disposition strategy for surplus plutonium. The summary addresses the environmental information to be considered for each of the decisions contemplated as part of this strategy. This information is compiled from the analyses presented in Chapter 4 of this SPD EIS. Section 2.18.1 summarizes impacts related to the proposed surplus plutonium disposition facilities and provides that information by alternative, and within each alternative, by site. Summarized impacts are presented for the No Action Alternative as well as for each of the 15 alternatives that encompass the range of reasonable alternatives for both the 50-t (55-ton) immobilization and the hybrid approaches to plutonium disposition. Section 2.18.2 compares the potential impacts related to implementation of lead assembly fabrication at five candidate sites and postirradiation examination at two candidate sites. To provide an overview of the impacts associated with full implementation of the MOX fuel approach to disposition, Section 2.18.3 presents an integrated assessment of the potential impacts of the MOX facility, lead assembly fabrication, postirradiation examination, and use of the MOX fuel in domestic, commercial reactors. To facilitate the evaluation of proposed immobilization technologies, the final section compares the impacts associated with the can-in-canister immobilization technology with those described in the *Storage and Disposition PEIS* for the ceramic immobilization and vitrification alternatives.

2.18.1 Summary of Impacts by Alternative and Site

Table 2–4 summarizes the potential impacts of the No Action and surplus plutonium disposition facility alternatives on key environmental resource areas. In addition, the amount of land that would be disturbed and the potential impacts from facility accidents and transportation are summarized. Impacts are presented by

alternative, and within each alternative, by the affected site. For the No Action Alternative, sites that currently store surplus plutonium are included in the table.

Impacts on air quality are expected to be low for all alternatives. Table 2–4 provides the incremental criteria pollutant concentrations from surplus plutonium disposition operations for each alternative. In all cases, the incremental concentrations would contribute less than 2 percent of the applicable regulatory standard. Total site air concentrations, which also factor in the amount associated with the No Action Alternative,[27] would be no more than 21 percent of the annual applicable regulatory standard, with the highest occurring in the alternatives that would have the immobilization facility located at SRS. That particular value represents projected sulfur dioxide concentrations as a percent of the annual National Ambient Air Quality Standards; the corresponding value for the No Action Alternative is also 21 percent, demonstrating that the increment associated with plutonium disposition facilities would be very small.[28]

Expected waste generation by alternative is estimated for TRU waste, LLW, mixed LLW, hazardous waste, and nonhazardous waste[29] from construction activities and 10 years of expected facility operation. As shown in Chapter 4, impacts associated with management of nonhazardous wastes would be minor and would not tend to be a discriminator among alternatives.

TRU waste generation would range from 1,400 m^3 (1,832 yd^3) to 1,810 m^3 (2,368 yd^3), and LLW generation would range from 1,700 m^3 (2,224 yd^3) to 2,400 m^3 (3,140 yd^3). Mixed waste generation would range from 20 m^3 (26 yd^3) for immobilizing all 50 t (55 tons) (Alternatives 11A, 11B, 12A, and 12B) to 50 m^3 (65 yd^3) for each of the hybrid alternatives. Hazardous waste generation would range from 770 m^3 (1,007 yd^3) (Alternatives 11A and 11B) to 940 m^3 (1,230 yd^3) (Alternatives 3, 5, 6A, 6B, 7, and 9).

Impacts on the waste management infrastructure from implementing alternatives for surplus plutonium disposition are expected to be minor. All of the waste expected to be generated from the different alternatives analyzed could be accommodated within existing or planned capacities for waste treatment, storage, and disposal at all of the candidate sites, except for TRU waste at Pantex. At Pantex, a maximum of 860 m^3 (1,125 yd^3) of TRU waste would be generated under Alternative 9 or 10. Because TRU waste is not routinely generated and stored at Pantex, TRU waste storage space would be designated within the pit conversion and MOX facilities. TRU waste would be shipped to WIPP near Carlsbad, New Mexico, for disposal.

Although the proposed facilities are still in the early stages of engineering and design, the surplus plutonium disposition program would integrate pollution prevention practices that include waste stream minimization, source reduction, and recycling, as well as DOE procurement processes that preferentially procure products made from recycled materials. The proposed facility designs would minimize the size of radiologically controlled areas, thereby minimizing the generation of radioactive waste. To the extent practical, solvents or other chemicals which, after use, are regulated by the Resource Conservation and Recovery Act would not be used at the DOE facilities, thereby minimizing the amount of hazardous and mixed waste generated. Wastewater would be recycled to the extent possible to minimize effluent discharge.

The employment column of Table 2–4 summarizes the number of direct jobs that would be generated by the proposed facilities under each alternative. All the action alternatives would generate employment opportunities

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[27] As indicated in Appendix G, the No Action Alternative projects air emissions to the year 2005, when plutonium disposition facility operations under the disposition alternatives would begin, and includes emissions from existing and other planned facilities.

[28] This conclusion assumes that activity levels under the No Action Alternative remain the same beyond 2005.

[29] Waste type definitions may be found in Appendix F.8.

at the facilities. Expected annual peak construction employment ranges from 463 workers (Alternative 11A) to 2,143 workers (Alternative 5).[30] Annual employment during operations would range from 751 workers (Alternatives 12A and 12B) to 1,165 workers (Alternatives 2 and 4B).

Potential effects on human health from facility construction, 10 years of operation, postulated facility accidents and intersite transportation of radioactive materials are also summarized in Table 2–4. Doses to workers from the construction and 10 years of routine operation of the three surplus plutonium disposition facilities at DOE sites would result in up to 2.0 latent cancer fatalities (LCFs) for both the hybrid alternatives and the 50-t (55-ton) immobilization alternatives. No LCFs would be expected to occur in the general population during routine operations. Under the No Action Alternative, continued storage of the surplus plutonium would also not result in any LCFs to the general population during routine operations. Doses to workers from the long-term storage (up to 50 years) of the surplus plutonium would result in up to 2.4 LCFs.

Table 2–4 presents the results of the analysis of the most severe nonreactor design basis accident scenario. For Alternative 4B, a criticality in the MOX facility would result in the most severe consequences. For all other alternatives except the No Action Alternative, a design basis fire in the pit conversion facility resulting in a tritium release would result in the most severe consequences. However, no design basis accident would be expected to result in LCFs in the general population.

No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would either be able to evacuate immediately or would not be affected by the events. Explosions, on the other hand, could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality were to occur, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the criticality. Beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident.

Materials transportation is analyzed to determine potential radiological and nonradiological impacts from routine and accident conditions. These results are summarized in Table 2–4. Transportation includes the movement of surplus plutonium from storage and among the proposed disposition facilities; depleted uranium hexafluoride from, for example, Portsmouth to a conversion facility; uranium dioxide from the conversion facility to the immobilization and/or MOX facilities; recovered HEU from the pit conversion facility to ORR; MOX fuel to Catawba, McGuire, and North Anna; spent nuclear fuel resulting from lead assembly irradiation at McGuire to the postirradiation examination site and then to storage at INEEL; and the immobilized plutonium to a potential geologic repository.[31] No traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions would be expected. For the hybrid alternatives, the number of trips would range from 1,917 (Alternative 10) to 2,530 (Alternatives 3, 6A, 6B, and 7), and the cumulative distances traveled would range from 3.6 million km (2.2 million mi) (Alternative 10) to 8.7 million km (5.4 million mi) (Alternatives 6A and 6B).

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[30] These values represent the combined peak annual construction workforce at each site. Peak construction employment under Alternative 11A is composed of the 463 construction workers at Hanford in 2003. Peak construction employment under Alternative 5 is composed of the 451 construction workers at Pantex in 2002 and the 1,692 construction workers at SRS in 2003.

[31] Shipments of spent fuel to the potential geologic repository are analyzed in the *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D) (DOE 1999b).

Immobilization-only alternatives would require from 1,877 trips for Alternative 11B to 2,236 trips for Alternative 12A. Cumulative distances traveled for the immobilization-only alternatives would range from 2.5 million km (1.5 million mi) (Alternative 11B) to 4.4 million km (2.7 million mi) (Alternative 12A).

Table 2–4 also provides the total land area that would be disturbed at each site for each alternative. Land disturbance relates directly to impacts on ecological resources, cultural resources, geology and soils, and land use and visual resources. The amount of land that would be disturbed for the hybrid alternatives would range from 19 hectares (47 acres) in Alternative 8, to 32 hectares (79 acres) in Alternatives 3, 5, and 9. Because these land areas are in or adjacent to previously disturbed areas and represent a very small percent of the land available at the candidate sites, the impacts on geology and soils and land use would be minor. Land disturbance associated with immobilizing approximately 50 t (55 tons) of surplus plutonium would range from 9.5 hectares (23 acres) in Alternative 11B, to 20 hectares (49 acres) in Alternative 12A or 12B. Construction and operation of the proposed facilities would not effect a significant change in any natural features of visual interest in the area of any of the candidate sites. No major impact is anticipated for any threatened or endangered species because there have been no sightings near the proposed facility locations at the candidate sites. Cultural resource impacts would be minor at all sites because at all sites except SRS, construction of facilities would be in mostly disturbed or developed areas; at SRS, cultural resource areas would be avoided. Archaeological investigations near F-Area have discovered five sites that could be impacted by construction of surplus plutonium disposition facilities. Two of these sites have been recommended to the South Carolina State Historic Preservation Officer (SHPO) as eligible for nomination to the National Register of Historic Places. Potential adverse impacts could be mitigated through either avoidance or data recovery. DOE currently plans to mitigate impacts by avoiding sites that are eligible or potentially eligible for nomination to the National Register. Cultural resource compliance activities would be conducted in accordance with the *Programmatic Memorandum of Agreement for the Savannah River Site* (SRARP 1989:179–188).

Impacts were also assessed on water availability and quality and infrastructure including requirements for roads, electricity, and fuel. These evaluations indicated that all impacts would be minor. [Text deleted.] None of the alternatives were found to pose a significant risk (when probability is considered) to the general population, nor would implementation of any of the alternatives result in a significant risk of disproportionately high and adverse impacts on minority or low-income groups within the general population.

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 1: No Action							
Hanford	No change	No change	No change	None	Dose Public: 4.7×10^{-2} Workers: 46 LCFs Public: 1.2×10^{-3} Workers: 0.92	NA	None
INEEL	No change	No change	No change	None	Dose Public: 7.6×10^{-5} Workers: 1.5 LCFs Public: 1.9×10^{-6} Workers: 2.9×10^{-2}	NA	None
Pantex	No change	No change	No change	None	Dose Public: 6.3×10^{-6} Storage Workers: 3 Packaging Workers: 16 LCFs Public: 1.6×10^{-7} Storage Workers: 6.0×10^{-2} Packaging Workers: 6.4×10^{-2}	NA	None

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
SRS	No change	No change	No change	None	Dose Public: 2.9×10^{-4} Workers: 7.5 LCFs Public: 7.2×10^{-6} Workers: 0.15	NA	None
LLNL	No change	No change	No change	None	Dose Public: 6.7×10^{-3} Workers: 25 LCFs Public: 1.7×10^{-4} Workers: 0.50	NA	None
LANL	No change	No change	No change	None	Dose Public: 2.7 Workers: 12.5 LCFs Public: 6.8×10^{-2} Workers: 0.25	NA	None
RFETS	No change	No change	No change	None	Dose Public: 0.10 Workers: 25 LCFs Public: 2.5×10^{-3} Workers: 0.50	NA	None

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
SRS	No change	No change	No change	None	Dose Public: 2.9×10^{-4} Workers: 7.5 LCFs Public: 7.2×10^{-6} Workers: 0.15	NA	None
LLNL	No change	No change	No change	None	Dose Public: 6.7×10^{-3} Workers: 25 LCFs Public: 1.7×10^{-4} Workers: 0.50	NA	None
LANL	No change	No change	No change	None	Dose Public: 2.7 Workers: 12.5 LCFs Public: 6.8×10^{-2} Workers: 0.25	NA	None
RFETS	No change	No change	No change	None	Dose Public: 0.10 Workers: 25 LCFs Public: 2.5×10^{-3} Workers: 0.50	NA	None

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford							
Hanford	CO: 0.651 NO_2: 0.0873 PM_{10}: 0.00541 SO_2: 0.00496	TRU: 1,800 LLW: 2,300 MLLW: 50 Haz: 800	Construction: 1,235 Operations: 1,165	22	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 7.2 Workers: 488 LCFs Public: 3.6×10^{-2} Workers: 2.0	Tritium release at pit conversion facility: 0.11 LCF	LCFs: 6.1×10^{-2} Traffic fatalities: 7.4×10^{-2} Kilometers traveled: 7.5M Additional risk of LCFs at Pantex: 8.3×10^{-2}

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 3: Pit Conversion, Immobilization, and MOX in New Construction at SRS							
SRS	CO: 0.37 NO_2: 0.0634 PM_{10}: 0.00423 SO_2: 0.124	TRU: 1,800 LLW: 2,400 MLLW: 50 Haz: 940	Construction: 1,968 Operations: 1,120	32 Disturbance could impact a site potentially eligible for the National Register of Historic Places	Construction (workforce) Dose: 4.1 LCFs: 1.6×10^{-3} Operations Dose Public: 1.8 Workers: 456 LCFs Public: 9.0×10^{-3} Workers: 1.8	Tritium release at pit conversion facility: 5.0×10^{-2} LCF	LCFs: 8.1×10^{-2} Traffic fatalities: 5.3×10^{-2} Kilometers traveled: 4.3M Additonal risk of LCFs at Pantex: 8.3×10^{-2}
[Text deleted because alternative deleted.][h]							

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford							
Pantex	CO: 0.381 NO_2: 0.0374 PM_{10}: 0.00215 SO_2: 0.00064	TRU: 180 LLW: 600 MLLW: 10 Haz: 20	Construction: 451 Operations: 400	5.0	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 0.58 Workers: 192 LCFs Public: 2.9×10^{-3} Workers: 0.77	Tritium release at pit conversion facility: 1.8×10^{-2} LCF	LCFs: 5.7×10^{-2} Traffic fatalities: 6.5×10^{-2} Kilometers traveled: 6.3M Additional risk of LCFs at Pantex: 0
Hanford	CO: 0.374 NO_2: 0.052 PM_{10}: 0.00367 SO_2: 0.00343	TRU: 1,600 LLW: 1,700 MLLW: 40 Haz: 780	Construction: 1,148 Operations: 720	16	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 0.30 Workers: 264 LCFs Public: 1.5×10^{-3} Workers: 1.1	Nuclear criticality at MOX facility: 1.9×10^{-2} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 4B: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in FMEF at Hanford							
Pantex	CO: 0.381 NO_2: 0.0374 PM_{10}: 0.00215 SO_2: 0.00064	TRU: 180 LLW: 600 MLLW: 10 Haz: 20	Construction: 451 Operations: 400	5.0	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 0.58 Workers: 192 LCFs Public: 2.9×10^{-3} Workers: 0.77	Tritium release at pit conversion facility: 1.8×10^{-2} LCF	LCFs: 5.7×10^{-2} Traffic fatalities: 6.5×10^{-2} Kilometers traveled: 6.3M Additional risk of LCFs at Pantex: 0
Hanford	CO: 0.507 NO_2: 0.0707 PM_{10}: 0.00499 SO_2: 0.00468	TRU: 1,600 LLW: 1,700 MLLW: 40 Haz: 780	Construction: 1,064 Operations: 765	17.4	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 0.15 Workers: 296 LCFs Public: 7.3×10^{-4} Workers: 1.2	Nuclear criticality at MOX or immobilization facility: 1.9×10^{-2} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS							
Pantex	CO: 0.381 NO_2: 0.0374 PM_{10}: 0.00215 SO_2: 0.00064	TRU: 180 LLW: 600 MLLW: 10 Haz: 20	Construction: 451 Operations: 400	5.0	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 0.58 Workers: 192 LCFs Public: 2.9×10^{-3} Workers: 0.77	Tritium release at pit conversion facility: 1.8×10^{-2} LCF	LCFs: 7.7×10^{-2} Traffic fatalities: 5.0×10^{-2} Kilometers traveled: 3.8M Additional risk of LCFs at Pantex: 0
SRS	CO: 0.275 NO_2: 0.0347 PM_{10}: 0.0024 SO_2: 0.0829	TRU: 1,600 LLW: 1,800 MLLW: 40 Haz: 920	Construction: 1,692 Operations: 720	27 Disturbance could impact a site potentially eligible for the National Register of Historic Places	Construction (workforce) Dose: 2.7 LCFs: 1.1×10^{-3} Operations Dose Public: 1.8×10^{-2} Workers: 264 LCFs Public: 9.2×10^{-4} Workers: 1.1	Nuclear criticality at MOX facility: 8.0×10^{-3} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS							
Hanford	CO: 0.247 NO_2: 0.031 PM_{10}: 0.00143 SO_2: 0.00123	TRU: 860 LLW: 1,500 MLLW: 40 Haz: 50	Construction: 844 Operations: 785	14	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 7.2 Workers: 214 LCFs Public: 3.6×10^{-2} Workers: 0.86	Tritium release at pit conversion facility: 0.11 LCF	LCFs: 9.6×10^{-2} Traffic fatalities: 9.1×10^{-2} Kilometers traveled: 8.6M Additional risk of LCFs at Pantex: 8.3×10^{-2}
SRS	CO: 0.152 NO_2: 0.0242 PM_{10}: 0.00181 SO_2: 0.0442	TRU: 950 LLW: 810 MLLW: 10 Haz: 890	Construction: 1,014 Operations: 335	15 Disturbance could impact a site potentially eligible for the National Register of Historic Places	Construction (workforce) Dose: 1.5 LCFs: 6.0×10^{-4} Operations Dose Public: 2.8×10^{-3} Workers: 242 LCFs Public: 1.4×10^{-5} Workers: 0.97	Nuclear criticality at immobilization facility: 8.0×10^{-4} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 6B: Pit Conversion and MOX Collocated in FMEF at Hanford, and Immobilization in New Construction and DWPF at SRS							
Hanford	CO: 0.247 NO_2: 0.031 PM_{10}: 0.00143 SO_2: 0.00123	TRU: 860 LLW: 1,500 MLLW: 40 Haz: 50	Construction: 655 Operations: 785	14	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 7.0 Workers: 214 LCFs Public: 3.5×10^{-2} Workers: 0.86	Tritium release at pit conversion facility: 0.11 LCF	LCFs: 9.6×10^{-2} Traffic fatalities: 9.1×10^{-2} Kilometers traveled: 8.6M Additional risk of LCFs at Pantex: 8.3×10^{-2}
SRS	CO: 0.152 NO_2: 0.0242 PM_{10}: 0.00181 SO_2: 0.0442	TRU: 950 LLW: 810 MLLW: 10 Haz: 890	Construction: 1,014 Operations: 335	15 Disturbance could impact a site potentially eligible for the National Register of Historic Places	Construction (workforce) Dose: 1.5 LCFs: 6.0×10^{-4} Operations Dose Public: 2.8×10^{-3} Workers: 242 LCFs Public: 1.4×10^{-5} Workers: 0.97	Nuclear criticality at immobilization facility: 8.0×10^{-4} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS							
INEEL	CO: 0.762 NO_2: 0.144 PM_{10}: 0.00833 SO_2: 0.345	TRU: 860 LLW: 1,500 MLLW: 40 Haz: 50	Construction: 866 Operations: 743	14	Construction (workforce) Dose: 2.0 LCFs: 7.7×10^{-4} Operations Dose Public: 2.2 Workers: 192 LCFs Public: 1.1×10^{-2} Workers: 0.77	Tritium release at pit conversion facility: 4.4×10^{-3} LCF	LCFs: 9.4×10^{-2} Traffic fatalities: 8.3×10^{-2} Kilometers traveled: 7.5M Additional risks of LCFs at Pantex: 8.3×10^{-2}
SRS	CO: 0.152 NO_2: 0.0242 PM_{10}: 0.00181 SO_2: 0.0442	TRU: 950 LLW: 810 MLLW: 10 Haz: 890	Construction: 1,014 Operations: 335	15 Disturbance could impact a site potentially eligible for the National Register of Historic Places	Construction (workforce) Dose: 1.5 LCFs: 6.0×10^{-4} Operations Dose Public: 2.8×10^{-3} Workers: 242 LCFs Public: 1.4×10^{-5} Workers: 0.97	Nuclear criticality at immobilization facility: 8.0×10^{-4} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 8: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in FMEF and HLWVF at Hanford							
INEEL	CO: 0.762 NO_2: 0.144 PM_{10}: 0.00833 SO_2: 0.345	TRU: 860 LLW: 1,500 MLLW: 40 Haz: 50	Construction: 866 Operations: 743	14	Construction (workforce) Dose: 2.0 LCFs: 7.7×10^{-4} Operations Dose Public: 2.2 Workers: 192 LCFs Public: 1.1×10^{-2} Workers: 0.77	Tritium release at pit conversion facility: 4.4×10^{-3} LCF	LCFs: 5.9×10^{-2} Traffic fatalities: 6.5×10^{-2} Kilometers traveled: 6.3M Additional risks of LCFs at Pantex: 8.3×10^{-2}
Hanford	CO: 0.271 NO_2: 0.0376 PM_{10}: 0.00265 SO_2: 0.00249	TRU: 950 LLW: 800 MLLW: 10 Haz: 750	Construction: 414 Operations: 335	4.5	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 7.8×10^{-3} Workers: 242 LCFs Public: 3.9×10^{-5} Workers: 0.97	Nuclear criticality at immobilization facility: 2.7×10^{-3} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS							
Pantex	CO: 0.705 NO_2: 0.0736 PM_{10}: 0.00531 SO_2: 0.00265	TRU: 860 LLW: 1,500 MLLW: 40 Haz: 50	Construction: 1,048 Operations: 785	17	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 0.61 Workers: 214 LCFs Public: 3.0×10^{-3} Workers: 0.86	Tritium release at pit conversion facility: 1.8×10^{-2} LCF	LCFs: 8.1×10^{-2} Traffic fatalities: 5.2×10^{-2} Kilometers traveled: 4.8M Additional risk of LCFs at Pantex: 0
SRS	CO: 0.152 NO_2: 0.0242 PM_{10}: 0.00181 SO_2: 0.0442	TRU: 950 LLW: 810 MLLW: 10 Haz: 890	Construction: 1,014 Operations: 335	15 Disturbance could impact a site potentially eligible for the National Register of Historic Places	Construction (workforce) Dose: 1.5 LCFs: 6.0×10^{-4} Operations Dose Public: 2.8×10^{-3} Workers: 242 LCFs Public: 1.4×10^{-5} Workers: 0.97	Nuclear criticality at immobilization facility: 8.0×10^{-4} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 10: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in FMEF and HLWVF at Hanford							
Pantex	CO: 0.705 NO_2: 0.0736 PM_{10}: 0.00531 SO_2: 0.00265	TRU: 860 LLW: 1,500 MLLW: 40 Haz: 50	Construction: 1,048 Operations: 785	17	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 0.61 Workers: 214 LCFs Public: 3.0×10^{-3} Workers: 0.86	Tritium release at pit conversion facility: 1.8×10^{-2} LCF	LCFs: 4.6×10^{-2} Traffic fatalities: 4.3×10^{-2} Kilometers traveled: 3.6M Additional risk of LCFs at Pantex: 0
Hanford	CO: 0.271 NO_2: 0.0376 PM_{10}: 0.00265 SO_2: 0.00249	TRU: 950 LLW: 800 MLLW: 10 Haz: 750	Construction: 414 Operations: 335	4.5	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 7.8×10^{-3} Workers: 242 LCFs Public: 3.9×10^{-5} Workers: 0.97	Nuclear criticality at immobilization facility: 2.7×10^{-3} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 11A: Pit Conversion in FMEF and Immobilization in FMEF and HLWVF at Hanford (No MOX)							
Hanford	CO: 0.548 NO_2: 0.0729 PM_{10}: 0.0044 SO_2: 0.00401	TRU: 1,400 LLW: 1,700 MLLW: 20 Haz: 770	Construction: 463 Operations: 812	11	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 6.9 Workers: 490 LCFs Public: 3.4×10^{-2} Workers: 2.0	Tritium release at pit conversion facility: 0.11 LCF	LCFs: 7.4×10^{-2} Traffic fatalities: 5.4×10^{-2} Kilometers traveled: 3.7M Additional risk of LCFs at Pantex: 8.3×10^{-2}

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 11B: Pit Conversion in New Construction at Pantex and Immobilization in FMEF and HLWVF at Hanford (No MOX)							
Pantex	CO: 0.381 NO_2: 0.0374 PM_{10}: 0.00215 SO_2: 0.00064	TRU: 180 LLW: 600 MLLW: 10 Haz: 20	Construction: 451 Operations: 400	5.0	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 0.58 Workers: 192 LCFs Public: 2.9×10^{-3} Workers: 0.77	Tritium release at pit conversion facility: 1.8×10^{-2} LCF	LCFs: 7.07×10^{-2} Traffic fatalities: 4.5×10^{-2} Kilometers traveled: 2.5M Additional risk of LCFs at Pantex: 0
Hanford	CO: 0.271 NO_2: 0.0376 PM_{10}: 0.00265 SO_2: 0.00249	TRU: 1,300 LLW: 1,100 MLLW: 10 Haz: 750	Construction: 414 Operations: 367	4.5	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 1.6×10^{-2} Workers: 266 LCFs Public: 8.0×10^{-5} Workers: 1.1	Nuclear criticality at immobilization facility: 2.7×10^{-3} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 12A: Pit Conversion in New Construction and Immobilization in New Construction and DWPF at SRS (No MOX)							
SRS	CO: 0.246 NO_2: 0.0529 PM_{10}: 0.00364 SO_2: 0.0852	TRU: 1,500 LLW: 1,700 MLLW: 20 Haz: 910	Construction: 1,196 Operations: 751	20 Disturbance could impact a site potentially eligible for the National Register of Historic Places	Construction (workforce) Dose: 2.9 LCFs: 1.2×10^{-3} Operations Dose Public: 1.6 Workers: 446 LCFs Public: 8.0×10^{-3} Workers: 1.8	Tritium release at pit conversion facility: 5.0×10^{-2} LCF	LCFs: 0.152 Traffic fatalities: 8.1×10^{-2} Kilometers traveled: 4.4M Additional risk of LCFs at Pantex: 8.3×10^{-2}

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

Site	Air Quality[a] (incremental pollutant concentrations in $\mu g/m^3$)	Waste Management[b] (m^3)	Employment[c] (direct)	Land Disturbance[d] (ha)	Human Health Risk[e] (dose in person-rem)	Facility Accidents[f]	Transportation[g]
Alternative 12B: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS (No MOX)							
Pantex	CO: 0.381 NO_2: 0.0374 PM_{10}: 0.00215 SO_2: 0.00064	TRU: 180 LLW: 600 MLLW: 10 Haz: 20	Construction: 451 Operations: 400	5.0	Construction (workforce) Dose: 0 LCFs: 0 Operations Dose Public: 0.58 Workers: 192 LCFs Public: 2.9×10^{-3} Workers: 0.77	Tritium release at pit conversion facility: 1.8×10^{-2} LCF	LCFs: 0.148 Traffic fatalities: 7.8×10^{-2} Kilometers traveled: 3.9M Additional risk of LCFs at Pantex: 0
SRS	CO: 0.152 NO_2: 0.0242 PM_{10}: 0.00181 SO_2: 0.0442	TRU: 1,300 LLW: 1,100 MLLW: 10 Haz: 890	Construction: 1,014 Operations: 351	15 Disturbance could impact a site potentially eligible for the National Register of Historic Places	Construction (workforce) Dose: 1.5 LCFs: 6.0×10^{-4} Operations Dose Public: 5.8×10^{-3} Workers: 254 LCFs Public: 2.9×10^{-5} Workers: 1.0	Nuclear criticality at immobilization facility: 8.0×10^{-4} LCF	

Table 2–4. Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site

[a] Values represent the incremental criteria pollutant concentrations associated with surplus plutonium disposition operations for the annual averaging period for nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter smaller than or equal to 10 microns (PM_{10}), and sulfur dioxide (SO_2), and for the 8-hour averaging period for carbon monoxide.

[b] Values are based on a construction period of approximately 3 years and 10 years of operation.

[c] Values are for the peak year of construction for each site and for the annual operation of all facilities for each alternative. Personnel needed to operate the planned HLW vitrification facility at Hanford, or DWPF at SRS, are not included.

[d] Values represent the total land disturbance at each site from construction and operations.

[e] Values for Alternative 1 represent impacts over 50 years of operation under No Action. Those for the remaining alternatives are for the period of construction and 10 years of operation. Public dose values represent the annual radiological dose (in person-rem) to the population within 80 km (50 mi) of the facility location for the year 2030 under Alternative 1, or for 2010 under Alternatives 2 through 12. Worker dose values represent the total radiological dose to involved workers at the facility (in person-rem/year). Public LCFs represent the 50-year LCFs estimated to occur in the population within 80 km (50 mi) for the year 2030 under Alternative 1, or the 10-year LCFs estimated to occur for the year 2010 under Alternatives 2 through 12. Worker LCFs represent the associated 50-year or 10-year LCFs estimated to occur in the involved workforce.

[f] The most severe of the design basis accidents (based on 95 percent meteorological conditions) is used to obtain the population LCF. Higher LCFs would be associated with postulated beyond-design-basis accidents as presented in Chapter 4 and described in detail in Appendix K.

[g] For alternatives that involve more than one site, the transportation impacts for the entire alternative are shown in the first site listed in the alternative. LCFs are from the radiological exposure associated with incident-free operations, radiological accidents, and fatalities expected as a result of vehicle emissions. Traffic fatalities are from nonradiological vehicle accidents. LCFs at Pantex are associated with repackaging requirements if the pit conversion facility were located elsewhere.

[h] Alternatives 3B, 5B, 6C, 6D, 7B, 9B, 12B, and 12D in the SPD Draft EIS have been deleted. Alternative 12C has been renumbered as 12B. Table entries for deleted alternatives have likewise been deleted.

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; FPF, Fuel Processing Facility; Haz, hazardous; HLWVF, high-level-waste vitrification facility; LCF, latent cancer fatality; LLW, low-level waste; MLLW, mixed low-level waste; NA, not applicable; TRU, transuranic.

2.18.2 Summary of Lead Assembly Fabrication and Postirradiation Examination Impacts

The impacts on key resources from fabrication of lead assemblies at the five candidate sites (ANL–W, Hanford, LLNL, LANL, and SRS) evaluated in Section 4.27 are summarized in Table 2–5. These areas include waste management, human health risk during normal operations, facility accidents, and transportation. The transportation analysis includes the shipment of plutonium dioxide from LANL to the candidate site; depleted uranium hexafluoride from the representative DOE storage site at the Portsmouth Gaseous Diffusion Plant to the representative conversion facility in Wilmington, North Carolina; uranium dioxide from the conversion facility to the lead assembly fabrication facility; MOX fuel rods from the lead assembly facility to the McGuire reactor for irradiation; and irradiated fuel rods from McGuire to a postirradiation examination facility.[32] Total distance traveled, in kilometers, is provided for each proposed fabrication site. Because facility modification activities would occur inside existing buildings (i.e., no new buildings would be constructed and no additional land would be disturbed), there should be little increase in air pollutants; land disturbances would be minimal; and the number of construction workers would be low. Little or no impacts are expected on any other resources areas.

Impacts from lead assembly and postirradiation examination activities are based on the fabrication of 10 assemblies, although it is likely that only 2 would be needed. If less than 10 lead assemblies were fabricated, the impacts would be lower than those presented in this SPD EIS. Impacts from facility modifications would not be expected to change because the facility modifications would be the same regardless of the number of assemblies produced. Impacts from routine operations, such as resources used, personnel exposure, waste generation, and transportation, would be expected to be reduced in proportion to the number of assemblies produced. The consequences of facility and transportation accidents would be expected to remain the same because the material at risk at any one time would likely not change. However, the risk of these accidents occurring would be reduced as the number of lead assemblies decreased.

There are no appreciable differences in environmental impacts among the five lead assembly candidate sites. There would be little difference in the volume of waste generated at any of the sites. The small differences in TRU waste and LLW would be due to wastes generated during modification of contaminated areas of existing buildings at ANL–W and LANL. In addition, less than 5 m^3 (6.5 ft^3) of hazardous waste would be generated during facility modification and lead assembly fabrication. The total amount of nonhazardous waste generated, primarily sanitary wastewater, would range from 8,700 to 13,500 m^3 (11,380 to 17,658 yd^3). No LCFs for either workers or the public would be expected to result from fabrication of lead assemblies at any of the proposed locations during routine operations. Impacts from facility accidents also show that no LCFs would be expected in the general population at any site from the postulated bounding design basis accident. Comparison of transportation impacts shows little differences among the sites, with no expected traffic fatalities or LCFs. Likewise, there are not expected to be any appreciable differences between the two postirradiation examination sites.

No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would either be able to evacuate immediately or would not be affected by the events. Explosions, on the other hand, could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality were to occur, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the criticality. Beyond-design-basis earthquakes would also have substantial consequences, ranging from workers

[32] Shipments of spent fuel to the potential geologic repository are analyzed in the *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D) (DOE 1999b).

being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident.

The impacts of postirradiation examination at ANL–W and ORNL, as evaluated in Section 4.27.6, would be minimal. No construction waste would be generated. With the exception of nonhazardous wastewater at ANL–W, all categories of waste generated during routine operations would use less than 1 percent of either site's applicable treatment, storage, and disposal capacity. Nonhazardous wastewater at ANL–W would use about 6 percent of that site's applicable capacity. Transportation impacts for postirradiation examination at ANL–W are included in the lead assembly impacts presented in Table 2–5. Transportation impacts for postirradiation examination at ORNL would be lower than those listed in Table 2–5 because the distance traveled would be less.

Table 2–5. Summary of Impacts of Lead Assembly Fabrication at the Candidate Sites[a]

Candidate Site	Waste Management[b] (m^3)	Human Health Risk[c] (dose in person-rem)	Facility Accidents[d]	Transportation[e]
ANL–W	Total TRU waste: 132 Total LLW: 736 Total MLLW: 4 Total Haz: 0	Dose Public: 0.011 Workers: 28 LCFs Public: 5.5×10^{-6} Workers: 0.011	Nuclear criticality LCFs: 1.7×10^{-4}	Radiological LCFs: 8.1×10^{-3} Traffic fatalities: 1.8×10^{-3} Kilometers traveled: 77,000
Hanford	Total TRU waste: 132 Total LLW: 700 Total MLLW: 4 Total Haz: 0	Dose Public: 0.025 Workers: 28 LCFs Public: 1.2×10^{-5} Workers: 0.011	Nuclear criticality LCFs: 2.7×10^{-3}	Radiological LCFs: 8.1×10^{-3} Traffic fatalities: 1.9×10^{-3} Kilometers traveled: 89,000
LLNL	Total TRU waste: 132 Total LLW: 700 Total MLLW: 4 Total Haz: 0	Dose Public: 1.1 Workers: 28 LCFs Public: 5.5×10^{-4} Workers: 0.011	Nuclear criticality LCFs: 3.2×10^{-2}	Radiological LCFs: 8.4×10^{-3} Traffic fatalities: 1.8×10^{-3} Kilometers traveled: 73,000
LANL	Total TRU waste: 137 Total LLW: 705 Total MLLW: 4 Total Haz: 0	Dose Public: 0.025 Workers: 28 LCFs Public: 1.2×10^{-5} Workers: 0.011	Nuclear criticality LCFs: 3.2×10^{-3}	Radiological LCFs: 8.1×10^{-3} Traffic fatalities: 1.6×10^{-3} Kilometers traveled: 49,000
SRS	Total TRU waste: 132 Total LLW: 700 Total MLLW: 4 Total Haz: 2	Dose Public: 6.6×10^{-3} Workers: 28 LCFs Public: 3.3×10^{-6} Workers: 0.011	Nuclear criticality LCFs: 6.5×10^{-4}	Radiological LCFs: 8.3×10^{-3} Traffic fatalities: 1.6×10^{-3} Kilometers traveled: 67,000

[a] Impacts are based on the fabrication of 10 lead assemblies and irradiation of 8. Should only two lead assemblies be fabricated and irradiated, impacts would be lower than indicated.
[b] Totals for 2-year modification and 3-year operation of lead assembly facility.
[c] Annual dose for public residing within 80 km (50 mi) of the candidate site. Worker dose is the same at all five facilities because estimated number of workers and estimated dose to worker does not vary by site. Estimated dose to public varies based on projected population within 80 km (50 mi) of candidate site.
[d] The most severe of the design basis accidents is listed.
[e] LCFs are from the radiological exposure associated with incident-free operations and radiological accidents; traffic fatalities, from nonradiological traffic accidents.

Key: ANL–W, Argonne National Laboratory–West; LANL, Los Alamos National Laboratory; LCF, latent cancer fatality; LLNL, Lawrence Livermore National Laboratory; LLW, low-level waste; MLLW, mixed-low-level waste; TRU, transuranic.

No LCFs would be expected to either workers or the public from routine postirradiation examination activities. There would be no routine releases of radioactivity to the environment, and thus, radiological impacts on the public. The average annual dose to facility workers would be 177 mrem, for an annual dose to the total facility

workforce of 1.8 person-rem. The most severe accident would be a nuclear criticality. Such an accident could result in high, though probably not fatal, radiological exposures to hot cell workers. No LCFs would be expected in the general population.

If DOE were to decide to immobilize all 50 t (55 tons) of surplus plutonium, no lead assembly activities would be required. Should DOE decide to pursue the MOX option, but to not fabricate lead assemblies, such activities would not occur at any of the five sites. Under both of these scenarios, current operations would continue at the sites and the environmental conditions would remain at baseline levels. (See Chapter 3 for a description of the current environmental conditions at the sites.)

2.18.3 MOX Fuel Integrated Impacts

The impacts from implementing the MOX fuel fabrication alternatives would not be limited to those associated with the MOX facility, but would also include impacts from lead assembly fabrication, irradiation, and postirradiation examination, and the use of reactors for irradiation of the MOX fuel assemblies. Any new construction would occur at existing DOE sites. MOX-related operations at all sites would be compatible with, or similar to, activities already occurring at those locations.

Tables 2–6 through 2–11 describe the potential impacts of implementation of the MOX alternatives, from fabrication of the MOX fuel assemblies and lead assemblies to irradiation of the assemblies in domestic, commercial reactors, and the transportation for all radioactive material movements. While these impacts would be cumulative over the life of the campaign, they would not all be concurrent. The data presented are those reported in Chapter 4.

Air emissions, presented in Table 2–6, would result primarily from building heating and vehicular emissions. Releases of criteria pollutants are provided as a range, with the lowest emissions at Hanford, where electricity is the method of heating, and the highest at INEEL, where coal-fired boilers produce steam for heating and travel distances for personnel result in vehicular emissions double those estimated for other candidate sites. Lead assembly fabrication and postirradiation examination activities are relatively small efforts that are not expected to measurably increase air emissions at any of the candidate sites. There are no nonradiological emissions from these facilities that are regulated under the National Emission Standards for Hazardous Air Pollutants (NESHAPs). As discussed in Section 4.32, radiological NESHAPs emissions would be monitored and maintained as part of the total site limit of 10 mrem/yr from all sources. There would be no incremental difference in the air emissions from Catawba, McGuire, or North Anna related to using MOX fuel. Criteria, toxic, and hazardous pollutant emissions are not related to the type of reactor fuel. Rather, emission of these pollutants from the reactor sites would be related to ancillary processes such as operation of diesel generators, periodic testing of emergency diesel generators, and facility operations.

TRU waste and LLW would be generated during operation of both the lead assembly and full-scale MOX facilities (see Table 2–7). The amount of waste generated would be process-specific, and would not vary appreciably by site. Lead assembly fabrication would result in a total of 132 m^3 (173 yd^3) of TRU waste and 700 m^3 (916 yd^3) of LLW waste. The larger amount of waste generated on an annual basis by lead assembly fabrication, as compared to full-scale fabrication, would be attributed to operational differences between fabricating MOX fuel on a laboratory rather than commercial scale. Similarly, activities such as material recycle may not be implemented to as great an extent on the smaller scale. No increase is expected in the amount of waste generated at the reactor sites as a result of using MOX fuel.

Table 2–6. Potential Impacts on Air Quality of MOX Fuel Fabrication and Irradiation

Criteria Pollutant	MOX Facility[a] (kg/yr)	L.A. Fab. and Postirrad. Exam. (kg/yr)	Reactor Operation Increment (kg/yr)	Total MOX Fuel Increment (kg/yr)
Carbon monoxide	35K to 83K	0	0	35K to 83K
Nitrogen dioxide	11K to 32K	0	0	11K to 32K
PM_{10}	31K to 60K	0	0	31K to 60K
Sulfur dioxide	0.1K to 73K	0	0	0.1K to 73K
Volatile organic compounds	4K to 10K	0	0	4K to 10K
Total suspended particulates[b]	31K to 60K	0	0	31K to 60K

[a] Includes vehicle emissions.
[b] Total suspended particulates assumed to be the same as PM_{10}.
[Text deleted.]

Table 2–7. Potential Impacts on Waste Generation of MOX Fuel Fabrication and Irradiation

Waste Type	MOX Facility (m^3)	L.A. Fab. and Postirrad. Exam. (m^3)	Reactor Operation Increment	Total MOX Fuel Increment[a] (m^3)
TRU waste	680	143	0	823
Low-level waste	940	840	0	1,780
Mixed LLW	30	5	0	35
Hazardous	30	1	0	31
Nonhazardous				
Liquid[b]	260K	7.9K	0	268K
Solid	4.4K	5.3K	0	9.7K

[a] Total contribution of MOX effort; based on total lead assembly and postirradiation examination activities and 10 years of MOX fuel fabrication.
[b] Primary contributor is sanitary use, not process-related activities.

More spent fuel would be generated at the reactor sites as a result of the proposed disposition of surplus plutonium as MOX fuel. As discussed in Section 4.28, it is expected that approximately 5 percent additional spent fuel would be generated as a result of MOX fuel irradiation at the proposed reactor sites. Even so, there would be sufficient space at the reactor sites (in either the spent fuel pools or dry storage) to store the additional spent fuel until it could be sent to a potential geologic repository pursuant to the NWPA. DOE's draft environmental impact statement for a potential geologic repository (DOE/EIS-0250D, July 1999) includes the MOX fuel that would be generated from this program.

Existing infrastructure would be adequate to support the MOX fuel alternatives, although it has been estimated that up to 2 km (0.62 mi) of new roads would be needed for the MOX facility (see Table 2–8). Consumption of coal, natural gas, and electricity vary greatly from site to site, for both the MOX and the lead assembly fabrication facilities, depending on the type of fuel used for heating. For example, electricity needed for MOX fuel fabrication would be 30,000 MWh/yr at all sites but Hanford. Hanford, which is estimated to use one and one-half times the electricity of the other sites (46,000 MWh/yr), uses electricity to heat its buildings. INEEL and SRS use coal for heating, and Pantex, natural gas. No additional infrastructure needs would result from the use of MOX fuel at the proposed reactors.

Table 2–9 compiles information about expected radiological impacts on workers during routine operations. The impacts on workers at the MOX facility are based on operating experience at existing MOX facilities in

Table 2–8. Potential Impacts on Infrastructure of MOX Fuel Fabrication and Irradiation

Requirement	MOX Facility	L.A. Fab. and Postirrad. Exam.	Reactor Operation Increment
Electricity (MWh/yr)	30K to 46K	0.7K to 1.2K	0
Water (l/yr)	68M	1.6M	0
Fuel			
Oil (l/yr)	63K	12K to 61K	0
Natural gas (m^3/yr)	0 to 1.1M	0 to 55K	0
Coal (t/yr)	0 to 2.1K	0 to 0.06K	0
Transportation			
Roads (km)	1.0 to 2.0	0	0
Rail (km)	0	0	0

Table 2–9. Potential Radiological Impacts on Workers of MOX Fuel Fabrication and Irradiation

Impact	MOX Facility (over 10 years)	L.A. Fab. and Postirrad. Exam. (over 6 years)	Reactor Operation Increment (over 16 years)
Average worker dose (mrem/yr)	65	451	0
Latent fatal cancer risk	2.6×10^{-4}	1.1×10^{-3}	0
Total dose (person-rem/yr)	22	15	0
Latent fatal cancers	0.088	0.035	0

Europe (DOE 1999a). Impacts on workers at the postirradiation examination facility are based on operating experience at ORNL (O'Connor et al. 1998a). The impacts at the lead assembly fabrication facilities are based on an average annual dose rate of 500 mrem/yr. (This is an administrative limit that has been set in accordance with as-low-as-is-reasonably-achievable principles.) The exposure over the life of the MOX campaign (10 years for the MOX facility, 3 years for lead assembly fabrication and 3 years for postirradiation examination) would result in an increased risk of fatal cancer of 2.6×10^{-4} at the MOX facility, 6.0×10^{-4} at the lead assembly site, and 2.2×10^{-4} at the postirradiation examination facility. The corresponding number of LCFs for MOX facility, lead assembly, and postirradiation examination workers from the MOX campaign would be 0.088, 0.033, and 0.002, respectively. No increase in the incremental dose to workers is expected at the proposed reactors from using MOX fuel.

The potential radiological impacts on the general population from routine operations would be very small. Table 2–10 shows that from routine operations annual doses from the MOX facility to the maximally exposed individual (MEI) range from 1.8×10^{-3} to 1.5×10^{-2} mrem/yr, which translates to an increased risk of fatal cancer of 9.0×10^{-9} to 7.5×10^{-8} for 10 years of exposure. The lowest dose would be received at Hanford; the highest, Pantex. However, the population around Pantex would receive the lowest total population dose, and the lowest annual dose to the average individual. Estimated results at Hanford would be at the high end of the range for both of these parameters, 2.9×10^{-1} person-rem/yr and 7.5×10^{-4} mrem/yr, respectively. The annual dose to the average individual would still be extremely small, and would result in only a 3.8×10^{-9} increased risk of fatal cancer for 10 years of exposure. Offsite dose to the MEI resulting from lead assembly fabrication ranges from a low at SRS of 5.5×10^{-5} to 6.4×10^{-2} mrem/yr at LLNL. The associated risk of fatal cancer would be extremely low for the same MEI, ranging from 8.3×10^{-11} to 9.6×10^{-8}. Annual doses to the average individual at SRS and LLNL would be 8.8×10^{-6} and 1.4×10^{-4} mrem, respectively; risk of LCFs to the same individuals would be 1.3×10^{-11} and 2.1×10^{-10}. Offsite dose to the MEI resulting from postirradiation examination would not be expected to change because the activities would not be additive, but would displace similar activities already being done in these facilities. No change would be expected in the radiation dose to the general population from normal operations associated with the disposition of MOX fuel at the proposed reactors (see Table 2–10).

Table 2–10. Potential Radiological Impacts on the Public of MOX Fuel Fabrication and Irradiation

Impact	MOX Facility (over 10 years)	L.A. Fab. and Postirrad. Exam. (over 6 years)	Reactor Operation Increment (over 16 years)
Annual dose to MEI (mrem)	1.8×10^{-3} to 1.5×10^{-2}	0 to 6.4×10^{-2}	0
Fatal cancer risk	9.0×10^{-9} to 7.5×10^{-8}	0 to 9.6×10^{-8}	0
Annual population dose (person-rem)	0.027 to 0.29	0 to 1.1	0
Fatal cancers	1.4×10^{-4} to 1.5×10^{-3}	0 to 1.7×10^{-3}	0
Annual dose to average ind. (mrem)	8.8×10^{-5} to 7.5×10^{-4}	0 to 1.4×10^{-4}	0
Fatal cancer risk	4.4×10^{-10} to 3.8×10^{-9}	0 to 2.1×10^{-10}	0

Transportation impacts are summarized in Table 2–11, and include radiological dose to the truck crew and the general population, nonradiological emissions from vehicle operation, potential traffic accident fatalities, and LCFs resulting from an accident involving a breach of containment and release of radioactive materials. Shipments analyzed include all those listed in Table 2–3 for the MOX, lead assembly, and postirradiation examination facilities, and shipments of fresh MOX fuel to the proposed reactor sites. The analysis shows that no traffic fatalities or LCFs would be expected from either routine transportation activities or accidents.

Table 2–11. Potential Overland Transportation Risks of MOX Fuel Fabrication and Irradiation

Impact	MOX Facility	L.A. Fab. and Postirrad. Exam.	Total MOX Fuel Increment
Routine radiological			
Crew (LCFs)	6.7×10^{-4} to 1.1×10^{-3}	7.1×10^{-5} to 5.6×10^{-4}	7.4×10^{-4} to 1.6×10^{-3}
Public (LCFs)	5.3×10^{-3} to 7.2×10^{-3}	6.0×10^{-4} to 4.8×10^{-3}	5.9×10^{-3} to 1.2×10^{-2}
Routine nonradiological, emissions (LCFs)	6.2×10^{-3} to 2.3×10^{-2}	7.7×10^{-5} to 3.7×10^{-4}	6.2×10^{-3} to 2.4×10^{-2}
Accidental, traffic (fatalities)	1.7×10^{-2} to 5.9×10^{-2}	4.7×10^{-4} to 1.9×10^{-3}	1.8×10^{-2} to 6.1×10^{-2}
Accidental, radiological (LCFs)	3.2×10^{-3} to 3.8×10^{-3}	5.6×10^{-4} to 3.0×10^{-3}	3.8×10^{-3} to 6.8×10^{-3}

Key: LCFs, latent cancer fatalities.

Accidents are unplanned events which would be different for each type of facility needed to implement the MOX approach. The accidents analyzed for the disposition facilities are presented in detail in Appendix K and the consequences summarized by alternative in Chapter 4 (Sections 4.3 through 4.19 for Alternative 2 through 10, respectively, Section 4.27 for the lead assembly and postirradiation examination alternatives, and Section 4.28 for the reactors). The design basis accident with the most severe consequences postulated for the MOX facility is a criticality. This accident would result in an estimated dose at a distance of 1 km (0.62 mi) from the facility of from 0.15 rem at Hanford to 0.75 rem at INEEL. This same accident would result in doses at the site boundaries ranging from 1.6×10^{-2} rem at INEEL and SRS to 4.7×10^{-2} rem at Pantex. Population doses and LCFs within 80 km (50 mi) would range from 1.0 person-rem and 5.2×10^{-4} LCF at INEEL to 55 person-rem and 2.8×10^{-2} LCF at Hanford. The frequency of such an accident is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year.

The postulated design basis accident with the most severe consequences for proposed lead assembly operations using MOX fuel would be associated with a nuclear criticality. The accident would result in an incremental increase in estimated dose at the site boundaries ranging from 9.3×10^{-4} rem at SRS to 5.3×10^{-1} rem at LLNL. The same accident would result in incremental changes in population doses and LCF probabilities within 80 km (50 mi), ranging from 3.4×10^{-1} person-rem and 1.6×10^{-4} LCF at ANL–W to 6.6 person-rem and 3.2×10^{-3} LCF at LANL, respectively. The frequency of such an accident is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year. A nuclear criticality would also be the most severe accident at the postirradiation

examination facilities, but the amount of spent fuel necessary for such an accident to be physically possible is at least one to two orders of magnitude greater than would normally be available.

The design basis accident with the most severe consequences postulated for the proposed reactors using MOX fuel is a loss-of-coolant accident. This accident would result in an increase in the estimated dose at a distance of 640 m (2,100 ft) from the reactor of 0.001 rem at North Anna to 0.15 rem at McGuire. The same accident would result in incremental increases in doses at the site boundaries ranging from 2.0×10^{-4} rem at North Anna to 0.06 rem at McGuire. The incremental change in population doses and LCFs within 80 km (50 mi) of the reactors would range from 0.9 person-rem and 5×10^{-4} LCF at North Anna to 110 person-rem and 0.06 LCF at Catawba. The frequency of such an accident is estimated to be between 1 in 48,000 and 1 in 130,000 per year.

This SPD EIS also evaluates the potential impacts from a set of postulated highly unlikely accidents with potentially severe consequences at the proposed reactors using both uranium-only and MOX cores. [Text deleted.] Regarding effects of MOX fuel on accident probabilities, the National Academy of Sciences states, ". . . no important overall adverse impact of MOX use on the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities will involve factors not related to fuel composition and hence unaffected by the use of MOX rather than LEU fuel" (NAS 1995:352). Regarding the effects of MOX fuel on accident consequences, the report states, ". . . it seems unlikely that the switch from uranium-based fuel could worsen the consequences of a postulated (and very improbable) severe accident in a LWR by no more than 10 to 20 percent. The influence on the consequences of less severe accidents, which probably dominate the spectrum value of population exposure per reactor-year of operation would be even smaller, because less severe accidents are unlikely to mobilize any significant quantity of plutonium at all" (NAS 1995:355).

The incremental effects of using MOX fuel in the proposed reactors in place of LEU fuel were derived from a quantitative analysis of several highly unlikely severe accident scenarios for MOX and LEU fuel. The analysis considers severe accidents where sufficient damage could occur to cause the release of plutonium or uranium through a breach of the plant's containment. The consequences of these accident releases on the general population were found to range from minus 4 to plus 14 percent[33] compared with LEU fuel, depending on the accident release scenario. This analysis was based on existing probabilistic risk assessments of severe accidents, and the release scenarios were modeled assuming projected population distributions near the proposed reactors in 2015.

The highest consequence accident at all three of the proposed reactors is an interfacing systems loss-of-coolant accident. However, there is an extremely small chance that this beyond-design-basis accident would ever occur. The likelihood of this accident occurring is 1 chance in 15 million at Catawba, 1 chance in 1.6 million at McGuire, and 1 chance in 4.2 million at North Anna. Were this accident to occur, the increases in the estimated dose at the site boundary for MOX fuel as compared to LEU fuel would be 2,000 rem at Catawba; 2,400 rem at McGuire; and 2,200 rem at North Anna. These increases are 14 percent, 12 percent, and 22 percent, respectively, above the doses expected from the same accident using LEU fuel. The incremental change in population doses and LCFs within 80 km (50 mi) of the reactors have been estimated to be 3.2×10^{6} person-rem and 1,300 LCFs (from 15,600 to 16,900 LCFs) at Catawba; 1.8×10^{6} person-rem and 800 LCFs (from 11,900 to 12,700) at McGuire; and 7.3×10^{5} person-rem and 410 LCFs (from 2,980 to 3,390 LCFs) at North Anna. Prompt fatalities from this accident would be expected to increase from 815 to 843 at Catawba, from 398 to 421 at McGuire, and from 54 to 60 at North Anna. The increase in risk to the population from this accident as a result of using MOX

[33] Accidents severe enough to cause a release of plutonium involve combinations of events that are highly unlikely. Estimates and analyses presented in Section 4.28 indicate an incremental range of postulated LCFs due to the use of MOX fuel of minus 7 to plus 1,300 (in the population within 80 km [50 mi] of the release point), with incremental attendant risks of LCFs over 16 years of reactor operation with MOX fuel of minus 1.3×10^{-3} and plus 1.4×10^{-3}, respectively.

fuel would be 1.4×10^{-3} at Catawba, 8.0×10^{-3} at McGuire, and 1.6×10^{-3} at North Anna over the estimated 16-year life of the MOX fuel irradiation program.

[Text deleted.]

2.18.4 Comparison of Immobilization Technology Impacts

To provide a basis for evaluating alternative immobilization forms and technologies, the environmental impacts associated with operating the ceramic and glass can-in-canister immobilization facilities evaluated in this SPD EIS were compared with the corresponding environmental impacts associated with operating the homogenous ceramic immobilization and vitrification facilities evaluated in the *Storage and Disposition PEIS* (DOE 1996a).

Section 4.29 presents the comparable impacts for key environmental resources (e.g., air quality, waste management, human health risk, and resource requirements) at Hanford and SRS for the homogenous ceramic immobilization/vitrification facilities and the can-in-canister immobilization facilities. Impacts associated with facility accidents, intersite transportation, and environmental justice are also discussed. The results of the comparative analysis are summarized here.

The comparison of impacts is based on immobilizing the full 50 t (55 tons) of surplus plutonium. The *Storage and Disposition PEIS* impact analyses are based on operating facilities that would convert the plutonium into an oxide in one new facility and immobilize it into a homogenous ceramic or glass form in another new facility. Impacts for a plutonium conversion facility are evaluated and itemized separately from the impacts for a ceramic immobilization or vitrification facility. In contrast, this SPD EIS considers the use of both new and existing facilities, and is based on a collocated plutonium conversion and immobilization capability. To compare the impacts, it was therefore necessary to combine the separate *Storage and Disposition PEIS* impact values, as appropriate, to establish a suitable standard of comparison.

Generally, air quality impacts associated with the ceramic or glass can-in-canister technologies would be lower or about the same as those evaluated in the *Storage and Disposition PEIS* for ceramic immobilization or vitrification. With the exception of sulfur dioxide in the ceramic can-in-canister process, all criteria pollutant concentrations associated with either can-in-canister technology would range from being the same to being much lower. Pollutant levels would not be expected to differ between the ceramic and glass can-in-canister processes.

Potential volumes of most waste types resulting from operation of the ceramic or glass can-in-canister technologies would be considerably less than the waste volumes expected from either ceramic immobilization or vitrification technology evaluated in the *Storage and Disposition PEIS*. For example, operation of a can-in-canister facility using the ceramic process at Hanford or SRS is estimated to result in TRU waste volumes of 126 m^3/yr (165 yd^3/yr), compared to the 647 m^3/yr (846 yd^3/yr) of TRU waste estimated in the *Storage and Disposition PEIS* from operation of the homogenous ceramic immobilization facility. Factors contributing to the reduced waste levels associated with the can-in-canister technology would include the use of dry-feed preparation techniques, coordination with existing HLW vitrification operations and the need for a smaller operating work force. Waste volumes would not be expected to differ appreciably between the ceramic and glass can-in-canister processes.

Section 4.29 also presents the potential radiological exposure and cancer risk to the public and involved workers from normal operation of the immobilization facilities. The potential risks to the public associated with either can-in-canister technology would be slightly higher than the homogeneous technologies at Hanford, but lower at SRS. For example, operation of a can-in-canister facility using the ceramic process at Hanford or SRS is estimated to result in population doses of 1.6×10^{-2} or 5.8×10^{-3} person-rem/yr, respectively, compared to the

population doses of 8.4×10^{-3} (at Hanford) or 6.6×10^{-2} person-rem/yr (at SRS) resulting from operation of the homogenous ceramic immobilization facility evaluated in the *Storage and Disposition PEIS*. These variations may be attributable to the incorporation of updated source terms, meteorology, population distribution, and other modeling variables in the analysis of the can-in-canister technologies. A comparison between the ceramic and glass can-in-canister technologies indicates operation of the ceramic process would result in slightly higher potential offsite impacts, regardless of whether it is located at Hanford or SRS. For example, the dose associated with operation of the can-in-canister facility at Hanford would result in a population dose of 1.6×10^{-2} person-rem/yr using the ceramic process and 1.5×10^{-2} person-rem/yr using the glass process; the same facility at SRS would result in a population dose of 5.8×10^{-3} person-rem/yr using the ceramic process, and a dose of 5.3×10^{-3} person-rem/yr using the glass process.

The estimated average worker dose and associated cancer risk for the can-in-canister technologies are slightly higher than estimated in the *Storage and Disposition PEIS* for the homogenous technologies. In all cases, however, worker dose would be within the DOE design objective of 1,000 mrem/yr. Potential radiological impacts on involved workers are not expected to differ appreciably between the ceramic and glass can-in-canister processes.

Although some potential hazardous chemical impacts were determined for the homogenous ceramic immobilization/vitrification technologies evaluated in the *Storage and Disposition PEIS*, none are expected for either the ceramic or glass can-in-canister technology because no hazardous chemical emissions would occur from operations.

Because of substantial differences between the *Storage and Disposition PEIS* and the SPD EIS in terms of the specific accident scenarios and supporting assumptions used in the determination of facility accident impacts, a standard basis for comparing homogenous technology and can-in-canister technology accidents is not available. For example, a design basis earthquake scenario was not evaluated in the *Storage and Disposition PEIS* for the plutonium conversion facility, nor were any other design basis accidents evaluated for that facility that could be incorporated with like impacts to the ceramic immobilization or vitrification facility for direct comparison to the accident scenarios presented in this SPD EIS. A design basis earthquake associated with the homogenous approach at Hanford would result in 5.8×10^{-8} and 3.2×10^{-6} LCF in the general population for ceramic immobilization and vitrification, respectively; a design basis earthquake affecting the same facilities at SRS would result in 6.2×10^{-8} and 3.4×10^{-6} LCF, respectively. As discussed earlier in this paragraph these values do not reflect the impact of such accidents on a plutonium conversion facility, and are therefore not directly comparable with the results for the can-in-canister approach shown in this SPD EIS. Comparison of the ceramic and glass can-in-canister processes indicates slightly higher impacts would be associated with the ceramic process. For example, a design basis earthquake at Hanford would result in 9.6×10^{-5} LCF in the general population using the ceramic process, and 8.4×10^{-5} LCF using the glass process. Similarly, a design basis earthquake at SRS would result in 3.6×10^{-5} LCF in the general population using a ceramic process, and 3.1×10^{-5} LCF using a glass process.

In terms of resource requirements, operation of the can-in-canister technologies would require lower amounts of electricity, fuel, land area, and water than would the homogenous technologies evaluated in the *Storage and Disposition PEIS*. Fewer workers would be required to operate the can-in-canister technologies, which in turn would result in lower socioeconomic impacts. Resource requirements differ between the ceramic and glass can-in-canister processes in that electricity requirements would be greater to support the ceramic process at either site (i.e., the ceramic process would require 29,000 or 24,000 MWh/yr at Hanford or SRS, respectively, compared to the 28,500 or 23,000 MWh/yr, respectively, required for the glass process).

The *Storage and Disposition PEIS* analysis assumes that canisters of plutonium immobilized with radionuclides would be transported to a potential geologic repository via rail. This SPD EIS analysis, however, conservatively

assumes that the immobilized canisters would be shipped by truck from the immobilization site to the repository, with one canister being transported per truck shipment.[34] The ceramic and glass can-in-canister technologies would result in fewer total potential fatalities from intersite transportation than would the homogenous ceramic immobilization/vitrification technologies evaluated in the *Storage and Disposition PEIS*. Because the ceramic can-in-canister process would produce fewer canisters, it would result in somewhat lower routine and accidental transportation impacts than the glass can-in-canister process.

Evaluations of both the homogenous ceramic immobilization/vitrification technologies and can-in-canister technologies included routine facility operations and transportation as well as accidents. No significant risk to the general population would be expected to occur for normal operations or in the event of a design basis accident. [Text deleted.] Similarly, implementation of these technologies would not result in a significant risk of disproportionately high and adverse impacts on minority or low-income groups within the general population.

[34] The *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D) (DOE 1999b) analyzes spent fuel shipments by rail and truck. No decision has been made as to the mode of transportation.

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Chapter 3
Affected Environment

3.1 APPROACH TO DEFINING THE AFFECTED ENVIRONMENT

In accordance with the Council on Environmental Quality National Environmental Policy Act (NEPA) regulations (CEQ 1986) on preparing an environmental impact statement (EIS), the affected environment is "interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment." The affected environment descriptions presented in this chapter provide the context for understanding the environmental consequences described in Chapter 4. As such, they serve as a baseline from which any environmental changes that may be brought about by implementing the proposed action and alternatives can be identified and evaluated. For this *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS), the baseline conditions are the existing conditions.

The candidate sites for the proposed surplus plutonium disposition facilities are the Hanford Site (Hanford), Idaho National Engineering and Environmental Laboratory (INEEL), the Pantex Plant (Pantex), and the Savannah River Site (SRS). As described in Chapter 2, areas within the boundaries of the sites that are potential locations for the proposed facilities include the 200 East and 400 Areas at Hanford, the Idaho Nuclear Technology and Engineering Center (INTEC)[1] at INEEL, Zone 4 West at Pantex, and F- and S-Areas at SRS. The resources that are described for the candidate sites are air quality and noise, waste management, socioeconomics, human health risk, environmental justice, geology and soils, water resources, ecological resources, cultural and paleontological resources, land use and visual resources, and infrastructure.

Selected Characteristics of the Candidate Sites for the Proposed Surplus Plutonium Disposition Facilities

		Population			Dose per Year[a]	
Site	Area (km^2)	Health Risk ROI[a]	Socio-economic ROI	Site Work Force	MEI (mrem)	Population (person-rem)
Hanford	1,450	380,000	179,949	12,882	0.0074	0.20
INEEL	2,300	121,500	213,547	8,291	0.031	0.24
Pantex	60	275,000	212,729	2,944	0.000088	0.0021
SRS	800	620,100	453,778	15,032	0.20	8.6

[a] For 1996.

Key: MEI, maximally exposed individual; ROI, region of influence.

Candidate sites for mixed oxide (MOX) fuel lead assembly fabrication and postirradiation examination are described in Section 3.6. These sites are Hanford, INEEL (at Argonne National Laboratory–West [ANL–W]), Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), Oak Ridge Reservation (ORR) (at Oak Ridge National Laboratory [ORNL]), and SRS. These additional sites are evaluated for related plutonium disposition activities only; therefore, they are not described in detail. Sites that would supply uranium dioxide are not described in this section because these activities are routinely performed at these locations, would be conducted in existing buildings with existing personnel, and would not be expected to result in additional impacts at these sites. See Figure 2–1 for the location of these sites.

Proposed reactor sites where the irradiation of MOX fuel would be performed are described in Section 3.7. The reactors that would be used are Catawba Nuclear Station Units 1 and 2, McGuire Nuclear Station Units 1 and 2, and North Anna Power Station Units 1 and 2. As described in Section 2.4.3, these reactors would be used for the irradiation of MOX fuel only.

[1] Formerly known as the Idaho Chemical Processing Plant (ICPP).

The U.S. Department of Energy (DOE) evaluated the environmental impacts of the surplus plutonium disposition alternatives within defined regions of influence (ROI) at each of the four candidate sites and along transportation routes. The ROIs are specific to the type of effect evaluated and encompass geographic areas within which any significant impact would be expected to occur. For example, human health risks to the general public from exposure to airborne contaminant emissions were assessed for an area within an 80 km (50 mi) radius of the proposed facilities. The human health risks of shipping materials among sites were evaluated for populations living along the roadways linking the DOE sites. Economic effects such as job and income growth were evaluated within a socioeconomic ROI that includes the county in which the site is located and nearby counties in which a substantial portion of the site's workforce resides. Brief descriptions of the ROIs are given in Table 3–1. More detailed descriptions of the ROI and the methods used to evaluate impacts are presented in Appendix F.

Table 3–1. General Regions of Influence for the Affected Environment

Environmental Feature	Region of Influence
Air quality and noise	The site and nearby offsite areas within local air quality control regions and the transportation corridors between the sites
Waste management	Waste management facilities on the site
Socioeconomics	The counties where at least 90 percent of site employees reside
Human health risk	The site and nearby offsite areas (within 80 km of the site and the transportation corridors between the sites) where worker and general population radiation, radionuclide, and hazardous chemical exposures may occur
Environmental justice	The minority and low-income populations within 80 km of the site and along the transportation corridors between the sites
Geology and soils	Geologic and soil resources within the site and nearby offsite areas
Water resources	Onsite and adjacent surface water bodies and groundwater
Ecological resources	The site and adjacent areas where ecological communities exist including nonsensitive and sensitive habitats and species
Cultural and paleontological resources	The area within the site and adjacent to the site boundary
Land use and visual resources	The site and the areas immediately adjacent to the site
Infrastructure	Power, fuel supply, water supply, and road systems on the site

At each of the four candidate sites, baseline conditions for each environmental resource area were determined from information provided in previous environmental studies, relevant laws and regulations, and other government reports and databases. More detailed information on the affected environment at the candidate sites can be found in annual site environmental reports and site NEPA documents.

For More Detailed Information on Environmental Conditions at the Candidate Sites for the Proposed Surplus Plutonium Disposition Facilities[a]

Draft Hanford Remedial Action EIS and Comprehensive Land Use Plan, 1996

DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final EIS, 1995

Final EIS for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, 1996

SRS Waste Management Final EIS, 1995

[a] Also consult annual site environmental reports.

3.2 HANFORD

Hanford, established in 1943 as one of the three original Manhattan Project sites, is in Washington State just north of Richland (Figure 2–2). Hanford was a U.S. Government nuclear materials production site that included nuclear reactor operation, storage and reprocessing of spent nuclear fuel, and management of radioactive and dangerous wastes. Present Hanford programs are diversified and include management of radioactive wastes, research and development (R&D) for advanced reactors, renewable energy technologies, waste disposal technologies and contamination cleanup, and plutonium stabilization and storage (DOE 1996a:3-20).

Hanford is owned and used primarily by DOE, but portions of it are owned, leased, or administered by other government agencies. Public access is limited to travel on the Route 4 and Route 10 access roads as far as the Wye Barricade, State Routes 24 and 240, and the Columbia River. By restricting access to the site, the public is buffered from the areas formerly used for production of nuclear materials and currently used for waste storage and disposal. Only about 6 percent of the land area has been disturbed and is actively used, leaving mostly vacant land with widely scattered facilities. The entire Hanford Site has been designated a National Environmental Research Park (DOE 1996a:3-20).

Hanford includes extensive production, service, and R&D areas. Onsite programmatic and general purpose facilities total approximately 799,000 m^2 (8.6 million ft^2) of space. Fifty-one percent (408,000 m^2 [4.4 million ft^2]) is general purpose space, including offices, laboratories, shops, warehouses, and other support facilities. The remaining 392,000 m^2 (4.2 million ft^2) of space are programmatic facilities comprising processing, evaporation, filtration, waste recovery, waste treatment, waste storage facilities, and R&D laboratories. More than half of the general purpose and programmatic facilities are more than 30 years old. Facilities designed to perform previous missions are being evaluated for reuse in the cleanup mission. The existing facilities are grouped into the following numbered operational areas (DOE 1996a:3-20, 3-21).

- The 100 Areas, in the northern part of the site on the southern shore of the Columbia River, are the site of eight retired plutonium production reactors and the dual-purpose N Reactor, all of which have been permanently shut down since 1991. The 100 Areas cover about 1,100 ha (2,720 acres).

- The 200 West and 200 East Areas are in the center of the site and are about 8 and 11 km (5 and 6.8 mi), respectively, south of the Columbia River. Historically, these areas have been used for fuel reprocessing; plutonium processing, fabrication, and storage; and waste management and disposal activities. The 200 Areas cover about 1,600 ha (3,950 acres).

- The 300 Area is in the southern part of the site, just north of the city of Richland. A few of the facilities continue to support nuclear and nonnuclear R&D to include the Pacific Northwest National Laboratory (PNNL). Many of the facilities in the 300 Area are in the process of being deactivated. This area covers 150 ha (370 acres).

- The 400 Area, about 8 km (5 mi) northwest of the 300 Area, is the location of the recently shut down Fast Flux Test Facility (FFTF) and Fuels and Materials Examination Facility (FMEF). FFTF is an advanced liquid-metal-cooled research reactor that was used in the testing of breeder reactor systems. The six-level process building (427 Building) is the main structure of FMEF and encloses about 17,000 m^2 (183,000 ft^2) of operating area. FMEF also consists of several connected buildings. This building has never been operated and is free of contamination. The exterior walls are reinforced concrete, and the cell walls are constructed of high-density concrete. The facility was designed and constructed for spent fuel examination and was subsequently partially converted for MOX fuel fabrication.

- The 600 Area comprises the remainder of Hanford, which includes most of the undisturbed land and support facilities and infrastructure (e.g., roads, railroads, telecommunications, water treatment and distribution, electrical transmission lines and substations, fire and ambulance, access control facilities, borrow pits, and a landfill).

- The 700 Area is the administrative center in downtown Richland and consists of government-owned buildings (e.g., the Federal Building).

- The 3000 Area is a support area in north Richland that is being vacated but still contains some administrative and support facilities.

In addition, there are DOE-leased facilities and DOE contractor-owned facilities that support Hanford operations. These facilities are on private land south of the 300 Area and outside of the 3000 Area (DOE 1996a:3-21).

DOE Activities. The Hanford mission is to clean up the site, provide scientific and technological excellence to meet global needs, and partner the economic diversification of the region. Current DOE activities that support Hanford's mission are shown in Table 3–2. In the area of waste management, Hanford has embarked on a long-range cleanup program in compliance with the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) and applicable Federal, State, and local laws. DOE has set a goal of cleaning up Hanford's waste sites and bringing its facilities into compliance with Federal, State, and local environmental laws by the year 2028. In addition, as part of the cleanup mission, DOE has the responsibility to safely store, handle, and stabilize plutonium materials and spent fuel (DOE 1996a:3-21, 3-22).

Table 3–2. Current Missions at Hanford

Mission	Description	Sponsor
Waste management	Store defense wastes and handle, store, and dispose of radioactive, hazardous, mixed, or sanitary wastes from current operations	Assistant Secretary for Environmental Management
Environmental restoration	Restore approximately 1,100 inactive radioactive, hazardous, and mixed waste sites and about 100 surplus facilities	Assistant Secretary for Environmental Management
Research and development	Conduct research in the fields of energy, health, safety, environmental sciences, molecular sciences, environmental restoration and waste management R&D, and national security activities	Various DOE Program Managers
Technology development	Develop new technologies for environmental restoration and waste management, including site characterization and assessment methods, and waste minimization	Various DOE Program Managers

Source: DOE 1996a:3-22.

Non-DOE Activities. In addition to the DOE mission-related activities, Hanford has some unique and diverse assets and non-DOE missions that include the following (DOE 1996a:3-22):

- The Fitzner-Eberhardt Arid Lands Ecology Reserve, 31,100 ha (76,800 acres), established in 1967, managed by the U.S. Fish and Wildlife Service (USFWS) for DOE as a habitat and wildlife reserve and nature research center (Sandberg 1998a).

- The area north of the Columbia River, managed in part by the Washington State Department of Wildlife as the Wahluke Slope Wildlife Recreation Area and in part by the USFWS as the Saddle Mountain National Wildlife Refuge.

- The Washington Nuclear Plant–2 (WNP–2), 1,100-MWe reactor operated by Energy Northwest (formerly Washington Public Power Supply System [WPPSS]) and also the partially completed WNP–1 reactor.

- The Laser Interferometer Gravitational-Wave Observatory, operated by the National Science Foundation as one of two widely separated installations (within the United States) that are operated in unison as a single gravitational-wave observatory.

- The Hanford Meteorological Station and towers.

- An observatory and radio telescope facilities on Rattlesnake Mountain.

- The U.S. Ecology commercial low-level radioactive waste disposal site on State-leased lands south of the 200 Areas near the center of Hanford.

3.2.1 Air Quality and Noise

3.2.1.1 Air Quality

Air pollution refers to any substance in the air that could harm human or animal populations, vegetation, or structures, or that unreasonably interferes with the comfortable enjoyment of life and property. Air pollutants are transported, dispersed, or concentrated by meteorological and topographical conditions. Air quality is affected by air pollutant emission characteristics, meteorology, and topography.

3.2.1.1.1 General Site Description

The climate at Hanford and the surrounding region is characterized as that of a semiarid steppe. The humidity is low, and winters are mild. The average annual temperature is 11.8 EC (53.3 EF); average monthly temperatures range from a minimum of -1.5 EC (29.3 EF) in January to a maximum of 24.7 EC (76.5 EF) in July. The average annual precipitation is 16 cm (6.3 in). Prevailing winds at the Hanford Meteorological Station are from the west-northwest. The average annual windspeed is 3.4 m/s (7.6 mph) (DOE 1996a:3-29). Additional information related to meteorology and climatology at Hanford is presented in Appendix F of the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement (Storage and Disposition PEIS)* (DOE 1996a:F-2–F-5) and in the *Hanford Site National Environmental Policy Act (NEPA) Characterization* (Neitzel 1996).

Most of Hanford is within the South-Central Washington Intrastate Air Quality Control Region (AQCR) #230, but a small portion of the site is in the Eastern Washington-Northern Idaho Interstate AQCR #62. None of the areas within Hanford and its surrounding counties are designated as nonattainment areas with respect to National Ambient Air Quality Standards (NAAQS) for criteria air pollutants (EPA 1997a). Applicable NAAQS and Washington State ambient air quality standards are presented in Table 3–3.

There are no prevention of significant deterioration (PSD) Class I areas within 100 km (62 mi) of Hanford. Hanford operates under a PSD permit issued in 1980 that limits emissions of nitrogen dioxide from the Plutonium-Uranium Extraction (PUREX) and Uranium Trioxide Plants in the 200 Area (DOE 1996a:3-29). These facilities have not been operated since 1994 and have been deactivated and transferred to the

Table 3–3. Comparison of Ambient Air Concentrations From Hanford Sources With Most Stringent Applicable Standards or Guidelines, 1994

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	Concentration (Fg/m³)
Criteria pollutants			
Carbon monoxide	8 hours	10,000[b]	0.7
	1 hour	40,000[b]	2.6
Nitrogen dioxide	Annual	100[b]	0.2
Ozone	8 hours	157[c]	(d)
PM_{10}	Annual	50[b]	0.01
	24 hours	150[b]	0.1
$PM_{2.5}$	3-year annual	15[c]	(e)
	24 hours (98th percentile over 3 years)	65[c]	(e)
Sulfur dioxide	Annual	50[f]	0.8
	24 hours	260[f]	6.6
	3 hours	1,300[b]	22.9
	1 hour	1,000[f]	47.9
	1 hour	660[f,g]	47.9
Other regulated pollutants			
Gaseous fluoride	30 days	0.84[f]	(i)
	7 days	1.7[f]	(i)
	24 hours	2.9[f]	(i)
	12 hours	3.7[f]	(i)
	8 months (Mar-Oct)	0.50[f]	(i)
Total suspended particulates	Annual	60[f]	0.01
	24 hours	150[f]	0.1
Hazardous and other toxic compounds			
Benzene	24 hours	0.12[h]	(i)
[Text deleted.]			

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period. The National Ambient Air Quality Standards (NAAQS) (EPA 1997a), other than those for ozone, particulate matter, and lead, and those based on annual averages, are not to be exceeded more than once per year. The 1-hr ozone standard is attained when the expected number of days per year with maximum hourly average concentrations above the standard is #1. The 1-hr ozone standard applies only to nonattainment areas. The 8-hr ozone standard is attained when the 3-year average of the annual fourth-highest daily maximum 8-hr average concentration is less than or equal to 157 Fg/m³. The 24-hr particulate matter standard is attained when the expected number of days with a 24-hr average concentration above the standard is #1. The annual arithmetic mean particulate matter standard is attained when the expected annual arithmetic mean concentration is less than or equal to the standard.

[b] Federal and State standard.

[c] Federal standard.

[d] Not directly emitted or monitored by the site.

[e] No data is available with which to assess $PM_{2.5}$ concentrations.

[f] State standard.

[g] Not to be exceeded more than twice in any 7 consecutive days.

[h] State's risk-based acceptable source impact levels.

[i] No sources identified at the site.

Note: NAAQS also include standards for lead. No sources of lead emissions have been identified at the site. Emissions of other air pollutants not listed here have been identified at Hanford, but are not associated with any alternatives evaluated. These other air pollutants are quantified in the *Storage and Disposition PEIS* (DOE 1996a). EPA recently revised

ambient air quality standards for particulate matter and ozone. The new standards, finalized on July 18, 1997, changed the ozone primary and secondary standards from a 1-hr concentration of 235 Fg/m^3 (0.12 ppm) to an 8-hr concentration of 157 Fg/m^3 (0.08 ppm). During a transition period while States are developing State implementation plan revisions for attaining and maintaining these standards, the 1-hr ozone standard will continue to apply in nonattainment areas (EPA 1997b:38855). For particulate matter, the current PM_{10} annual standard is retained, and two $PM_{2.5}$ (particulate matter with an aerodynamic diameter less than or equal to 2.5 Fm) standards are added. These standards are set at a 15-Fg/m^3 3-year annual arithmetic mean based on community-oriented monitors and a 65-Fg/m^3 3-year average of the 98th percentile of 24-hr concentrations at population-oriented monitors. The revised 24-hr PM_{10} standard is based on the 99th percentile of 24-hr concentrations. The existing PM_{10} standards will continue to apply in the interim period (EPA 1997c:38652).
Source: DOE 1996a:3-30; EPA 1997a; WDEC 1994.

DOE Office of Environmental Restoration for continued surveillance and maintenance awaiting eventual decommissioning.

Ambient air quality near the Hanford boundary is currently monitored for particulate matter. Particulate concentrations can reach rather high levels in eastern Washington because of extreme natural events (dust storms, volcanic eruptions, and large brush fires [DOE 1996b:4-46–4-50]). The 24-hr standard for particulate matter with an aerodynamic diameter less than or equal to 10 Fm (PM_{10}) was exceeded in 1993 at Columbia Center in Kennewick, about 10 km (6.2 mi) southeast of Hanford, likely as a result of windblown dust. Ambient air quality at Hanford is discussed in more detail in the *Hanford Site 1995 Environmental Report* (Dirkes and Hanf 1996:56, 61, 62, 95–108). Routine monitoring of most nonradiological pollutants is not conducted at the site. Monitoring of nitrogen oxides and total suspended particulates at Hanford has been discontinued as a result of phasing out programs for which the monitoring was required. Carbon monoxide, sulfur dioxide, and nitrogen dioxide have been monitored periodically in communities and commercial areas southeast of Hanford. In 1995, air samples of semivolatile organic compounds were collected on the site and at an offsite location, and the results are discussed in the annual environmental report (Dirkes and Hanf 1996:95–108). All concentrations of these compounds were below the applicable risk-based concentrations.

The primary sources of air pollutants at Hanford include process emissions, vehicular emissions, and construction activities. Table 3–3 presents the existing ambient air pollutant concentrations at the site boundary attributable to sources at Hanford. These concentrations are based on emissions for the year 1994. The emissions were modeled using meteorological data from 1989–1990 (DOE 1996a:3-30). Only those pollutants that would be emitted by any of the surplus plutonium disposition alternatives are presented. With the exception of particulate matter, as discussed previously, the concentrations of these pollutants—concentrations from Hanford combined with those from background (non-Hanford) sources—are in compliance with the ambient air quality standards. All coal-fired steam generation facilities have been shut down at Hanford. The conversion to oil, natural gas, and electric energy sources was completed in 1998. This will result in a significant reduction in air pollutant emissions from the site. Detailed information on emissions of other pollutants at Hanford is discussed in the *Hanford Site NEPA Characterization* (Neitzel 1996:4.28–4.32, 6.12).

3.2.1.1.2 Proposed Facility Locations

Prevailing winds in the 200 Areas (Hanford Meteorological Station) are from the west-northwest (Neitzel 1996:4.3, 4.6; Hoitink and Burk 1996:2.10). The 200 East Area has emissions of various air pollutants from oil-fired steam generation and releases of various toxic pollutants from tank farms, waste processing, and laboratories. Emissions from these sources are quantified in the *Tank Waste Remediation System EIS* (DOE 1996c:G-35–G-111).

Prevailing winds in the 400 Area are from the south-southwest, with a secondary maximum from the northwest (Neitzel 1996:4.6; Hoitink and Burk 1996:2.10). The 400 Area has no nonradioactive air pollutant emission sources of concern (Neitzel 1996:4.30).

3.2.1.2 Noise

Noise is unwanted sound that interferes or interacts negatively with the human or natural environment. Noise may disrupt normal activities or diminish the quality of the environment.

3.2.1.2.1 General Site Description

Major noise sources within Hanford include various facilities, equipment, and machines (e.g., cooling systems, transformers, engines, pumps, boilers, steam vents, paging systems, construction and materials-handling equipment, and vehicles). Data from two noise surveys indicate that background noise levels (measured as the 24-hr equivalent sound level) at Hanford range from 30 to 60.5 decibels A-weighted (dBA) (DOE 1996a:3-29). The 24-hr background sound level in undeveloped areas at Hanford ranges from 24 to 36 dBA, except when high winds elevate sound levels (Neitzel 1996:4.127). The primary source of noise at the site and nearby residences is traffic. Most Hanford industrial facilities are far enough from the site boundary that noise levels from these sources at the boundary are not measurable or are barely distinguishable from background noise levels (DOE 1996a:3-29). Hanford is currently in compliance with the State noise regulations (DOE 1996a:3-29–3-31). Noise sources, existing noise levels at Hanford, and noise standards are described in the *Storage and Disposition PEIS* (DOE 1996a:3-29–3-31, F-31, F-32) and in the *Hanford Site NEPA Characterization* (Neitzel 1996:4.125–4.130).

The potential impact of traffic noise resulting from Hanford activities was evaluated for a draft EIS addressing the siting of the proposed New Production Reactor. Estimates were made of baseline traffic noise along two major access routes: State Route 24, leading from the Hanford Site west to Yakima, and State Route 240, south of the site and west of Richland, where it handles maximum traffic volume. Modeled traffic noise levels (equivalent sound level [1-hr]) at 15 m (50 ft) from State Route 24 for both peak and offpeak periods were 62 dBA. Traffic noise levels from State Route 240 for both peak and offpeak periods were 70 dBA (Neitzel 1996:4.127, 4.130). These traffic noise levels were projections based on employment levels about 30 percent higher than actual levels at Hanford in 1997. About 9 percent of Hanford's employees commute by vanpool or bus (Mecca 1997a). Existing traffic noise levels may be different as a result of changes in site employment and ride-sharing activities.

The U.S. Environmental Protection Agency (EPA) guidelines for environmental noise protection recommend an average day-night average sound level of 55 dBA as sufficient to protect the public from the effects of broadband environmental noise in typically quiet outdoor and residential areas (EPA 1974:29). Land-use compatibility guidelines adopted by the Federal Aviation Administration and the Federal Interagency Committee on Urban Noise indicate that yearly day-night average sound levels less than 65 dBA are compatible with residential land uses and levels up to 75 dBA are compatible with residential uses if suitable noise reduction features are incorporated into structures (DOT 1995). It is expected that for most residences near Hanford, the day-night average sound level is less than 65 dBA and is compatible with the residential land use, although for some residences along major roadways noise levels may be higher.

3.2.1.2.2 Proposed Facility Locations

No distinguishing noise characteristics have been identified at either the 200 East Area or the 400 Area. Both are far enough from the site boundary—the 200 East Area is 12.6 km (7.8 mi) and the 400 Area is 6.1 km (3.8 mi)

away—that noise levels from the facilities at the boundary are not measurable or are barely distinguishable from background levels.

3.2.2 Waste Management

Waste management includes minimization, characterization, treatment, storage, transportation, and disposal of waste generated from ongoing DOE activities. The waste is managed using appropriate treatment, storage, and disposal technologies and in compliance with all applicable Federal and State statutes and DOE orders.

3.2.2.1 Waste Inventories and Activities

Hanford manages the following types of waste: high-level waste (HLW), transuranic (TRU), mixed TRU, low-level waste (LLW), mixed LLW, hazardous, and nonhazardous. HLW would not be generated by surplus plutonium disposition activities at Hanford, and thus is not discussed further. Waste generation rates and the inventory of stored waste from activities at Hanford are provided in Table 3–4. Table 3–5 summarizes the Hanford waste management capabilities. More detailed descriptions of the waste management system capabilities at Hanford are included in the *Storage and Disposition PEIS* (DOE 1996a:3-61, E-12).

Table 3–4. Waste Generation Rates and Inventories at Hanford

Waste Type	Generation Rate (m^3/yr)	Inventory (m^3)
TRU[a]		
Contact handled	450	11,450
Remotely handled	72	273
LLW	3,902	0
Mixed LLW		
RCRA	840	8,170
TSCA	7	103
Hazardous	560	NA[b]
Nonhazardous		
Liquid	200,000	NA[b]
Solid	43,000	NA[b]

[a] Includes mixed TRU waste.

[b] Generally, hazardous and nonhazardous wastes are not held in long-term storage.

Key: LLW, low-level waste; NA, not applicable; RCRA, Resource Conservation and Recovery Act; TRU, transuranic; TSCA, Toxic Substances Control Act.

Source: DOE 1996d:15, 16, except hazardous and nonhazardous solid wastes (DOE 1996a:3-62, E-19), and nonhazardous liquid wastes (Teal 1997).

EPA placed Hanford on the National Priorities List on November 3, 1989. In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), DOE entered into a Tri-Party Agreement with EPA and the State of Washington to govern the environmental compliance and cleanup of Hanford. That agreement meets the legal requirements specified under the Federal Facility Compliance Agreement (FFCA). An aggressive environmental restoration program is under way using priorities established in the Tri-Party Agreement (DOE 1996a:3-61). More information on regulatory requirements for waste disposal is provided in Chapter 5.

3.2.2.2 Transuranic and Mixed Transuranic Waste

All currently generated contact-handled TRU waste is being placed in above-grade storage buildings at the Hanford Central Waste Complex and the TRU Waste Storage and Assay Facility (DOE 1996a:3-64). TRU waste will be maintained in storage until shipped to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico, for disposal, beginning in 2000 (Aragon 1999). The new Waste Receiving and Processing Facility has the capability to process retrieved suspect TRU waste and certify newly generated and stored TRU waste for shipment to WIPP (Dirkes and Hanf 1996:10). Treatment of TRU waste will be provided in the future at the Stabilization Facility and Thermal Treatment Facility. TRU waste will be treated to meet WIPP waste acceptance criteria, packaged in accordance with DOE and U.S. Department of Transportation (DOT) requirements, and transported to WIPP for disposal (DOE 1996a:3-144). Mixed TRU

Table 3–5. Waste Management Capabilities at Hanford

Facility Name/Description	Capacity	Status	Applicable Waste Type: TRU	Mixed TRU	LLW	Mixed LLW	Haz	Non-Haz
Treatment Facility (m^3/yr except as otherwise specified)								
242-A Evaporator, m^3/day	265	Online	X	X	X	X		
Waste Receiving and Processing Facility	1,820	Online	X	X	X	X		
Stabilization Facility Contract	1,860	Planned for 1999	X	X		X		
Thermal Treatment Facility Contract	5,135	Planned for 2001	X	X		X		
Grout Treatment Facility	15,000	Online				X		
Shielded Analytical Lab Waste Treatment Unit, kg/hr	4	Online				X		
Maintenance & Storage Facility, batch/yr	26	Online				X		
200 Area Effluent Treatment Facility, m^3/min	0.57	Online			X	X		
200 East Area Sanitary Wastewater Treatment Facility	120,000	Online						X
Storage Facility (m^3)								
Central Waste Complex	16,800	Online	X	X	X	X		
TRU Waste Storage and Assay Facility	416	Standby	X	X	X	X		
305-B Storage Facility	20	Online			X	X	X	
B-Plant Canyon Waste Pile	5	Online			X			
B-Plant Container Storage	51	Online				X		
PUREX Tunnel 1	4,141	Online			X	X		
PUREX Tunnel 2	19,528	Online			X	X		
PUREX Canyon Waste Pile	432	Online				X		
200 Area Liquid Effluent Retention Facility	59,000	Online			X	X		
4843 Alkali Metal Storage Facility	95	Standby				X	X	
Disposal Facility (m^3 except as otherwise specified)								
Grout Vaults	230,000	Online			X			
LLW Burial Ground	1,740,000	Online			X			
Radioactive Mixed Waste Disposal Facility	14,200	Standby			X	X		
200 Area Treated Effluent Disposal Facility, m^3/min	8.7	Online						X
Energy Northwest Sewage Treatment Facility, m^3/yr	235,000	Online						X

Key: Haz, hazardous; LLW, low-level waste; PUREX, Plutonium-Uranium Extraction (Plant); TRU, transuranic.
Source: Dirkes and Hanf 1996:46; Kovacs 1997; Rhoderick 1998; Sandberg 1998a; Teal 1997.

wastes are included in the TRU waste category because these wastes are expected to go to WIPP for ultimate disposal (DOE 1996a:3-64).

3.2.2.3 Low-Level Waste

Solid LLW is compacted and sent to the LLW Burial Ground in the 200 West Area for disposal in trenches. Additional LLW is received from offsite generators and disposed of at the LLW Burial Ground. LLW resulting from the tank waste remediation system waste pretreatment program will be vitrified; as a contingency, the Grout Facility will be maintained in standby condition. The vitrified LLW will be disposed of on the site in the 200 Area under the tank waste remediation system program (DOE 1996a:3-64).

U.S. Ecology operates a licensed commercial LLW Burial Ground on a site southwest of the 200 East Area that is leased to the State of Washington. The facility is not a DOE facility and is not considered part of DOE's Hanford operations (DOE 1996a:E-17).

3.2.2.4 Mixed Low-Level Waste

One of the existing treatment facilities for mixed LLW is the 242-A Evaporator in the 200 East Area, which reduces the volume of these wastes and removes cesium via ion exchange (DOE 1996a:3-64). The process condensate from the evaporator is temporarily stored in the Liquid Effluent Retention Facility until it is treated in the Liquid Effluent Treatment Facility. The Liquid Effluent Retention Facility consists of three Resource Conservation and Recovery Act (RCRA)–compliant surface impoundments for storing process condensate from the 242-A Evaporator. This facility provides equalization of the flow and pH to the Liquid Effluent Treatment Facility. The Liquid Effluent Treatment Facility provides ultraviolet light/peroxide destruction of organic compounds, reverse osmosis to remove dissolved solids, and ion exchange to remove the last traces of contaminants. Discharge of the treated effluent is via a dedicated pipeline to an underground drain field. The effluent treatment process produces a mixed LLW sludge that is concentrated, dried, packaged in 208-l (55-gal) drums, and transferred to the Central Waste Complex. This secondary waste is stored prior to treatment (if necessary) and disposal in the Mixed Waste Trench (Dirkes and Hanf 1996:10, 45, 46). In a recent modification to the Tri-Party Agreement, DOE has agreed to begin designing a vitrification facility to treat liquid mixed LLW (DOE 1996a:E-17; E-18).

The Waste Receiving and Processing Facility, near the Central Waste Complex in the 200 West Area, eventually will provide size reduction, decontamination, condensation, melting, amalgamation, incineration, ash stabilization, and shipping for Hanford mixed waste. The Waste Receiving and Processing Facility is being constructed in two phases: module 1 and module 2 (2A and 2B) and is designed to process 6,800 drums of waste annually (Dirkes and Hanf 1996:40). Module 1 will be designed to prepare retrieved and stored TRU waste and will be operational in 1999. Module 2A is designed to process LLW, TRU waste, mixed LLW, and mixed TRU waste, and is operational. Module 2B, if authorized, will be designed to process LLW, TRU waste, mixed LLW, and mixed TRU waste with a dose rate greater than 200 mrem/hr. Module 2B has an undetermined startup date (DOE 1996a:E-18).

The Radioactive Mixed Waste Disposal Facilities are in the Hanford LLW Burial Ground and are designated as 218-W-5, Trench 31, and Trench 34. The facilities consist of rectangular trenches with approximate dimensions of 76 by 30 m (250 by 100 ft). These facilities are RCRA compliant, with double liners and leachate collection and removal systems (Dirkes and Hanf 1996:40).

3.2.2.5 Hazardous Waste

There are no treatment facilities for hazardous waste at Hanford; therefore, the wastes are accumulated in satellite storage areas (for less than 90 days) or at interim RCRA-permitted facilities such as the 305-B Waste Storage Facility. The common practice for newly generated hazardous waste is to ship it off the site by truck using

DOT-approved transporters for treatment, recycling, recovery, and disposal at RCRA-permitted facilities (DOE 1996a:3-65, E-18; Sandberg 1998a).

3.2.2.6 Nonhazardous Waste

Sanitary wastewater is discharged to onsite treatment facilities such as septic tanks, subsurface soil adsorption systems, and wastewater treatment plants. These facilities treat an average of 600,000 l/day (159,000 gal/day) of sewage (DOE 1996a:E-19).

The 200 Area Treated Effluent Disposal Facility industrial sewer collects the treated wastewater streams from various plants in the 200 Areas and disposes of the clean effluent at two 2-ha (5-acre) ponds permitted by the State of Washington (DOE 1996a:E-19). The design capacity of the facility is approximately 8,700 l/min (2,300 gal/min), although the discharge permit presently limits the average monthly flow to about 2,400 l/min (640 gal/min) (Dirkes and Hanf 1996:46).

Nonhazardous solid wastes include construction debris, office trash, cafeteria wastes, furniture and appliances, nonradioactive friable asbestos, powerhouse ash, and nonradioactive/nonhazardous demolition debris. Until 1997, nonhazardous solid wastes were disposed of in the 600 Area central landfill. Under an agreement between DOE and the city of Richland, most of the site's nonregulated and nonradioactive solid wastes are now sent to the Richland Sanitary Landfill for disposal (DOE 1996a:3-65, E-19). The Richland Sanitary Landfill is at the southern edge of the Hanford Site boundary. Nonradioactive friable asbestos and medical waste are shipped off the site for disposal (Dirkes and Hanf 1996:83; Sandberg 1998a).

3.2.2.7 Waste Minimization

The Hanford Site Pollution Prevention Program is a comprehensive and continual effort to systematically reduce the quantity and toxicity of hazardous, radioactive, mixed, and sanitary wastes; conserve resources and energy; reduce hazardous substance use; and prevent or minimize pollutant releases to all environmental media from all operations and site cleanup activities. In accordance with sound environmental management, preventing pollution through source reduction is the first priority in the Hanford Site Pollution Prevention Program, and the second priority is environmentally safe recycling. For instance, Hanford pollution prevention efforts in 1995 helped to prevent the generation of approximately 2,900 m^3 (3,790 yd^3) of radioactive mixed waste, 207 t (228 tons) of RCRA waste, 30,000 m^3 (39,200 yd^3) of process wastewater, and 4,400 t (4,850 tons) of sanitary waste. Also during 1995, Hanford recycled approximately 632 t (697 tons) of office paper, 20 t (22 tons) of cardboard, 3,600 t (3,970 tons) of ferrous metal, 215 t (237 tons) of nonferrous metal, 57 t (63 tons) of lead, 16 t (18 tons) of solid chemicals, and 78,000 l (20,600 gal) of liquid chemicals. In addition, Hanford's new centralized recycling center collects aerosol cans, fluorescent light ballasts, fluorescent light tubes, and lead acid batteries (Dirkes and Hanf 1996:44, 45).

3.2.2.8 Preferred Alternatives From the WM PEIS

Preferred alternatives from the *Waste Management Programmatic Environmental Impact Statement* (WM PEIS) (DOE 1997a:summary, 95) are shown in Table 3–6 for the four waste types analyzed in this SPD EIS. A decision on the future management of these wastes could result in the construction of new waste management facilities at Hanford and the closure of other facilities. Decisions on the various waste types are expected to be announced in a series of records of decision (RODs) to be issued on this WM PEIS. In fact, the TRU waste ROD was issued on January 20, 1998 (DOE 1998a) with the hazardous waste ROD issued on August 5, 1998 (DOE 1998b). The TRU waste ROD states that DOE will develop and operate mobile and fixed facilities to characterize and prepare TRU waste for disposal at WIPP. Each DOE site that has, or will

Table 3–6. Preferred Alternatives From the WM PEIS

Waste Type	Preferred Action
TRU and mixed TRU	DOE prefers onsite treatment and storage of Hanford's TRU waste pending disposal at WIPP.[a]
LLW	DOE prefers to treat Hanford's LLW on the site. Hanford could be selected as one of the regional disposal sites for LLW.
Mixed LLW	DOE prefers regionalized treatment at Hanford. This includes the onsite treatment of Hanford's wastes and could include treatment of some mixed LLW generated at other sites. Hanford could be selected as one of the regional disposal sites for mixed LLW.
Hazardous	DOE prefers to continue to use commercial facilities for hazardous waste treatment.[a]

[a] ROD for TRU waste (DOE 1998a) and ROD for hazardous waste (DOE 1998b) selected the preferred alternatives for these waste types at Hanford.

Key: LLW, low-level waste; ROD, record of decision; TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

Source: DOE 1997a:summary, 95.

generate, TRU waste will, as needed, prepare and store its TRU waste on the site. The hazardous waste ROD states that most DOE sites will continue to use offsite facilities for the treatment and disposal of major portions of the nonwastewater hazardous waste, with ORR and SRS continuing to treat some of their own hazardous waste on the site in existing facilities where this is economically favorable. More detailed information and DOE's alternatives for the future configuration of waste management facilities at Hanford is presented in the WM PEIS and the hazardous waste and TRU waste RODs.

3.2.3 Socioeconomics

Statistics for employment and regional economy are presented for the regional economic area (REA) as defined in Appendix F.9, which encompasses nine counties surrounding Hanford in Washington. Statistics for population, housing, community services, and local transportation are presented for the ROI, a two-county area in which 91 percent of all Hanford employees reside as shown in Table 3–7. In 1997, Hanford employed about 12,882 persons (about 3.7 percent of the REA civilian labor force) (Mecca 1997b).

Table 3–7. Distribution of Employees by Place of Residence in the Hanford Region of Influence, 1997

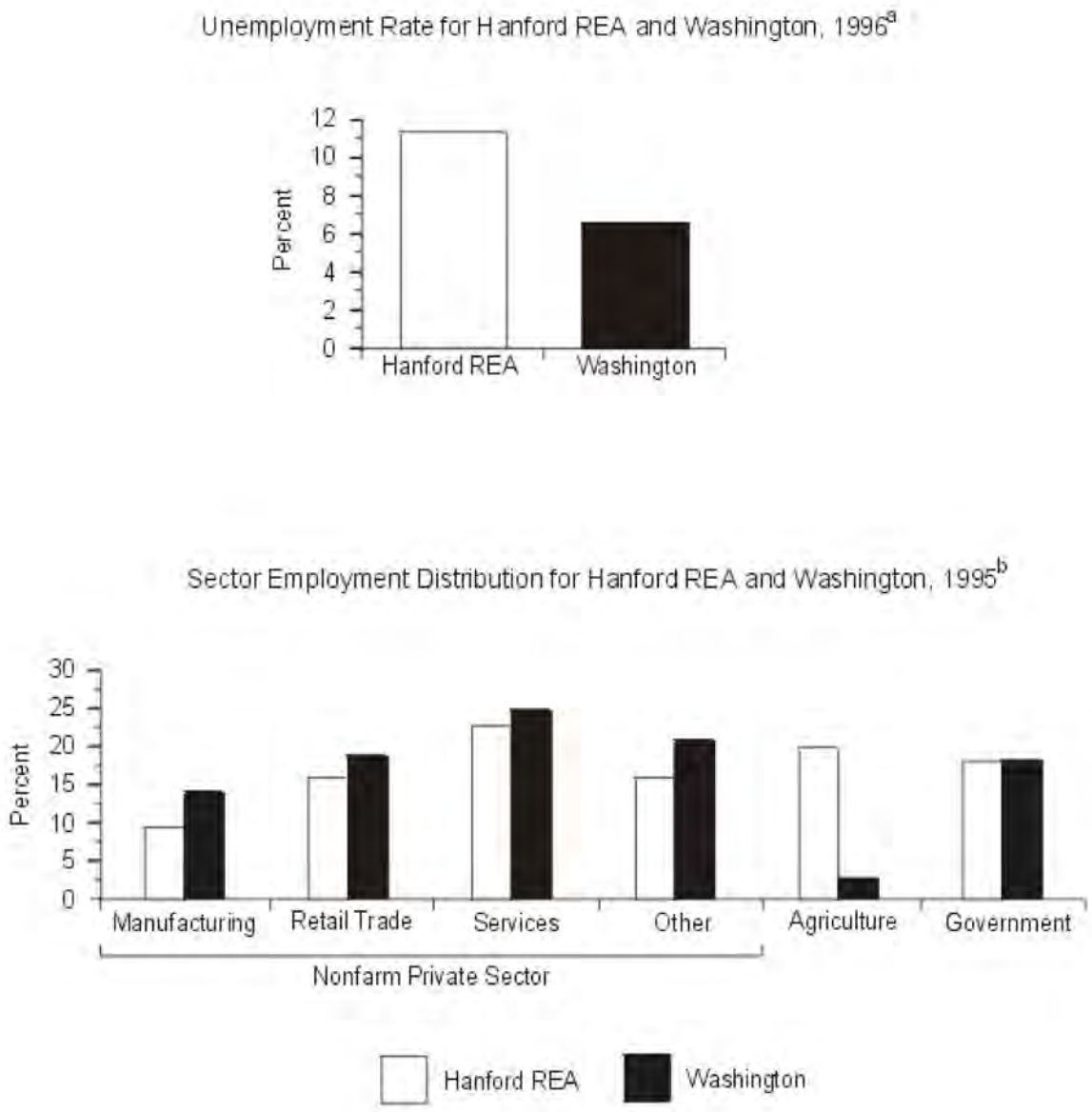
County	Number of Employees	Total Site Employment (Percent)
Benton	10,563	82
Franklin	1,159	9
ROI total	11,722	91

Source: Mecca 1997b.

3.2.3.1 Regional Economic Characteristics

Selected employment and regional economy statistics for the Hanford REA and Washington are summarized in Figure 3–1. Between 1990 and 1996, the civilian labor force in the REA increased 35.3 percent to 344,611. In 1996, the unemployment rate in the REA was 11.1 percent, significantly higher than the rate of 6.5 percent in Washington State (DOL 1999).

In 1995, service activities represented the largest sector of employment in the REA (22.3 percent). This was followed by agriculture (19.6 percent) and government (17.4 percent). Overall, the State total for these employment sectors was 25.0 percent, 3.7 percent, and 18.0 percent, respectively (DOL 1997).



[a]DOL 1999.
[b]DOL 1997.

REA Regional economic area

Figure 3–1. Employment and Local Economy for the Hanford Regional Economic Area and the State of Washington

3.2.3.2 Population and Housing

In 1996, the ROI population totaled 179,949. Between 1990 and 1996, the ROI population increased 18.9 percent compared with the 12.9 percent increase experienced in Washington (DOC 1997). Between 1980 and 1990, the number of housing units in the ROI increased by about 4.6 percent, compared with a 20.3 percent increase in Washington. The total number of housing units within the ROI for 1990 was 58,541 (DOC 1994). The 1990 homeowner vacancy rates for the ROI was 1.4 percent compared with the State's rate of 1.3 percent. The ROI renter vacancy rate was 5.5 percent compared with 5.8 percent for the State (DOC 1990a). Population and housing trends in the ROI and Washington are summarized in Figure 3–2.

3.2.3.3 Community Services

3.2.3.3.1 Education

Ten school districts provide public education in the Hanford ROI. As shown in Figure 3–3, school districts in 1997 were operating at capacities ranging from 65 to 100 percent. In 1997, the student-to-teacher ratio in the ROI averaged 16:1 (Nemeth 1997a). In 1990, the average student-to-teacher ratio for Washington was 11.4:1 (DOC 1990b; 1994).

3.2.3.3.2 Public Safety

In 1997, a total of 281 sworn police officers were serving the ROI. The ROI average officer-to-population ratio was 1.6 officers per 1,000 persons (Nemeth 1997b). This compares with the 1990 State average of 1.7 police officers per 1,000 persons (DOC 1990b). In 1997, 616 paid and volunteer firefighters provided fire protection services in the Hanford ROI. The average firefighter-to-population ratio in 1997 in the ROI was 3.4 firefighters per 1,000 persons (Nemeth 1997b). This compares with the 1990 State average of 1 firefighter per 1,000 persons (DOC 1990b). Figure 3–4 displays the ratio of sworn police officers and firefighters to population for the two counties in the Hanford ROI.

3.2.3.3.3 Health Care

In 1996, a total of 257 physicians served the ROI. The average physician-to-population ratio in the ROI was 1.4 physicians per 1,000 persons compared with the 1996 State average of 3.7 per 1,000 persons (Randolph 1997). In 1997, there were four hospitals serving the ROI. The hospital bed-to-population ratio averaged 2.1 beds per 1,000 persons (Nemeth 1997c). This compares with a State 1991 average of 2.4 beds per 1,000 persons (DOC 1996:128). Figure 3–4 displays the ratio of physicians-to-population and hospital bed-to-population for the two counties in the Hanford ROI.

3.2.3.4 Local Transportation

Vehicular access to Hanford is provided by State Routes 240, 243, 24, and Stevens Drive. State Route 240 connects to the Richland bypass highway, which interconnects with I–182. State Route 243 exits the site's northwestern boundary and serves as a primary link between the site and I–90. State Route 24 enters the site from the west and continues eastward across the northernmost portion of the site and intersects State Route 26 about 16 km (10 mi) east of the site boundary. Stevens Drive out of north Richland is the favored route to Hanford (see Figure 2–2).

One current road improvement project that could affect vehicular access to Hanford is repaving and signal work at the intersection of State Route 240 and Stevens Drive. Two projects, currently in the planning stage, could affect vehicular access to Hanford in the future: a realignment of State Route 240 from Stevens Drive

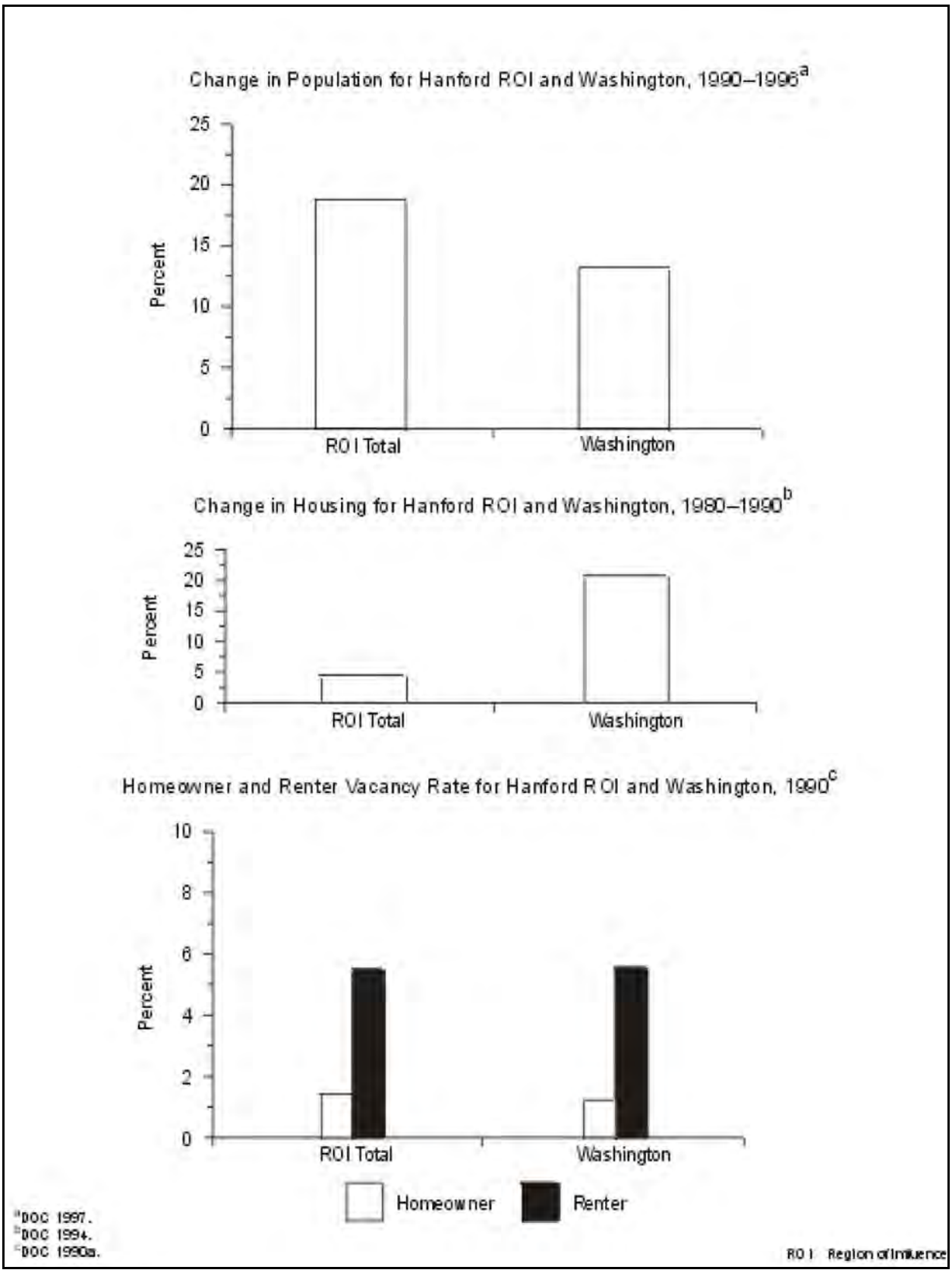


Figure 3–2. Population and Housing for the Hanford Region of Influence and the State of Washington

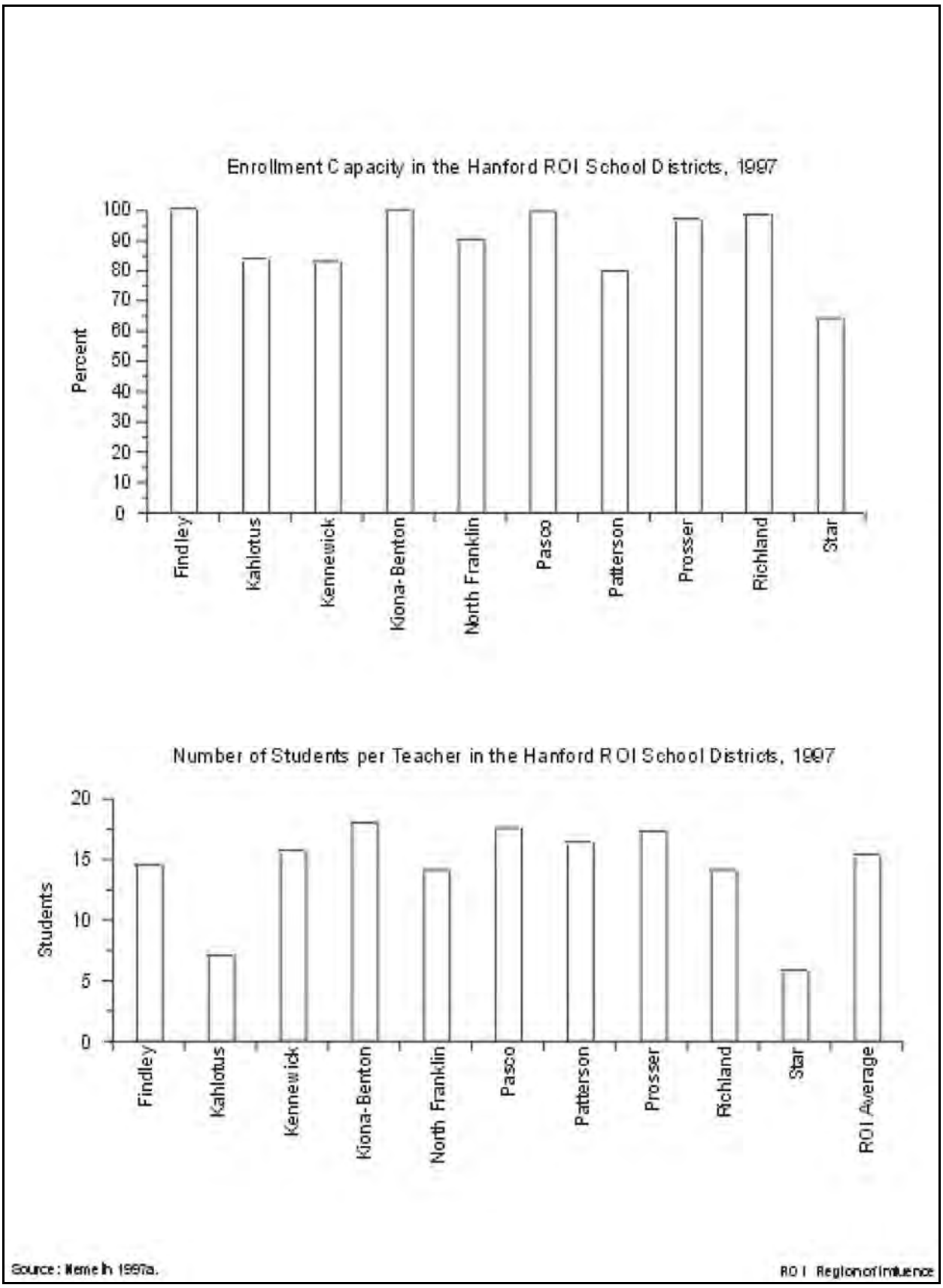


Figure 3–3. School District Characteristics for the Hanford Region of Influence

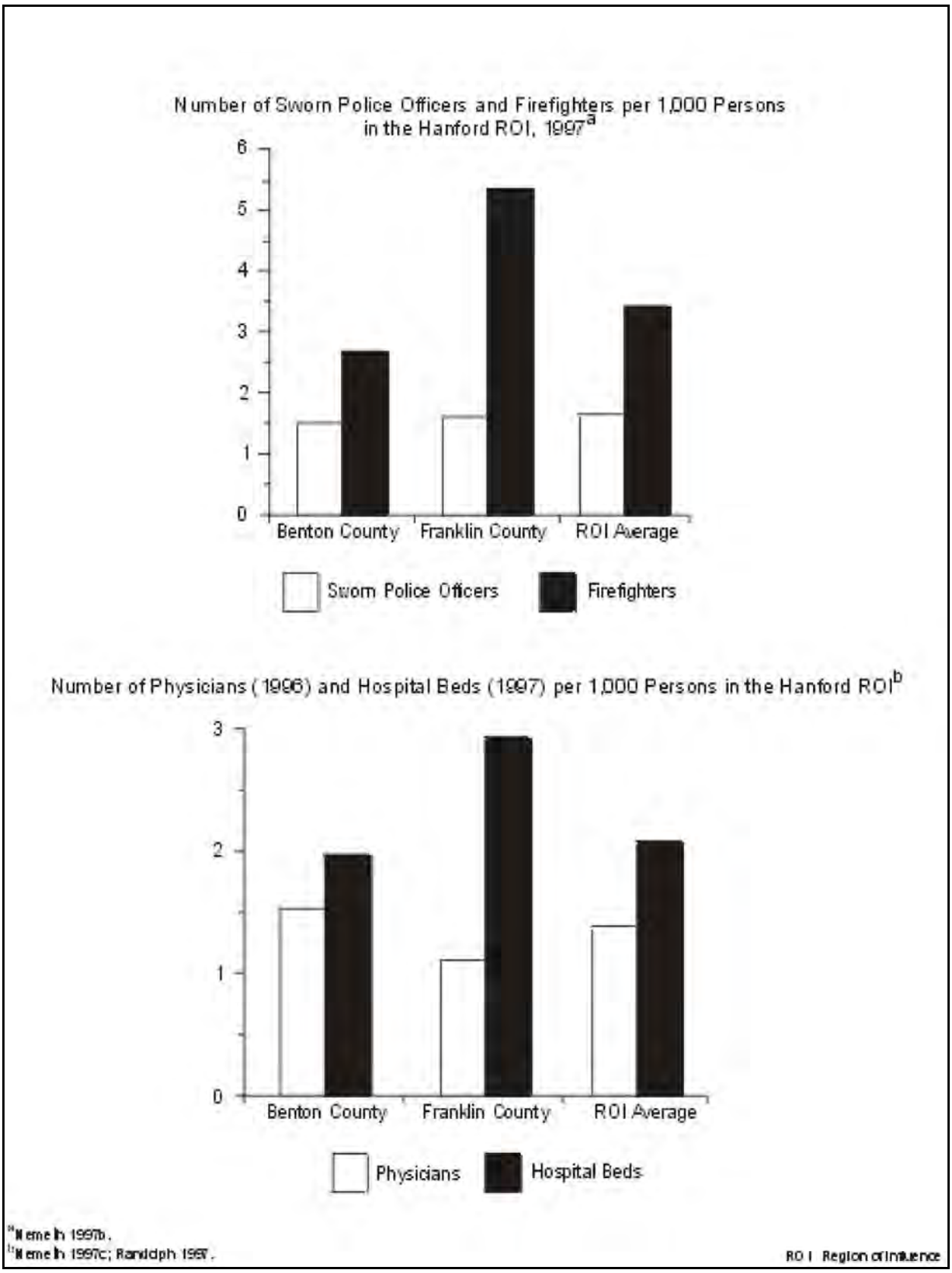


Figure 3–4. Public Safety and Health Care Characteristics for the Hanford Region of Influence

to State Route 224 and the paving of asphalt overlay of State Route 224 from West Richland to State Route 240 in the year 2000 (MacNeil 1997). However, an improvement project on Grosscup Road would provide relief of congestion due to State Route 224 paving activities.

The local intercity transit system, Ben Franklin Transit, supplies bus service between the Tri-Cities and Hanford. Both private interests and Ben Franklin Transit provide vanpooling opportunities in the ROI.

Onsite rail transport is provided by a short-line railroad that connects with the Union Pacific line just south of the Yakima River. The Union Pacific line interchanges with the Washington Central and Burlington Northern and Santa Fe at the city of Kennewick. There is no passenger rail service at Hanford (see Section 3.2.11.1.1 for more information).

In the ROI, the Columbia River is used as an inland waterway for barge transportation from the Pacific Ocean. The Port of Benton provides a barge slip where shipments arriving at Hanford may be off-loaded.

Tri-Cities Airport, near the city of Pasco, provides jet air passenger and cargo service by both national and local carriers. Numerous smaller private airports are located throughout the ROI (DOE 1996a).

3.2.4 Existing Human Health Risk

Public and occupational health and safety issues include the determination of potentially adverse effects on human health that result from acute and chronic exposures to ionizing radiation and hazardous chemicals.

3.2.4.1 Radiation Exposure and Risk

3.2.4.1.1 General Site Description

Major sources and levels of background radiation exposure to individuals in the vicinity of Hanford are shown in Table 3–8. Annual background radiation doses to individuals are expected to remain constant over time. The total dose to the population, in terms of person-rem, changes as the population size changes. Background radiation doses are unrelated to Hanford operations.

Table 3–8. Sources of Radiation Exposure to Individuals in the Hanford Vicinity Unrelated to Hanford Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation[a]	
Cosmic radiation	30
External terrestrial radiation	30
Internal terrestrial radiation	40
Radon in homes (inhaled)	200[b]
Other background radiation[c]	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Air travel	1
Consumer and industrial products	10
Total	365

[a] Dirkes and Hanf 1997:264.
[b] An average for the United States.

[c] NCRP 1987:11, 40, 53.

Releases of radionuclides to the environment from Hanford operations provide another source of radiation exposure to individuals in the vicinity of Hanford. Types and quantities of radionuclides released from Hanford operations in 1996 are listed in the *Hanford Site Environmental Report for Calendar Year 1996* (Dirkes and Hanf 1997:65–71). Doses to the public resulting from these releases are presented in Table 3–9. These doses fall within radiological limits per DOE Order 5400.5 (DOE 1993a:II-1–II-5) and are much lower than those of background radiation.

Table 3–9. Radiation Doses to the Public From Normal Hanford Operations in 1996 (Total Effective Dose Equivalent)

	Atmospheric Releases[a]		Liquid Releases		Total	
Members of the Public	**Standard[b]**	**Actual**	**Standard[b]**	**Actual**	**Standard[b]**	**Actual**
Maximally exposed individual (mrem)	10	4.6×10^{-3}	4	2.8×10^{-3}[(c)]	100	7.4×10^{-3}
Population within 80 km (person-rem)[d]	None	0.13	None	0.072	100	0.20
Average individual within 80 km (mrem)[e]	None	3.4×10^{-4}	None	1.9×10^{-4}	None	5.3×10^{-4}

[a] Includes direct radiation dose from surface deposits of radioactive material.

[b] The standards for individuals are given in DOE Order 5400.5 (DOE 1993a:II-1–II-5). As discussed in that order, the 10-mrem/yr limit from airborne emissions is required by the Clean Air Act, and the 4-mrem/yr limit is required by the Safe Drinking Water Act; for this SPD EIS, the 4-mrem/yr value is conservatively assumed to be the limit for the sum of doses from all liquid pathways. The total dose of 100 mrem/yr is the limit from all pathways combined. The 100-person-rem value for the population is given in proposed 10 CFR 834, as published in 58 FR 16268 (DOE 1993b:para. 834.7). If the potential total dose exceeds the 100 person-rem value, it is required that the contractor operating the facility notify DOE.

[c] Includes the drinking water dose.

[d] About 380,000 in 1996.

[e] Obtained by dividing the population dose by the number of people living within 80 km (50 mi) of the site.

Source: Dirkes and Hanf 1997:chap. 5.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from Hanford operations in 1996 is estimated to be 3.7×10^{-9}. That is, the estimated probability of this person dying of cancer at some point in the future from radiation exposure associated with 1 year of Hanford operations is less than 4 in 1 billion. (It takes several to many years from the time of radiation exposure for a cancer to manifest itself.)

According to the same risk estimator, 1×10^{-4} excess fatal cancers are projected in the population living within 80 km (50 mi) of Hanford from normal operations in 1996. To place this number in perspective, it may be compared with the number of fatal cancers expected in the same population from all causes. The 1996 mortality rate associated with cancer for the entire U.S. population was 0.2 percent per year (Famighetti 1998:964). Based on this mortality rate, the number of fatal cancers expected during 1996 from all causes in the population living within 80 km (50 mi) of Hanford was 760. This expected number of fatal cancers is much higher than the 1×10^{-4} fatal cancer estimated from Hanford operations in 1996.

Hanford workers receive the same dose as the general public from background radiation, but they also receive an additional dose from working in facilities with nuclear materials. Table 3–10 presents the average dose to the individual worker and the cumulative dose to all workers at Hanford from operations in 1996. These doses fall within the radiological regulatory limits of 10 CFR 835 (DOE 1995a:para. 835.202). According to a risk

Table 3–10. Radiation Doses to Workers From Normal Hanford Operations in 1996 (Total Effective Dose Equivalent)

	Onsite Releases and Direct Radiation	
Occupational Personnel	**Standard[a]**	**Actual**
Average radiation worker (mrem)	None[b]	19
Total workers (person-rem)[c]	None	266

[a] The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995a:para. 835.202). However, DOE's goal is to maintain radiological exposure as low as is reasonably achievable. It has therefore established an administrative control level of 2,000 mrem/yr (DOE 1994a:2-3); the site must make reasonable attempts to maintain individual worker doses below this level.

[b] No standard is specified for an "average radiation worker"; however, the maximum dose that this worker may receive is limited to that given in footnote "a."

[c] About 14,000 (badged) in 1996.

Source: Lyon 1997.

estimator of 400 fatal cancers per 1 million person-rem among workers[2] (Appendix F.10), the number of projected fatal cancers among Hanford workers from normal operations in 1996 is 0.11.

A more detailed presentation of the radiation environment, including background exposures and radiological releases and doses, is presented in the *Hanford Site Environmental Report for Calendar Year 1996* (Dirkes and Hanf 1997). The concentrations of radioactivity in various environmental media (including air, water, and soil) in the site region (on and off the site) are also presented in that report.

3.2.4.1.2 Proposed Facility Locations

External radiation doses have been measured in the 200 and 400 Areas. In 1996, the annual doses in the 200 and 400 Areas were roughly the same, about 85 mrem. This is 10 mrem higher than the value measured at the offsite control locations. The concentration of plutonium 239/240 in air in the 200 Area in 1996 was about 1×10^{-5} pCi/m^3. Although this was about 100 times higher than the value at the control location, it was still very small. No measurements of plutonium concentrations in air were reported for the 400 Area (Dirkes and Hanf 1997:75, 76, 124, 185, 186).

3.2.4.2 Chemical Environment

The background chemical environment important to human health consists of the atmosphere, which may contain hazardous chemicals that can be inhaled; drinking water, which may contain hazardous chemicals that can be ingested; and other environmental media through which people may come in contact with hazardous chemicals (e.g., surface water during swimming, soil through direct contact, or food). Hazardous chemicals can cause cancer and noncancer health effects. The baseline data for assessing potential health impacts from the chemical environment are addressed in Section 3.2.1.

[2] The risk estimator for workers is lower than the estimator for the public because of the absence from the workforce of the more radiosensitive infant and child age groups.

Effective administrative and design controls that decrease hazardous chemical releases to the environment and help achieve compliance with permit requirements (e.g., air emissions and National Pollutant Discharge Elimination System [NPDES] permit requirements) contribute to minimizing health impacts on the public. The effectiveness of these controls is verified through the use of monitoring information and inspection of mitigation measures. Health impacts on the public may occur via inhalation of air containing hazardous chemicals released to the atmosphere during normal Hanford operations. Risks to public health from other possible pathways, such as ingestion of contaminated drinking water or direct exposure, are lower than those via the inhalation pathway.

Baseline air emission concentrations and applicable standards for hazardous chemicals are addressed in Section 3.2.1. The baseline concentrations are estimates of the highest existing offsite concentrations and represent the highest concentrations to which members of the public could be exposed. These concentrations are in compliance with applicable guidelines and regulations. Information on estimating the health impacts of hazardous chemicals is presented in Appendix F.10.

Exposure pathways to Hanford workers during normal operations may include the inhalation of contaminants in the workplace atmosphere and direct contact with hazardous materials. The potential for health impacts varies among facilities and workers, and available information is insufficient for a meaningful estimate of impacts. However, workers are protected from workplace hazards through appropriate training, protective equipment, monitoring, substitution, and engineering and management controls. They are also protected by adherence to Occupational Safety and Health Administration (OSHA) and EPA standards that limit workplace atmospheric and drinking water concentrations of potentially hazardous chemicals. Appropriate monitoring that reflects the frequency and amounts of chemicals used in the operational processes ensures that these standards are not exceeded. Additionally, DOE requires that conditions in the workplace be as free as possible from recognized hazards that cause, or are likely to cause, illness or physical harm. Therefore, workplace conditions at Hanford are substantially better than required by standards.

3.2.4.3 Health Effects Studies

Three epidemiological studies and a feasibility study have been conducted on communities around Hanford to determine whether there are excess cancers in the general population. One study found no excess cancers but identified an elevated rate of neural tube defects in progeny. This elevated rate was not attributed to parental employment at Hanford. A second study suggested that neural tube defects were associated with cumulative radiation exposure, and showed other defects statistically associated with parental employment at Hanford, but not with parental radiation exposure. The third study did not show any cancer risk associated with living near the facility.

Many epidemiological studies have been carried out on the Hanford workers over the years. The studies have consistently shown a statistically significant elevated risk of death from multiple myeloma associated with radiation exposure among Hanford male workers. The elevated risk was observed only among workers exposed to 10 rads (~10 rem) or more. Other studies have also identified an elevated risk of death from pancreatic cancers, but a recent reanalysis did not conclude there was an elevated risk. Studies of female Hanford workers have shown an elevated risk of deaths from musculoskeletal system and connective tissue conditions. For a more detailed description of the studies reviewed and their findings, and for a discussion of the epidemiologic surveillance program implemented by DOE to monitor the health of current workers, refer to Appendix M.4.2 of the *Storage and Disposition PEIS* (DOE 1996a:M-224–M-230).

3.2.4.4 Accident History

Prior to 1997, there were 128 nuclear-process-related incidents with some degree of safety significance at Hanford over its period of operation. These do not include less-significant instances of radioactivity release or

contamination during normal operations, which have been the subject of other reviews. The 128 incidents fall into three significant categories, based on the seriousness of the actual or potential consequences.

Fifteen of the incidents were Category 1, indicating that serious injury, radiation release or exposure above limits, substantial actual plant damage, or a significant challenge to safety resulted. Forty-six events were Category 2, less severe than Category 1, but involving significant cost or a less significant threat to safety. The remaining 67 incidents were Category 3, causing minor radiation exposure or monetary cost, or involving a violation of operating standards without a serious threat to safety (DOE 1996a:3-60).

On May 14, 1997, a chemical explosion occurred at the Hanford Plutonium Reclamation Plant in a room where nonradioactive bulk chemicals were mixed for the now-discontinued plutonium recovery process. The reclamation plant was designed to concentrate liquid feeds, dissolve and process solid material, and perform solvent-extraction recovery of plutonium from aqueous streams. Eight workers outside the plant at the time of the explosion complained of various symptoms, including headaches, light-headedness, and a strange metallic taste. All eight workers were transported to a nearby medical center, where they were examined and released. A small fire protection water line ruptured during the explosion, resulting in the release of water from the building. No one was injured and no radioactive materials were released to the environment. The explosion caused significant localized damage to the facility.

3.2.4.5 Emergency Preparedness

Each DOE site has established an emergency management program that would be activated in the event of an accident. This program has been developed and maintained to ensure adequate response to most accident conditions and to provide response efforts for accidents not specifically considered. The emergency management program includes emergency planning, preparedness, and response.

Accordingly, the DOE Richland Operations Office has developed and maintains a comprehensive set of emergency preparedness plans and procedures for Hanford to support onsite and offsite emergency management actions in the event of an accident. The DOE Richland Operations Office also provides technical assistance to other Federal agencies and to State and local governments. Hanford contractors are responsible for ensuring that emergency plans and procedures are prepared and maintained for all facilities, operations, and activities under their jurisdiction, and for directing implementation of those plans and procedures during emergency conditions. The DOE Richland Operations Office, contractor, and State and local government plans are fully coordinated and integrated. Emergency control centers have been established by the DOE Richland Operations Office and its contractors for the principal work areas to provide oversight and support to emergency response actions within those areas.

Following the May 1997 explosion at Hanford (discussed previously), a review of the emergency management response indicated that multiple programs and systems failed in the hours following the accident. In a letter to Secretarial Offices, Secretary of Energy Federico Peña identified actions to be taken at all DOE sites to implement lessons learned from the emergency response (Peña 1997). The actions involve the following elements:

1. Improve training for facility and site emergency personnel
2. Ensure that equipment and qualified personnel are ready for the wide variety of potential radiological and chemical hazards
3. Improve coordination with local medical communities
4. Have in place comprehensive procedures to attend to personnel who are potentially affected by an accident

3.2.5 Environmental Justice

Environmental justice concerns the environmental impacts that proposed actions may have on minority and low-income populations, and whether such impacts are disproportionate to those on the population as a whole in the potentially affected area. In the case of Hanford, the potentially affected area includes parts of Washington and Oregon.

The potentially affected area around the 200 East Area is defined by a circle with an 80-km (50-mi) radius centered at the planned HLW vitrification facility (lat. 46E33'03.64" N, long. 119E30'13.95" W). The total population residing within that area in 1990 was 346,031. The proportion of the population that was considered minority was 26.2 percent. The potentially affected area surrounding the 400 Area is defined by a circle with an 80-km (50-mi) radius centered at FMEF (lat. 46E26'07" N, long. 119E21'55" W). The total population residing within that area in 1990 was 277,515, and the proportion of the population deemed minority was 25.4 percent. The same census data show that the percentage of minorities for the contiguous United States was 24.1, and the percentages for the States of Washington and Oregon were 13.3 and 9.2, respectively (DOC 1992).

Figure 3–5 illustrates the racial and ethnic composition of the minority population in the potentially affected area around the 200 East Area. At the time of the 1990 census, Hispanics were the largest minority group within the potentially affected area, constituting 21.5 percent of the total population. Native Americans contributed about 2 percent, and Asians, about 1.4 percent. Blacks made up about 1.2 percent of the population (DOC 1992).

As for the racial and ethnic composition of the minority population in the potentially affected area around the 400 Area, Hispanics were the largest minority group, constituting 21.5 percent of the total population during the 1990 census. Asians contributed about 1.4 percent, and Native Americans, about 2.0 percent. Blacks were about 1.2 percent of the population (DOC 1992).

A breakdown of incomes in the potentially affected area is also available from the 1990 census data (DOC 1992). At that time, the poverty threshold was $9,981 for a family of three with one related child under 18 years of age. A total of 64,780 persons (19.0 percent of the total population) residing within the potentially affected area around the 200 East Area reported incomes below that threshold. The data also show that 47,310 persons (17.3 percent of the total population) residing within the potentially affected area around the 400 Area reported incomes below the poverty threshold. Data obtained during the 1990 census also show that of the total population of the contiguous United States, 13.1 percent reported incomes below the poverty threshold, and that the figures for Washington and Oregon were 10.9 and 12.4 percent, respectively.

3.2.6 Geology and Soils

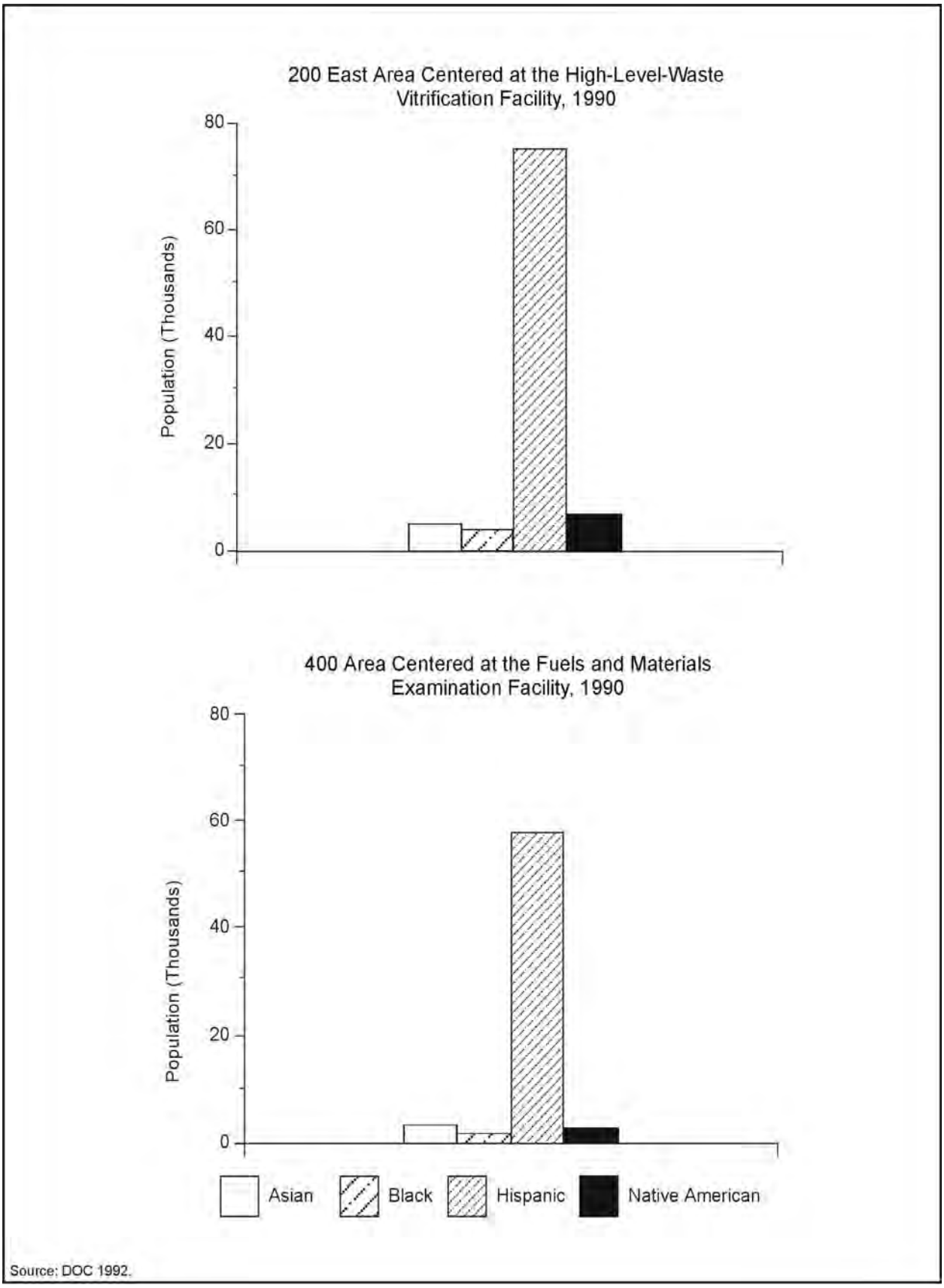
Geologic resources are consolidated or unconsolidated earth materials, including ore and aggregate materials, fossil fuels, and significant landforms. Soil resources are the loose surface materials of the earth in which plants grow, usually consisting of disintegrated rock, organic matter, and soluble salts.

3.2.6.1 General Site Description

The rocks beneath Hanford consist of Miocene-age and younger rocks that overlay older Cenozoic sedimentary and volcanic basement rocks. The major geologic units underlying Hanford are, in ascending order: subbasalt (basement) rocks, the Columbia River Basalt Group (with alluvial interbeds of sand, gravel, or silt of the Ellensburg Formation), the Ringold Formation, the Plio-Pleistocene unit, early “Palouse” soil, and the Hanford Formation (DOE 1996a:3-38; DOE 1996c:4-5).

Basalt outcrops are exposed on ridges at Gable Mountain, Gable Butte, and the Saddle Mountains in the northern part of Hanford, and on Rattlesnake Hills and Yakima Ridge, overlapping the western and southwestern edges

of Hanford (DOE 1996a:3-38). Other than crushed rock, sand, and gravel, no economically viable geologic resources have been identified at Hanford (DOE 1996c:4-10).



Source: DOC 1992.

Figure 3–5. Racial and Ethnic Composition of Minorities Around Hanford

Known faults in the Hanford area include those on Gable Mountain and the Rattlesnake-Wallula alignment. The faults in Central Gable Mountain are considered capable, although there is no observed seismicity on or near Gable Mountain. The Rattlesnake-Wallula alignment is interpreted as possibly being capable because there appear to be active portions of the fault system 56 km (35 mi) southwest of the central part of Hanford. A capable fault is one that has had movement at or near the ground surface at least once within the past 35,000 years or recurrent movement within the past 500,000 years (Barghusen and Feit 1995:2.2-13, 2.2-14).

According to the Uniform Building Code, Hanford is in Seismic Zone 2B, meaning that moderate damage could occur as a result of an earthquake. Seismicity of the Columbia Plateau, as determined by the rate of earthquakes per area and the historical magnitude of these events, is lower than that of other regions in the Pacific Northwest (DOE 1996a:3-38, 3-39). The two largest earthquakes near Hanford occurred in 1918 and 1973; each had an approximate Richter magnitude of 4.5 and a Modified Mercalli Intensity of V. They occurred in the central portion of the Columbia Plateau north of Hanford (Neitzel 1996:4.49). An earthquake with a maximum horizontal acceleration of 0.25g is calculated to have an annual probability of occurrence of 1 in 10,000 at Hanford (Barghusen and Feit 1995:2.2-14).

There is some potential for slope failure at Hanford, although only the slopes of Gable Mountain and White Bluffs are steep enough to warrant landslide concern. White Bluffs, east of the Columbia River, poses the greatest concern because of the clay-rich nature of some beds above the river level, the discharge of large quantities of irrigation water into the ground atop the cliffs, the surface incline toward the Columbia River, and the eastward channel migration of the Columbia and its undercutting of the adjacent bluffs. A large landslide along White Bluffs could fill the Columbia River channel and divert water onto Hanford (DOE 1996a:3-40). Calculations of the potential impacts of such a landslide indicate a flood area similar to the probable maximum flood (Neitzel 1996:4.58–4.61).

Several major volcanoes are in the Cascade Range west of Hanford, including Mount Adams, 164 km (102 mi) from Hanford, and Mount St. Helens, 218 km (135 mi) west-southwest of the site (DOE 1996a:3-40). Ashfalls from at least three Cascade volcanoes have blanketed the central Columbia Plateau since the late Pleistocene epoch. Generally, ashfall layers have not exceeded more than a few centimeters in thickness, with the exception of the Mount Mazama (Crater Lake, Oregon) eruption, when as much as 10 cm (3.9 in) of ash fell over western Washington (Barghusen and Feit 1995:2.2-14).

Fifteen different soil types occur at Hanford. These soils vary from sand to silty and sandy loam. The dominant soil types are the Quincy (Rupert) sand, Burbank loamy sand, Ephrata sandy loam, and the Warden silt loam. No soils at Hanford are currently classified as prime farmlands because there are no current soil surveys, and the only prime farmland soils in the region are irrigated (DOE 1996b:4-15). The soils at Hanford are considered acceptable for standard construction techniques (DOE 1996a:3-40). More detailed descriptions of the geology and the soil conditions at Hanford are included in the *Storage and Disposition PEIS* (DOE 1996a:3-38–3-40) and the *Hanford Remedial Action EIS* (DOE 1996b).

3.2.6.2 Proposed Facility Locations

The nearest capable fault to the 200 East Area is about 10 km (6.2 mi) away (Mecca 1997a:6). The predominant soils of the 200 East Area are the Burbank loamy sand and the Ephrata sandy loam, and the soils are not subject to liquefaction or other instabilities (Mecca 1997a:6; Neitzel 1996:4-46).

The nearest capable fault to the 400 Area is about 19 km (12 mi) away (Mecca 1997a:6). The predominant soil type in the 400 Area is the Rupert sand, and the soils are not subject to liquefaction or other instabilities (Mecca 1997a:6; Neitzel 1996:4-46).

3.2.7 Water Resources

3.2.7.1 Surface Water

Surface water includes marine or freshwater bodies that occur above the ground surface, including rivers, streams, lakes, ponds, rainwater catchments, embayments, and oceans.

3.2.7.1.1 General Site Description

The major surface water features at Hanford are the Columbia River, the Yakima River, the springs along the Columbia River and on Rattlesnake Mountain, and onsite ponds. Flow of the Columbia River is regulated by several dams upstream and downstream from the site. The nearest dam upstream from Hanford is the Priest Rapids Dam, and the closest downstream dam is the McNary Dam. The Hanford Reach is the portion of the Columbia River that extends from Priest Rapids Dam to the upstream edge of the pool behind McNary Dam. Because the flows are regulated, flow rates in the Hanford Reach can vary considerably; it is the last remaining free-flowing, nontidal section of the river (DOE 1996a:3-32). The average flow rate at the Priest Rapids Dam is about 3,360 m^3/s (118,700 ft^3/s). About one-third of the Hanford Site drains into the Yakima River, which forms a portion of the southern site boundary (Neitzel 1996:4.53–4.55). The average annual flow rate for the Yakima River is about 104 m^3/s (3,670 ft^3/s). Rattlesnake Springs and Snively Springs are in the southwestern portion of the site and flow into intermittent streams. Flows received by these streams infiltrate rapidly into the surface sediments thereof (DOE 1996a:3-32).

Waters of the Columbia River are used primarily for hydroelectric power, transportation, irrigation and other agricultural purposes, recreation, and municipal domestic water. Hanford uses water from the river for domestic and industrial purposes (DOE 1996a:3-32).

Flooding of the site has occurred along the Columbia River, but chances of recurrence have been greatly reduced by the construction of dams to regulate river flow. No maps of flood-prone areas have been produced by the Federal Emergency Management Agency (FEMA). FEMA produces these maps for areas capable of being developed, and the Hanford Site is not designated for commercial or residential development (DOE 1996b:4-22). However, analyses have been completed to determine the potential for the probable maximum flood. This is determined through hydrologic factors, including the amount of precipitation within the drainage basin, snow melt, and tributary conditions. The probable maximum flood for the Columbia River below the Priest Rapids Dam has been calculated at 39,600 m^3/s (1.4 million ft^3/s). Figure 3–6 shows the elevations of the highest flood of record, the river at normal flow, the 1948 flood, and the probable maximum flood (DOE 1996b:4-23).

Potential flooding due to dam failure has been evaluated by the U.S. Army Corps of Engineers (USACE). Upstream failures could have any number of causes, the magnitude of the resultant flooding depending on the size of the breach in the dam. USACE evaluated various scenarios for failure of the Grand Coulee Dam and assumed flow conditions of about 11,300 m^3/s (400,000 ft^3/s). The worst-case scenario assumed a 50 percent breach in the dam (Figure 3–7). The flood wave from an instantaneous 50 percent breach was calculated to be 595,000 m^3/s (21 million ft^3/s). In addition to the areas affected by the probable maximum flood, the remainder of the 100 Area, the 300 Area, and nearly all of Richland, Washington, would be flooded. Determinations were not made for larger instantaneous breaches in the Grand Coulee Dam, because the 50 percent scenario was believed to be the largest conceivable flow from a natural or manmade breach. It was not considered credible that a structure as large as the Grand Coulee Dam could be 100 percent destroyed instantaneously. The analysis also assumed that the 50 percent breach would occur only as the result of direct explosive detonation, and not because of some natural event such as an earthquake (DOE 1996b:4-24).

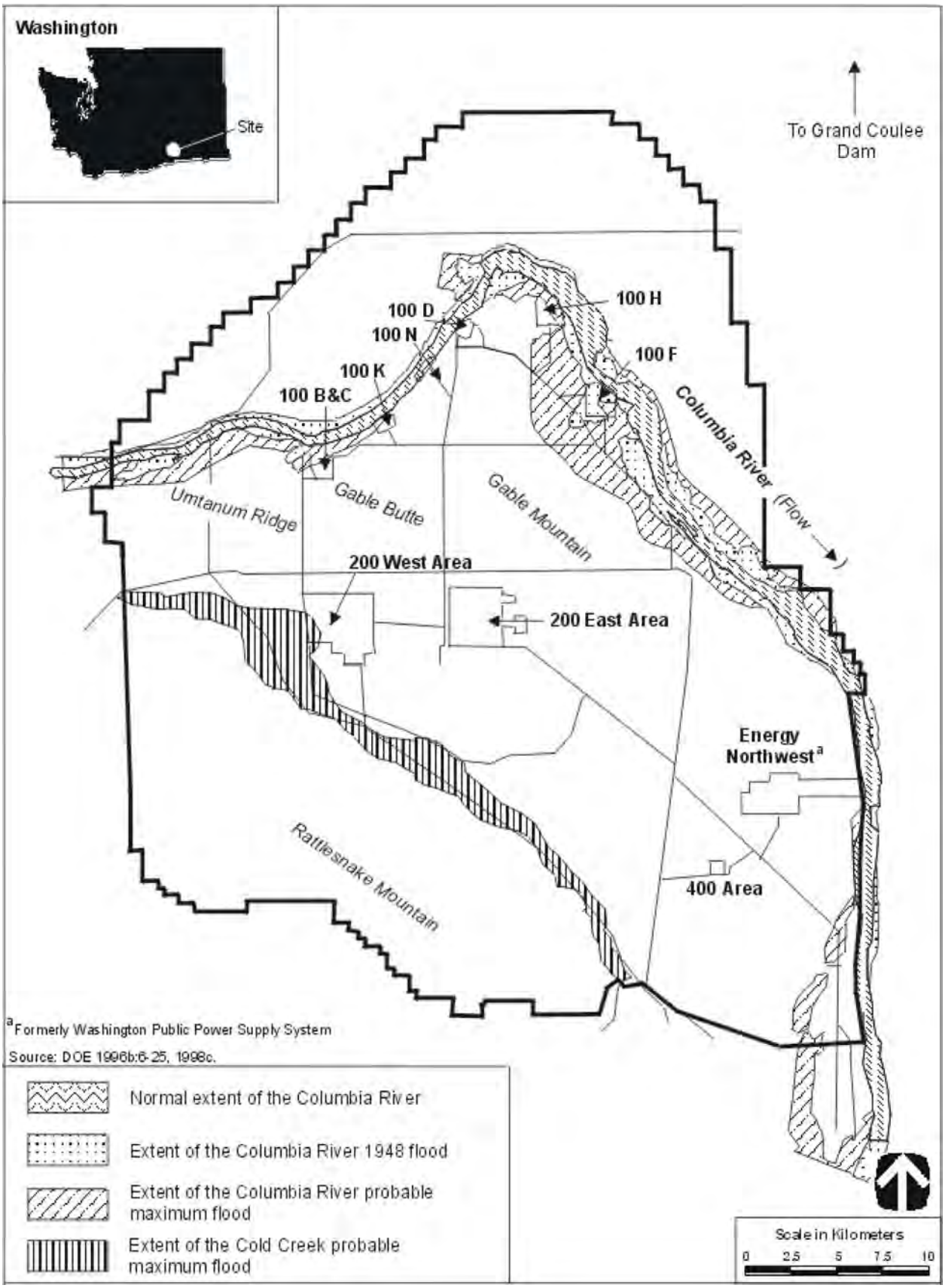


Figure 3–6. Flood Area for the Probable Maximum Flood and Columbia River 1948 Flood

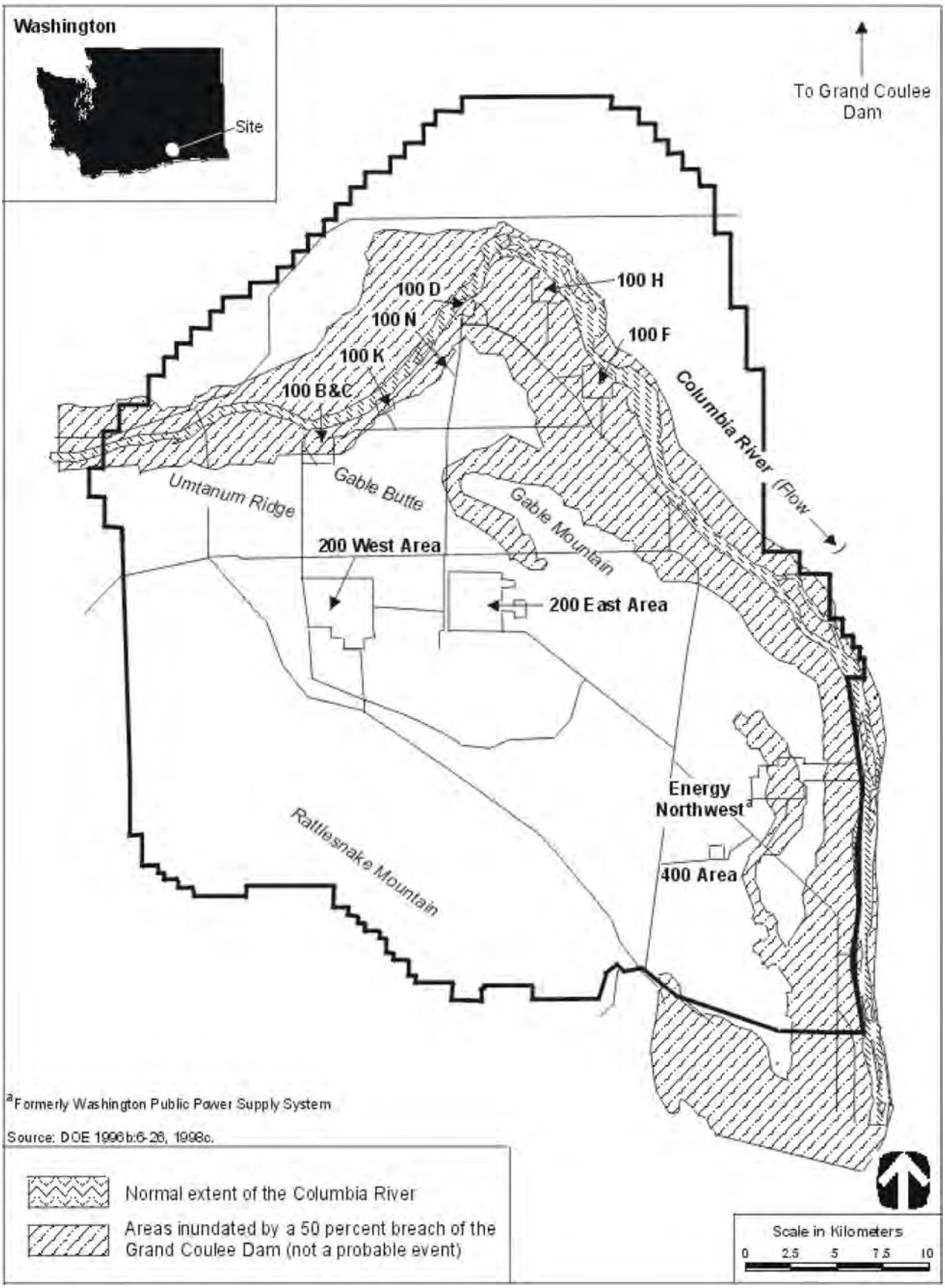


Figure 3–7. Flood Area of a 50 Percent Breach of the Grand Coulee Dam

The possibility of a landslide resulting in river blockage has also been evaluated for White Bluffs. Calculations were made for a landslide volume of 765,000 m^3 (1 million yd^3) with a concurrent flow of about 17,000 m^3/s (600,000 ft^3/s) in the river, which is the 200-year flood. This combination resulted in a flood wave crest elevation of 122 m (400 ft) above mean sea level, similar to that from the 50 percent breach of the Grand Coulee Dam (DOE 1996b:4-24).

The Hanford Reach has been classified Class A: excellent drinking water, a recreation area, and wildlife habitat (DOE 1996a:3-32; Dirkes and Hanf 1996:113). The river currently meets applicable drinking water and water quality standards. No federally designated Wild and Scenic Rivers exist on Hanford, although consideration is being given to so designating the Hanford Reach (Barghusen and Feit 1995:2.2-17–2.2-19).

DOE continues to assert a federally reserved water withdrawal right for the Columbia River. Currently, Hanford withdraws approximately 13.5 billion l/yr (3.6 billion gal/yr) from the Columbia River (DOE 1996a:3-34).

Hanford has six NPDES-permitted discharges and two NPDES permits for these discharges. One permit, WA-000374-3, includes five discharges in the 100 and 300 Areas. A request for a minor permit modification to delete two inactive outfalls from the 100 N-Area was submitted to EPA in August 1995. No effluent noncompliance issues were associated with any of these outfalls in 1995 (Dirkes and Hanf 1996:31, 32).

Permit #WA-002592-7 was issued for the 300 Area Treated Effluent Disposal Facility, which had 10 permit exceedances in 1996. This disposal facility was in normal operations and meeting design specifications at the time of these events. All indications suggest that the facility is unable to consistently meet the restrictions of the facility's NPDES permit despite the use of the best available technology (Dirkes and Hanf 1997:36). An application for a permit modification was submitted to the EPA in November 1997. A revised permit is expected to be issued in 1998 (Sandberg 1998b).

Hanford received a general storm-water permit in February 1994. The *Annual Site Compliance Evaluation and the Pollution Prevention Plan* was updated as required by the permit. No noncompliances were associated with this permit in 1995 (Dirkes and Hanf 1996:32).

All radiological contaminant concentrations measured in the Columbia River in 1995 were lower than the DOE-derived concentration guides and Washington State ambient surface water quality criteria (Dirkes and Hanf 1996:114). For nonradiological parameters, applicable standards for Class A–designated surface water were met; however, the minimum detectable concentration of silver exceeded the Washington State toxicity standard. During 1995, there was no evidence of deterioration in water quality attributable to Hanford operations along the Hanford Reach (Dirkes and Hanf 1996:119).

The Columbia River is also the primary discharge area for the unconfined aquifer underlying Hanford. The site conducts sampling of these discharges and refers to them as riverbank springs. Hanford-origin contaminants continued to be detected in riverbank spring water during 1995. The location and extent of the contaminated discharges were consistent with recent groundwater surveys. Tritium; strontium 90; technetium 99; uranium 234, 235, and 238; cadmium; chloroform; chromium; copper; nitrate; trichloroethylene (TCE); and zinc entered the river along the 100 Area shoreline. Tritium; technetium 99; iodine 129; uranium 234, 235, and 238; chromium; nitrate; and zinc entered the river along the portion extending from the old Hanford Townsite to below the 300 Area. All radiological contaminants in these discharges were below DOE-derived concentration guides. With the exception of TCE, the concentrations of all anion and volatile organic compounds measured in riverbank spring water collected from the Hanford shoreline were below Washington State ambient surface water quality criteria. The concentration of TCE exceeded the EPA standard for protection of human health for the consumption of water and organisms in the 100 K-Area riverbank spring (Dirkes and Hanf 1996:124–126, 132).

3.2.7.1.2 Proposed Facility Locations

The water source in the 200 Area is the Hanford export water system that withdraws Columbia River water at the 100 B-Area pumphouse (Mecca 1997a:5, 7). Most of the Hanford Site is supplied with water from this system. Water is withdrawn at a rate of about 36.2 million l/day (9.6 million gal/day). This system provides water to other areas of the site, but since the shutdown of the reactors its primary function is to provide water to the 200 Area (Mecca 1997a:145–147). More detailed information on this water system may be found in Section 3.2.11.

The 200 East Area sits on a plateau about 11 km (6.8 mi) south of the Columbia River (Mecca 1997a:120; Barghusen and Feit 1995:2.2-8). In this area, only the East Powerhouse Ditch and the 216-B-3C Pond are active. The pond was originally excavated in the mid-1950s for disposal of process cooling water and other liquid waste occasionally containing low levels of radionuclides. West Lake, north of the 200 East Area, is predominantly recharged from groundwater. The lake has not received direct effluent discharges from site facilities; it owes its existence to the intersection of the elevated water table with the land surface in the topographically low area south of Gable Mountain and north of the 200 East Area (Neitzel 1996:4.61).

Analyses of maximum flooding scenarios have indicated that the 200 East Area would not be flooded, even in the worst-case scenario of a failure of the Grand Coulee Dam (Neitzel 1996:4.55–4.61; ERDA 1976:1–11). Similar results have been produced by landslide analyses—specifically, analysis of a landslide-induced blockage of the Columbia River at White Bluffs. Such a blockage would cause flooding, but it would not impact the 200 East Area facilities (Neitzel 1996:4-58).

The 400 Area receives its water from three wells that have a total capacity of about 397 million l/yr (105 million gal/yr) (Mecca 1997a:780). Two other wells would provide emergency service if these wells failed, and another, dire emergency service if all other wells failed. Chlorination is the only treatment provided to these wells (Dirkes and Hanf 1996:140).

No specific flooding analyses have been completed for the 400 Area, but analyses have been completed for the site as a whole. According to the sitewide data, the elevation of the ground surface in the 400 Area is about 30 m (100 ft) above that of the maximum calculated flood from a 50 percent breach in the Grand Coulee Dam (Mecca 1997a:4). Also, the 400 Area is above the elevation of the maximum historical flood of 1894 (Neitzel 1996:4.56).

3.2.7.2 Groundwater

Aquifers are classified by Federal and State authorities according to use and quality. The Federal classifications include Class I, II, and III groundwater. Class I groundwater is either the sole source of drinking water or is ecologically vital. Class IIA and IIB are current or potential sources of drinking water (or other beneficial use), respectively. Class III is not considered a potential source of drinking water and is of limited beneficial use.

3.2.7.2.1 General Site Description

Groundwater under Hanford occurs in confined and unconfined aquifers. The unconfined aquifer lies within the glacioalluvial sands and gravels of the Hanford Formation and the fluvial and lacustrine sediments of the Ringold Formation. Groundwater generally flows eastward across the site; because of local water disposal practices, however, the water table has risen as much as 27 m (89 ft) in the 200 West Area. This has caused groundwater mounding with radial and northward flow components in the 200 Area. Depth to groundwater across the site ranges from 24 to 80 m (79 to 262 ft) (DOE 1996a:3-34).

The unconfined aquifer is recharged mainly from rainfall and runoff from the higher elevation on the western border and from artificial recharge from irrigation and wastewater disposal practices at Hanford. In the vicinity of Hanford, groundwater is discharged along the Columbia River, and some lesser amounts along the Yakima River (DOE 1996a:3-34).

The confined aquifers at Hanford consist of sedimentary interbeds and interflow zones that occur between basalt flows in the Columbia River Basalt Group. Aquifer thickness varies from several centimeters to at least 52 m (171 ft). Recharge of the confined aquifer occurs where the basalt formations are near ground level, and thus surface water is allowed to infiltrate them. Groundwater from the confined aquifers discharges to the Columbia River (DOE 1996a:3-34).

Water use in the Pasco Basin, which includes Hanford, is primarily via surface water diversion; groundwater accounts for less than 10 percent of water use. While most of the water used by Hanford is surface water withdrawn from the Columbia River, some groundwater is used. One of the principal users of groundwater was FFTF, which used about 697,000 l/day (184,000 gal/day) when it operated. The other facilities that use groundwater are the Yakima Barricade and the Patrol Training Academy (Dirkes and Hanf 1996:139–144; Barghusen and Feit 1995:2.2-21–2.2-24). DOE currently asserts an unlimited federally reserved groundwater withdrawal right with respect to the existing Hanford operations and withdraws about 195 million l/yr (52 million gal/yr) (DOE 1996a:3-37).

Groundwater quality beneath portions of the Hanford Site from the 200 Areas north and east to the Columbia River has been affected by past liquid waste disposal practices and as a result of spills and leaks from single-shell radioactive waste storage tanks (Dirkes and Hanf 1997:95). The unconfined aquifer contains radiological and nonradiological contaminants at levels exceeding water quality criteria and standards. Contamination in the confined aquifer is typically limited to areas of exchange with the unconfined aquifer. Tritium and nitrate plumes have moved steadily eastward across the site and seeped into the Columbia River. No aquifers have been designated sole-source aquifers (Barghusen and Feit 1995:2.2-22).

3.2.7.2.2 Proposed Facility Locations

Two major groundwater mounds have been formed in the 200 Area, both in response to wastewater discharges. The first was created by disposal at U Pond in the 200 West Area. This mound has been slowly dissipating since the pond was decommissioned in 1984. The second major mound was created by discharges to B Pond east of the 200 East Area. The water table near B Pond increased to a maximum of about 9 m (30 ft) above preoperational conditions in 1990, and has dropped slightly over the last few years because of the reduced volume of discharges. These mounds have altered the unconfined flow patterns that generally recharge from the west and flow to the east. Water levels in the unconfined aquifer continually change as a result of variations in the volume and location of wastewater discharges. Consequently, the movement of groundwater and its associated constituents has also changed with time (Dirkes and Hanf 1996:185).

The radiological contaminants in two 200 East Area groundwater plumes include cesium 137, cobalt 60, plutonium, strontium 90, technetium 99, and tritium. They are the result of historical reprocessing operations at B Plant. Two pump-and-treat test systems used in treatability testing of these plumes were discontinued in May 1995 after about 5 million l (1.3 million gal) of water were treated. Decisions concerning further actions have been deferred until the data are evaluated. A RCRA Field Investigation/Corrective Measures Study addressing contaminants associated with PUREX Plant discharges is being prepared (Dirkes and Hanf 1996:197–219).

In the 400 Area, groundwater flows to the east. The flow direction at the Nonradioactive Dangerous Waste Landfill and the Solid Waste Landfill, which are nearby, is east-southeast. Because of their rather high

permeabilities, Hanford Formation sediments dominate groundwater flows in these areas. Transmissivity of the unconfined aquifer system in the landfill areas is particularly high, because the system is within the main flow channel of the catastrophic floods that deposited the Hanford Formation gravels. In the 400 Area, the Hanford Formation consists mainly of the sand-dominated facies, and the water table is near the point of contact between the Hanford and Ringold Formations. Transmissivity of the aquifer in the 400 Area is an order of magnitude lower than that in the landfill areas (Hartman and Dresel:1997:3.11, 3.12). Water for the 400 Area is supplied by three wells in the unconfined aquifer. Each well has a pumping capacity of 83.3 l/min (22 gal/min). The water is distributed throughout the 400 Area for potable, process, and fire protection use (Dirkes and Hanf 1997:193; Rohl 1994:2-7).

Nitrate is the only significant contaminant attributable to 400 Area operations. Elevated levels have been attributed to the sanitary sewage lagoon, a source of groundwater contamination that should be eliminated by a recently constructed sewage treatment system. Other contamination found in well samples is believed not to emanate from the 400 Area (Hartman and Dresel 1997:6.90).

3.2.8 Ecological Resources

Ecological resources are defined as terrestrial (predominantly land) and aquatic (predominantly water) ecosystems characterized by the presence of native and naturalized plants and animals. For the purposes of this SPD EIS, those ecosystems are differentiated in terms of habitat support of threatened, endangered, and other special-status species—that is, “nonsensitive” versus “sensitive” habitat.

3.2.8.1 Nonsensitive Habitat

Nonsensitive habitat comprises those terrestrial and aquatic areas of the site that typically support the region’s major plant and animal species.

3.2.8.1.1 General Site Description

Hanford is made up of large, undisturbed expanses of shrub-steppe habitat that supports nearly 600 plant species and numerous animal species suited to the region’s semiarid environment (DOE 1996d:3-89, 3-90). Present site development consists of clusters of large buildings at widely spaced locations, occupying about 6 percent of the total available area. The remaining site area can be divided into 10 major plant communities (see Figure 3–8). The dominant plants are cheatgrass, big sagebrush, rabbitbrush, and Sandberg’s bluegrass, with cheatgrass providing at least half of the total plant coverage. Shrub-steppe is considered a priority habitat by the State of Washington because of its significant value to sensitive wildlife. Trees that were originally planted on farmland to provide windbreaks and shade serve as nesting platforms for several species of birds, including hawks, owls, ravens, magpies, and great blue herons, and as night roosts for wintering bald eagles (DOE 1996a:3-42; DOE 1996b:4-51).

Animal species at Hanford include over 1,000 species of insects, 12 species of amphibians and reptiles, 214 species of birds, 44 species of fish, and 39 species of mammals (Dirkes and Hanf 1997:275). Grasshoppers and darkling beetles are among the more conspicuous groups, and along with other species, are important in the food web of the local birds and mammals. The most abundant reptile is the side-blotched lizard, although short-horned and sagebrush lizards, gopher snakes, yellow-bellied racers, and Pacific rattlesnakes are also seen frequently. The horned lark and western meadowlark are the most abundant nesting birds, but the site also supports populations of chukar partridge, gray partridge, and sage grouse (DOE 1996d:3-90). The Hanford Reach, including several sparsely vegetated islands, provides nesting habitat for the Canadian goose, ring-billed gull, Forster’s tern, and great blue heron. Numerous raptors, such as the northern harrier, ferruginous hawk, Swainson’s hawk, red-tailed hawk, prairie falcon, American kestrel, and owls, use the site as a refuge, especially during nesting (DOE 1996a:3-42; DOE 1996b:4-56; DOE 1996e:3-90). Mammals on the site are generally small

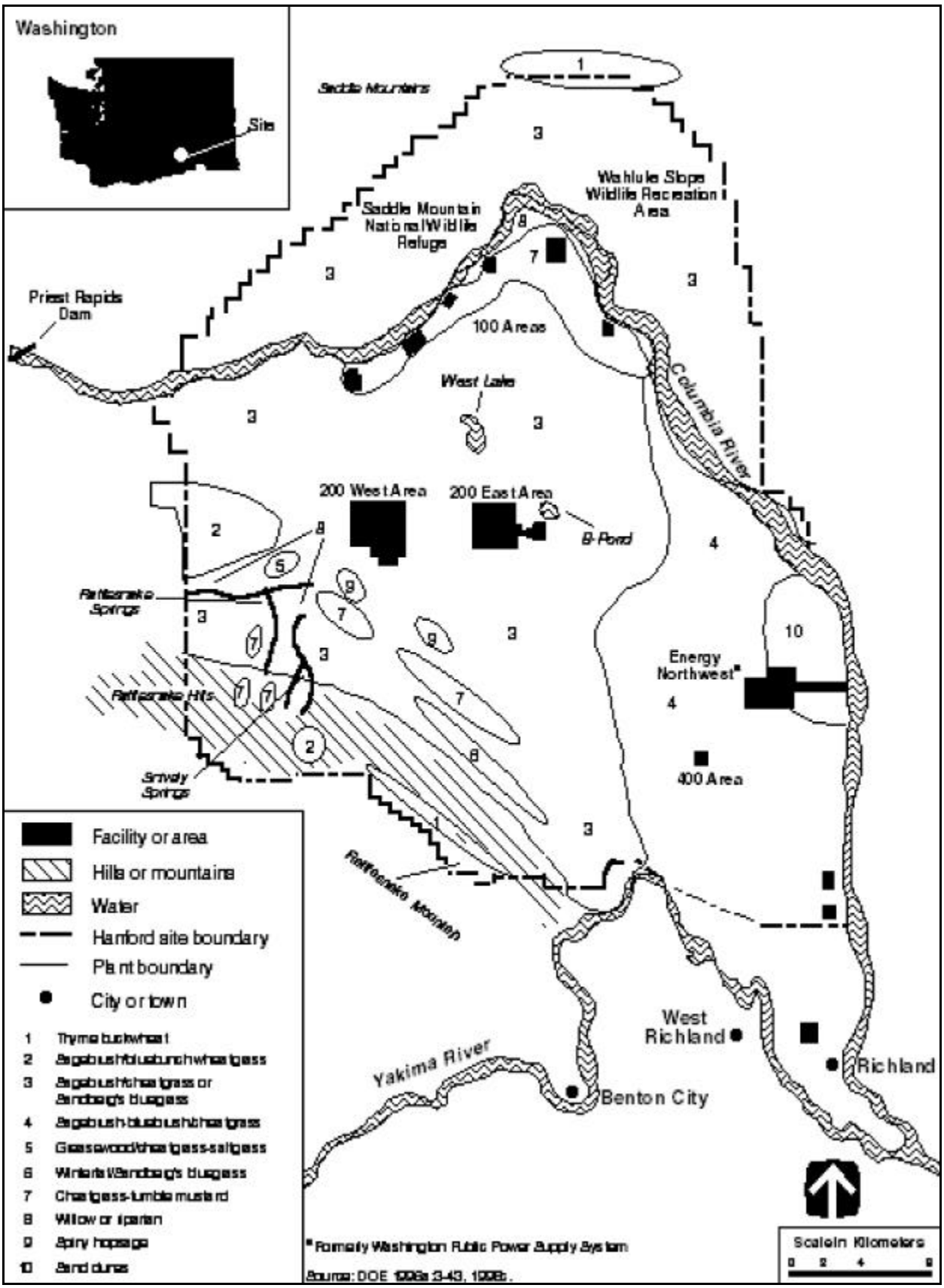


Figure 3–8. Major Plant Communities at Hanford

and nocturnal, the Great Basin pocket mouse being the most abundant. Other small mammals include the deer mouse, Townsend ground squirrel,pocket gopher, harvest mouse, Norway rat, sagebrush vole, grasshopper mouse, montane vole, vagrant shrew, Leasts chipmunk, and Merriam's shrew. Larger mammals include the mule deer and elk. Small numbers of bobcats and badgers also inhabit the site. The largest predator, which ranges all across the site, is the coyote. Bat species include the pallid bat, which frequents deserted buildings and is thought to be the most abundant. Other species include the hoary bat, silver-haired bat, California brown bat, little brown bat, Yuma brown bat, and Pacific western big-eared bat (DOE 1996b:4-55; DOE 1996d:3-90).

There are two types of natural aquatic habitats on the Hanford Site. The dominant one, the Columbia River, flows along the northern and eastern edges; the other is the small spring-streams and seeps in the Rattlesnake Hills. Several artificial water bodies, primarily ponds and ditches, have been formed as a result of wastewater disposal practices associated with the operation of reactors and separation facilities. Although they are temporary and will vanish with cessation of activities, all except West Lake form established aquatic ecosystems when present. West Lake is created by a rise in the water table in the 200 Areas, and because it is not fed by surface flow, it is alkaline and has limited plant and animal species (DOE 1996b:4-63).

The Columbia River supports a large and diverse community of plankton, benthic invertebrates, fish, and other aquatic organisms. The Hanford Reach supports transient phytoplankton and zooplankton populations and 44 anadromous and resident species of fish (DOE 1996d:3-90). Of these species, the chinook salmon, sockeye salmon, coho salmon, and steelhead trout use the river as a migration route to upstream spawning areas. Principal resident fish species sought by anglers include whitefish, sturgeon, smallmouth bass, catfish, walleye, and perch. There are also large populations of rough fish present, including carp, shiners, suckers, and squawfish. Small spring-streams, such as Rattlesnake and Snively Springs, support diverse biotic communities and are extremely productive, consisting of dense blooms of watercress and aquatic insects (DOE 1996b:4-63, 4-64). Temporary wastewater ponds and ditches develop riparian communities and are attractive to migrating birds in autumn and spring (DOE 1996e:3-90).

3.2.8.1.2 Proposed Facility Locations

Biological surveys in the 200 East Area and immediately surrounding areas show that approximately 40 percent of the area is big sagebrush and grey rabbitbrush, both native species characteristic of shrub-steppe communities. Roughly 20 percent is Russian thistle, the remainder being either disturbed vegetation or bare gravel (DOE 1996c:4-32). Because of past disturbances and human occupancy in the 200 Areas, wildlife associated with shrub-steppe habitat is somewhat limited (DOE 1996c:S-7). Several animal species may be found in this area. Bird species include the burrowing owl, ferruginous hawk, great blue heron, loggerhead shrike, long-billed curlew, northern harrier, sage sparrow, Swainson's hawk, western meadowlark, vesper sparrow, and horned lark. Potential mammal species include the black-tailed jackrabbit, coyote, Great Basin pocket mouse, house mouse, deer mouse, mule deer, Nuttall's cottontail, raccoon, and badger. Reptiles likely to be seen include the gopher snake, northern Pacific rattlesnake, western yellow-bellied racer, and side-blotched lizard (Mecca 1997b:Poston memo to Teal).

The 400 Area is characterized as postfire shrub-steppe habitat dominated by cheatgrass and small shrubs, including gray and green rabbitbrush. Generally, the same animal species listed above as potentially located in the 200 Area may be found in the 400 Area, with the following exceptions: great blue heron, raccoon, and badger. Species that may be infrequently seen due to limited habitat as a result of fire include loggerhead shrike and sage sparrow (Mecca 1997b:Poston memo to Teal). No surface water flows within 1.6 km (1 mi) of the proposed facility locations in the 200 East and 400 Areas (Mecca 1997b).

3.2.8.2 Sensitive Habitat

Sensitive habitat comprises those terrestrial and aquatic (including designated wetlands) areas of the site that support threatened and endangered, State-protected, and other special-status plant and animal species.[3]

3.2.8.2.1 General Site Description

The primary jurisdictional wetlands on the Hanford Site are found along the Hanford Reach and include the riparian and riverine habitats associated with the river shoreline (DOE 1996b:4-64). The riparian zone varies with seasonal water-level fluctuations and daily variations related to power generation at Priest Rapids Dam, but is known to support extensive stands of willows, grasses, various macrophytes, and other plants. Other large areas of wetlands can be found within the Saddle Mountain National Wildlife Refuge and the Wahluke Slope Wildlife Recreation Area. Wetland habitat in these areas consists of large ponds resulting from irrigation runoff. The ponds support extensive stands of cattails and other emergent aquatic vegetation that are frequently used as nesting sites by waterfowl (DOE 1996a:3-42).

Sixty-five threatened, endangered, and other special-status species listed by the Federal Government or the State of Washington may be found in the vicinity of Hanford, as shown in Table 3.2.6–1 of the *Storage and Disposition PEIS* (DOE 1996a:3-45).

3.2.8.2.2 Proposed Facility Locations

Riparian habitats are associated with the B Pond Complex near the 200 East Area and a small cooling and wastewater pond in the 400 Area (DOE 1996b:4-64). Wetland plants occurring along the shoreline of B Pond include herbaceous and woody species such as showy milkweed, western goldenrod, three square bulrush, horsetail rush, common cattail, and mulberry. Wildlife species observed include a variety of mammals and waterfowl (DOE 1996c:4-33). Similar representative plants and animals may be found in the 400 Area, with the exception of bulrushes, cattails, horsetails, and mulberry (Mecca 1997a:Poston memo to Teal).

No animals or plants on the Federal list of threatened and endangered species are known to occur on or around the 400 Area and 200 East Area. As indicated in Table 3–11, the State of Washington has classified eight bird, one mammal, four plant, and two reptile species as threatened, endangered, or species of concern. Loggerhead shrike and sage sparrow nest in undisturbed sagebrush habitat. Other bird species of concern that may occur in shrub-steppe habitat are the burrowing owl, ferruginous hawk, golden eagle, long-billed curlew, sage thrasher and Swainson's hawk. The only mammal species is the State-listed endangered pygmy rabbit which have only rarely been observed at Hanford. Pipers daisy has been found at B Pond near the 200 East Area and crouching milkvetch, stalked-pod milkvetch, and squill onion are also found in the vicinity. The reptile species of concern are the desert night snake and striped whipsnake (Dirkes and Hanf 1997:F.1–F.3; DOE 1996a:3-44; DOE 1996c:4-34).

3.2.9 Cultural and Paleontological Resources

Cultural resources are human imprints on the landscape and are defined and protected by a series of Federal laws, regulations, and guidelines. Hanford has a well-documented record of cultural and paleontological resources. The *Hanford Cultural Resources Management Plan*, approved by the State Historic Preservation Officer (Battelle 1989), establishes guidance for the identification, evaluation, recordation, curation, and management of

[3] The Federal Government defines threatened and endangered species in the Endangered Species Act, and wetlands in 33 CFR 328.3.

these resources. There are 645 cultural resource sites and isolated finds recorded. Forty-eight archaeological sites and one building are included on the National Register of Historic Places. Nominations have been prepared

Table 3–11. Threatened and Endangered Species, Species of Concern, and Sensitive Species Occurring or Potentially Occurring in the Vicinity of 200 East Area and 400 Area

Common Name	Scientific Name	Federal Status	State Status
Birds			
Burrowing owl	*Athene cunicularia*	Species of Concern	Candidate Species
Ferruginous hawk	*Buteo regalis*	Species of Concern	Threatened
Golden eagle	*Aquila chrysaetos*	Not listed	Candidate Species
Loggerhead shrike	*Lanius ladovicianus*	Species of Concern	Candidate Species
Long-billed curlew	*Numenius americanus*	Not listed	Candidate Species
Sage sparrow	*Amphispiza belli*	Not listed	Candidate Species
Sage thrasher	*Oreoscoptes montanus*	Not listed	Candidate Species
Swainson's hawk	*Buteo swainsoni*	Not listed	Candidate Species
Mammals			
Pygmy rabbit	*Brachylagus idahoenis*	Species of Concern	Endangered
Plants			
Crouching milkvetch	*Astragalus succumbens*	Not listed	Monitor Group 3[a]
Piper's daisy	*Erigeron piperianus*	Not listed	Sensitive
Squill onion	*Allium scillioides*	Not listed	Monitor Group 3[a]
Stalked-pod milkvetch	*Astragalus sclerocarpus*	Not listed	Monitor Group 3[a]
Reptiles			
Desert night snake	*Hypsiglena torquata*	Not listed	Monitor Group
Striped whipsnake	*Masticophis taeniatus*	Not listed	Candidate Species

[a] Taxa that are more abundant or less threatened than previously assumed.

Source: Dirkes and Hanf 1997:F.1–F.3; DOE 1996c:4-34; McConnaughey 1998; Roy 1998.

for several archaeological districts and sites considered to be eligible for listing on the National Register. While many significant cultural resources have been identified, only about 6 percent of Hanford has been surveyed, and few of the known sites have been evaluated for their eligibility for listing on the National Register. Cultural resource reviews are conducted whenever projects are proposed in previously unsurveyed areas. In recent years, reviews have exceeded 500 per year (DOE 1996b:4-68, 4-69).

Cultural sites are often occupied continuously or intermittently over substantial time spans. For this reason, a single location (sites) may contain evidence of use during both historic and prehistoric periods. In the discussions that follow, the numbers of prehistoric and historic resources are presented; the sum of these resources may be greater than the total number of sites reported due to this dual-use history at sites. Therefore, where the total number of sites reported is less than the sum of prehistoric and historic sites certain locations were used during both periods.

3.2.9.1 Prehistoric Resources

Prehistoric resources are physical properties that remain from human activities that predate written records.

3.2.9.1.1 General Site Description

Currently, 283 prehistoric sites have been identified, 17 of which contain historic components. Of 48 sites included on the National Register, 2 are individual sites (Hanford Island Site and Paris Site), and the remainder are located in seven archaeological districts. In addition, four other archaeological districts have been nominated or are planned to be nominated for the National Register. A number of sites have been identified along the Middle Columbia River and in inland areas away from the river, but near other water sources. Some evidence of human occupation has been found in the arid lowlands. Sites include remains of numerous pithouse villages, various types of open campsites, graves along the riverbanks, spirit quest monuments (rock cairns), hunting camps, game drive complexes, quarries in mountains and rocky bluffs, hunting and kill sites in lowland stabilized dunes, and small temporary camps near perennial sources of water away from the river (DOE 1996b:4-69, 4-70).

More than 10,000 years of prehistoric human activity in the largely arid environment of the Middle Columbia River region have left extensive archaeological deposits. Archaeological surveys have been conducted at Hanford since 1926; however, little excavation has been conducted at any of the sites. Surveys have included studies of Gable Mountain, Gable Butte, Snively Canyon, Rattlesnake Mountain, Rattlesnake Springs, and a portion of the Basalt Waste Isolation Project Reference Repository location. Most of the surveys have focused on islands and on a 400-m (1,312-ft) wide area on either side of the river. From 1991 through 1995, the 100 Areas were surveyed, and new sites were identified. Excavations have been conducted at several sites on the riverbanks and islands and at two unnamed sites. Test excavations have been conducted at the Wahluke, Vernita Bridge, and Tsulim sites and at other sites in Benton County (DOE 1996a:3-48).

3.2.9.1.2 Proposed Facility Locations

An archaeological survey has been conducted for all undeveloped portions of the 200 East Area and half of the undeveloped portions of the 200 West Area. No prehistoric sites were identified. Because most of the 200 Areas are either developed or disturbed, it is unlikely that they contain intact archaeological deposits. Likewise, most of the 400 Area is disturbed and is unlikely to contain intact prehistoric or historic sites. A cultural resources survey found only 12 ha (30 acres) that were undisturbed, and no sites were identified either within the 400 Area or within 2 km (1.2 mi) of the 400 Area. The *Hanford Cultural Resources Management Plan* provides for survey work before construction and has contingency guidelines for handling the discovery of previously unknown archaeological resources encountered during construction (DOE 1996a:3-48).

3.2.9.2 Historic Resources

Historic resources consist of physical properties that postdate the existence of written records. In the United States, historic resources are generally considered to be those that date no earlier than 1492.

3.2.9.2.1 General Site Description

There are 202 historic archaeological sites and other historic localities recorded at Hanford. Of these sites, 1 is included on the National Register as a historic site, and 56 are listed as archaeological sites. Sites and localities that predate the Hanford era include homesteads, ranches, trash scatters, dumps, gold mine tailings, roads, and townsites, including the Hanford townsite and the East White Bluffs townsite and ferry landing. More recent historic structures include the defense reactors and associated materials-processing facilities that played an important role in the Manhattan Project and the Cold War era (DOE 1996a:3-48, 3-49).

Lewis and Clark were the first European Americans to visit this region, during their 1804 to 1806 expedition. They were followed by fur trappers, military units, and miners. It was not until the 1860s that merchants set up stores, a freight depot, and the White Bluffs Ferry on the Hanford Reach, and Chinese gold miners began to work the gravel bars. Cattle ranches opened in the 1880s, and farmers soon followed. Several small thriving towns, including Hanford, White Bluffs, and Ringold, grew up along the riverbanks in the early 20th century.

Other ferries were established at Wahluke and Richmond. These towns and nearly all other structures were razed after the U.S. Government acquired the land for the original Hanford Engineer Works in the early 1940s (part of the Manhattan Project). Plutonium produced at the 100 B-Reactor was used in the first nuclear explosion at the White Sands Missile Range in New Mexico, and later in the bomb that destroyed Nagasaki, Japan, to help end World War II. The Hanford 100 B-Reactor is listed on the National Register and is designated a National Mechanical Engineering Landmark, a National Historic Civil Engineering Landmark, and a National Nuclear Engineering Landmark (DOE 1996a:3-48).

3.2.9.2.2 Proposed Facility Locations

Within the 200 Area, the only National Register–evaluated historic site is the old White Bluffs freight road that crosses diagonally through the 200 West Area. The road, which was originally a Native American trail, has been in continuous use as a transportation route since prehistoric times and has played a role in European-American immigration, regional development, agriculture, and the recent Hanford operations. The road has been determined eligible for inclusion on the National Register by the State Historic Preservation Officer, but the segment in the 200 West Area is considered a noncontributing element (i.e., lacking sufficient integrity to be a significant element of the road). A 100-m (328-ft) restricted zone protects the road from uncontrolled disturbance. Buildings in the 200 Area associated with the Manhattan Project and Cold War era have been evaluated for eligibility for nomination to the National Register and are under review by the State Historic Preservation Officer. No known historic resources have been identified in the 400 Area (DOE 1996b:3-49).

3.2.9.3 Native American Resources

Native American resources are sites, areas, and materials important to Native Americans for religious or heritage reasons. In addition, cultural values are placed on natural resources such as plants, which have multiple purposes within various Native American groups. Of primary concern are concepts of sacred space that create the potential for land-use conflicts.

3.2.9.3.1 General Site Description

In prehistoric and early historic times, the Hanford Reach was heavily populated by Native Americans of various tribal affiliations. The Wanapum and the Chamnapum bands of the Yakama Tribe lived along the Columbia River at what is now Hanford. Some of their descendants still live nearby at Priest Rapids, northwest of Hanford. Palus People, who lived on the lower Snake River, joined the Wanapum and Chamnapum to fish the Hanford Reach, and some inhabited the east bank of the river. Walla Walla and Umatilla People also made periodic visits to fish in the area. These people retain traditional secular and religious ties to the region, and many have knowledge of the ceremonies and lifeways of their culture. The Washani, or Seven Drums religion, which has ancient roots and originated among the Wanapum, is still practiced by many people on the Yakama, Umatilla, Warm Springs, and Nez Perce Reservations. Native plant and animal foods, some of which can be found at Hanford, are used in the ceremonies performed by tribal members (DOE 1996b:4-71).

Consultation is required to identify the traditional cultural properties that are important in maintaining the cultural heritage of Native American tribes. Under separate treaties signed in 1855, the Confederated Tribes and Bands of the Yakama Indian Nation and the Confederated Tribes of the Umatilla Indian Reservation ceded lands to the United States that include the present Hanford Site. Under the treaties, the tribes reserved the right to fish at usual and accustomed places in common with the citizens of the territory, and retained the privilege of hunting, gathering roots and berries, and pasturing horses and cattle upon open, unclaimed land. The Treaty of 1855 with the Nez Perce Tribe includes similar reservations of rights, and the Nez Perce have identified the Hanford Reach as the location of usual and accustomed places for fishing. The Wanapum People are not signatory to any treaty with the United States and are not a federally recognized tribe; however, they live about 8 km (5 mi) west of the

Hanford boundary, they were historical residents of Hanford, and their interests in the area have been acknowledged (DOE 1996b:4-71, 4-72).

All these tribes are active participants in decisions regarding Hanford and have expressed concerns about hunting, fishing, pasture rights, and access to plant and animal communities and important sites. Sites sacred to Native Americans at Hanford include remains of prehistoric villages, burial grounds, ceremonial longhouses or lodges, rock art, fishing stations, and vision quest sites. Culturally important localities and geographic features include Rattlesnake Mountain, Gable Mountain, Gable Butte, Goose Egg Hill, Coyote Rapids, and the White Bluffs portion of the Columbia River (DOE 1996a:3-49).

Consultations (see Chapter 5 and Appendix O) were initiated with appropriate Native American groups to determine any concerns associated with the actions evaluated in this SPD EIS.

3.2.9.3.2 Proposed Facility Locations

Neither the 200 East Area nor the 400 Area is known to contain any Native American resources.

3.2.9.4 Paleontological Resources

Paleontological resources are the physical remains, impressions, or traces of plants or animals from a former geological age.

3.2.9.4.1 General Site Description

Remains from the Pliocene and Pleistocene Ages have been identified at Hanford. The Upper Ringold Formation dates to the Late Pliocene Age and contains fish, reptile, amphibian, and mammal fossil remains. Late Pleistocene Touchet beds have yielded mammoth bones. These beds are composed of fluvial sediments deposited along ridge slopes that surround Hanford at distances greater than 5 km (3.1 mi) from the 200 and 400 Areas (DOE 1996a:3-49).

3.2.9.4.2 Proposed Facility Locations

No paleontological resources have been reported near the 200 and 400 Areas.

3.2.10 Land Use and Visual Resources

3.2.10.1 Land Use

Land may be characterized by its potential for the location of human activities (land use). Natural resource attributes and other environmental characteristics could make a site more suitable for some land uses than for others. Changes in land use may have both beneficial and adverse effects on other resources (biological, cultural, geological, aquatic, and atmospheric).

Hanford covers approximately 1,450 km^2 (560 mi^2) of the southeastern part of the State of Washington and extends over parts of Benton, Grant, and Franklin Counties. The site is owned entirely by the Federal Government and is administered and controlled by DOE (DOE 1996a:3-23).

3.2.10.1.1 General Site Description

The Tri-Cities area southeast of Hanford includes residential, commercial, and industrial land use. This area, encompassing the cities of Richland, Kennewick, and Pasco, is the population center closest to Hanford. Additional cities near the southern boundary of Hanford include Benton City, Prosser, and West Richland (DOE 1996b:4-81). Agriculture is a major land use in the remaining areas surrounding Hanford. In 1996, wheat was the largest crop in terms of area planted in Benton, Franklin, and Grant Counties. Alfalfa, apples, asparagus, cherries, corn, grapes, and potatoes are the other major crops in Benton, Franklin, and Grant Counties (DOE 1996b:4-106). Hanford is a Superfund site, listed on the National Priorities List. Public access to most facility areas is restricted.

DOE has designated the entire Hanford Site as a National Environmental Research Park, an outdoor laboratory for ecological research to study the environmental effects of energy development. The Hanford National Environmental Research Park is a shrub-steppe habitat that contains a wide range of semiarid land ecosystems and offers the opportunity to examine linkages between terrestrial, subsurface, and aquatic environments (DOE 1996a:3-23).

Land-use categories at Hanford include reactor operations, waste operations, administrative support, operations support, sensitive areas (including environmentally or culturally important areas), R&D and engineering development, and undeveloped areas. Generalized land uses at Hanford and vicinity are shown in Figure 3–9. Approximately 6 percent of Hanford has been disturbed and is occupied by operational facilities (DOE 1995b:4-1). Hanford contains a variety of widely dispersed facilities, including old reactors, R&D facilities, and various production and processing plants. The largest category of existing Hanford land use is sensitive areas. Approximately 665 km^2 (257 mi^2), nearly half the site, have been designated as ecological study areas or refuges. Sensitive open-space areas include the Fitzner-Eberhardt Arid Lands Ecology Reserve near Rattlesnake Mountain and two areas north of the Columbia River: the Saddle Mountain National Wildlife Refuge, administered by the USFWS, and the Wahluke Slope Wildlife Recreation Area, managed by the Washington State Department of Fish and Wildlife (DOE 1996b:4-109). Other special-status lands in the vicinity include McNary National Wildlife Refuge, administered by the USFWS, and the Columbia River Islands Area of Critical Environmental Concern and McCoy Canyon, both administered by the Bureau of Land Management (BLM).

The Fitzner-Eberhardt Arid Lands Ecology Reserve, encompassing approximately 315 km^2 (122 mi^2) in the southwestern portion of Hanford, is managed as a habitat and wildlife reserve and environmental research center by the USFWS (DOE 1996b:4-109, Sandberg 1998a). The Rattlesnake Hills Research Natural Area of the Arid Lands Ecology Reserve remains the largest Research Natural Area in the State of Washington. Because public access to the Arid Lands Ecology Reserve has been restricted since 1943, the shrub-steppe habitat is virtually undisturbed. This geographic area contains a number of small, contaminated sites that were remediated in 1994 and 1995 and have been revegetated (DOE 1996b:4-109).

The Columbia River, which is adjacent to and runs through the Hanford Site, is used for public boating, water skiing, fishing, and hunting of upland game birds and migratory fowl. Public access is allowed on certain islands, while other areas are considered sensitive because of unique habitats and the presence of cultural resources (DOE 1996b:4-109). The area known as the Hanford Reach includes the quarter-mile strip of public land on either side of the last free-flowing, nontidal segment of the Columbia River. In 1988, Congress passed Public Law 100-605, known as the *Comprehensive Conservation Study of the Hanford Reach of the Columbia River*, which required the Secretary of the Interior to prepare a study in consultation with the Secretary of Energy to evaluate outstanding features of the Hanford Reach (DOE 1996b:4-109). The results of this study can be found in the *Hanford Reach of the Columbia River Comprehensive River Conservation Study and Environmental Impact Statement* (NPS 1994). The study recommends that Congress designate an 80-km (50-mi) segment of the Columbia River extending downstream from below Priest Rapids Dam to near Johnson Island (river mile 346.5 to river mile 396) as a National Wildlife Refuge and Wild and Scenic River.

About 2,400 ha (5,930 acres) or 1.7 percent of the total acreage at Hanford is available for radioactive waste management facilities (DOE 1997a:4-20). Onsite programmatic and general purpose space totals approximately 799,000 m^2 (8.6 million ft^2). Fifty-one percent or approximately 408,000 m^2 (4.4 million ft^2) is general purpose space, including offices, laboratories, shops, warehouses, and other support facilities. The remaining 392,000 m^2 (4.2 million ft^2) of space is devoted to programmatic facilities, including processing, evaporation, filtration, waste recovery, waste treatment, waste storage facilities, and R&D laboratories (Mecca 1997a:120).

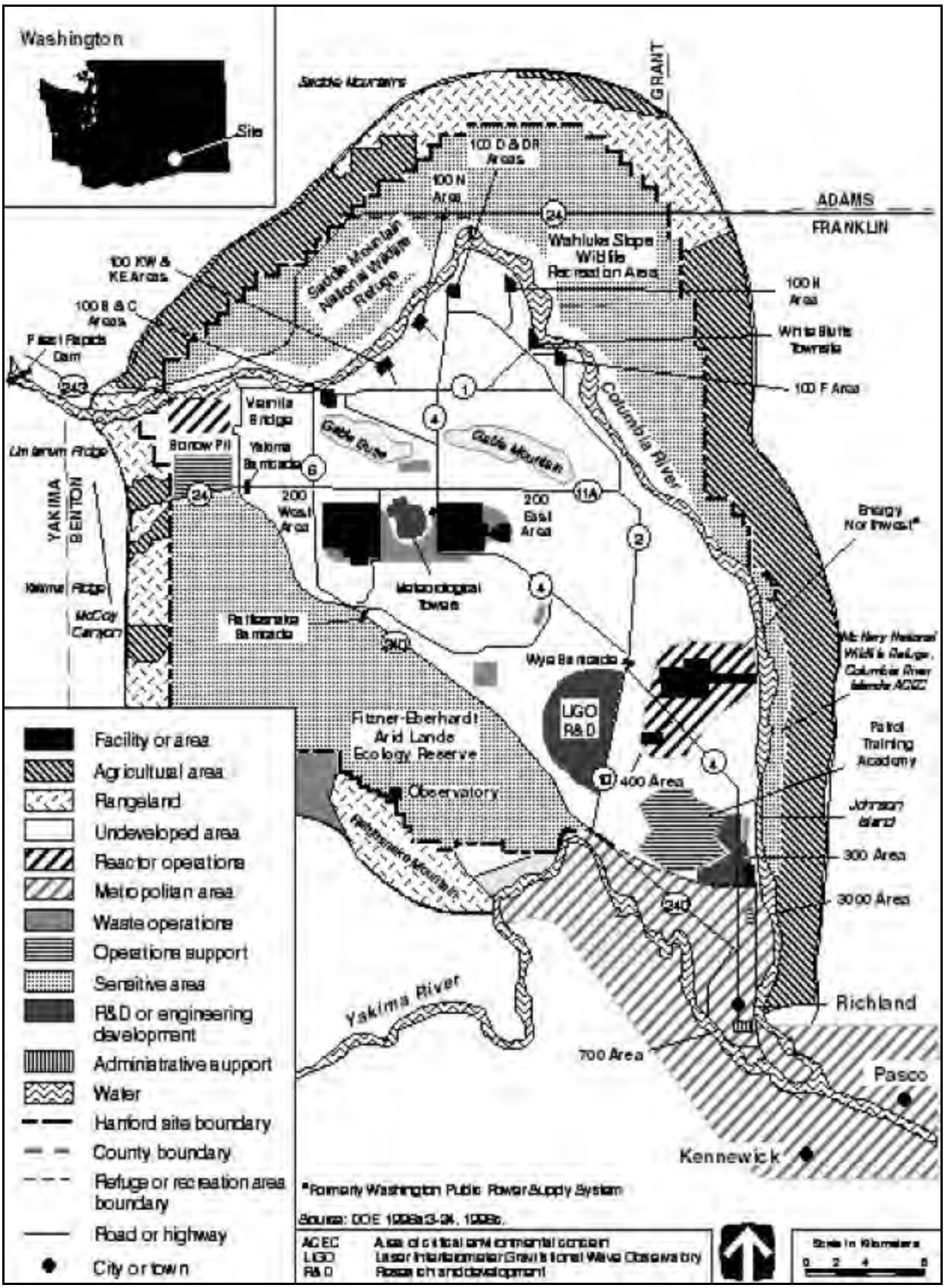


Figure 3–9. Generalized Land Use at Hanford and Vicinity

The 200 East Area is on the Central Plateau. This areas occupies about 11 km^2 (4.2 mi^2) and is dedicated to fuel reprocessing, waste-processing management, and disposal activities. Waste operations and operations support are the primary land uses. The Environmental Restoration Disposal Facility provides disposal capacity for environmental remediation waste generated during remediation of the Hanford Site (DOE 1996b:4-110).

The 400 Area occupies 0.6 km^2 (0.2 mi^2) and is about 8 km (5 mi) northwest of the 300 Area (DOE 1995b:4-2). It is the site of FFTF used in the testing of breeder reactor systems. Also in this area is FMEF, an unused building designed to fabricate fast breeder reactor fuel.

The *Hanford Site Development Plan* provides an overview of land use, infrastructure, and facility requirements to support the DOE missions at Hanford (DOE 1996b:4-109). Included in the plan is a Master Plan section that outlines the relationship of the land and the infrastructure required to support Hanford Site missions (DOE 1996b:4-109). The DOE Richland Operations Office has undertaken new comprehensive land-use planning to define how to best use the land at Hanford for the next 30 to 40 years (DOE 1996a:3-23). Its *Comprehensive Land-Use Plan* identifies existing and planned land uses, with accompanying restrictions; covers a specific timeframe; and will be updated as necessary.

Private lands bordering Hanford are subject to the planning regulations of Benton, Franklin, and Grant Counties and the city of Richland. Most of the land at Hanford is situated in Benton County. Benton County and the city of Richland have a comprehensive land-use planning process under way, with deadlines mandated under the State of Washington Growth Management Act of 1990 (DOE 1996a:3-23).

Under separate treaties signed in 1855, lands occupied by the present Hanford Site were ceded to the United States by the Confederated Tribes and Bands of the Yakama Indian Nation and by the Confederated Tribes of the Umatilla Indian Reservation (DOE 1996b:4-115). Under these treaties, the tribes retained the right to fish in their usual and accustomed places, and to hunt, gather roots and berries, and pasture horses and cattle on open, unclaimed lands. Tribal fishing rights have been recognized as effective within the Hanford Reach. DOE considers Hanford's past nuclear materials production mission and its current mission of waste management inconsistent with the continued exercise of these treaty-reserved privileges (DOE 1996b:4-115, 4-116).

3.2.10.1.2 Proposed Facility Locations

The 200 East Area is on a plateau about 11 km (6.8 mi) from the Columbia River. The 200 East and West Areas cover about 16 km^2 (6.2 mi^2) and have been dedicated for some time to fuel-reprocessing and waste management and disposal activities (DOE 1995b:4-2). Waste operations are confined primarily to the 200 Areas. The 200 East Area had previously been used to reprocess irradiated nuclear fuel and to store the resulting waste (DOE 1996c:4-50). The land is currently disturbed and is designated for waste operations. The distance from the 200 East Area to the nearest site boundary is approximately 10 km (6.2 mi).

The land in the 400 Area is currently disturbed and is designated for reactor operations. The distance from the 400 Area to the nearest site boundary is 7 km (4.3 mi).

3.2.10.2 Visual Resources

Visual resources are natural and human-created features that give a particular landscape its character and aesthetic quality. Landscape character is determined by the visual elements of form, line, color, and texture. All four elements are present in every landscape; however, they exert varying degrees of influence. The stronger the influence exerted by these elements in a landscape, the more interesting the landscape. The more visual variety that exists with harmony, the more aesthetically pleasing the landscape.

3.2.10.2.1 General Site Description

Hanford is in the Pasco Basin of the Columbia Plateau north of the city of Richland, which is at the confluence of the Yakima and Columbia Rivers. The topography of land in the vicinity of Hanford ranges from generally flat to gently rolling. Rattlesnake Mountain, rising to 1,060 m (3,480 ft) above mean sea level, forms the southwestern boundary of the site (DOE 1995a:4-33). Gable Mountain and Gable Butte are the highest land forms within the site, rising approximately 60 m (200 ft) and 180 m (590 ft), respectively. The Columbia River flows through the northern part of the site and, turning south, forms part of the eastern site boundary. White Bluffs, steep whitish-brown bluffs adjacent to the Columbia River and above the northern boundary of the river in this region, are a striking feature of the landscape (Neitzel 1996:4.125).

Typical of the regional shrub-steppe desert, the site is dominated by widely spaced, low-brush grasslands. A large area of unvegetated, mobile sand dunes extends along the east boundary, and unvegetated blowouts are scattered throughout the site. Hanford is characterized by mostly undeveloped land, with widely spaced clusters of industrial buildings along the southern and western banks of the Columbia River and at several interior locations.

The adjacent visual landscape consists primarily of rural rangeland and farms; the city of Richland, part of the Tri-Cities area, is the only adjoining urban area. Viewpoints affected by DOE facilities are primarily associated with the public access roadways (including State Routes 24 and 240, Hanford Road, Horn Rapids Road, Route 4 South, and Steven Drive), the bluffs, and the northern edge of the city of Richland. The Energy Northwest (formerly WPPSS) nuclear reactors and DOE facilities are brightly lit at night and are highly visible from many areas. Developed areas are consistent with a Visual Resource Management (VRM) Class IV designation, while the remainder of the Hanford Site ranges from VRM Class III to Class IV (DOI 1986a, 1986b).

Site facilities across Hanford can be seen from elevated locations (e.g., Gable Mountain), a few public roadways (State Routes 24 and 240), and the Columbia River. State Route 24 provides public access to the northern portion of the site. The height of structures ranges from about 3 to 30 m (10 to 100 ft), with a few stacks and towers that reach 60 m (200 ft). Viewsheds along this highway include limited views of the Columbia River where the road drops down into the river valley. A turnout on State Route 24 along the north side of the river offers views of the river and B- and C-Reactors. A rest stop along the road to the south of the river provides views of the Umtanum Ridge to the west, the Saddle Mountains to the north, and the Columbia River valley to the east and west (DOE 1996b:4-96). State Route 240 provides public access to the southwestern portion of the Hanford Site. Viewsheds along this highway include the flat, open lands of the Arid Lands Ecology Reserve in the foreground to the west, with the prominent peaks of Rattlesnake Mountain and the extended ridgelines of the Rattlesnake Hills in the background. From the highway, views are expansive due to the flat terrain, with Saddle Mountain in the distance to the north and steam plumes from the Energy Northwest reactor cooling towers often visible in the distance to the east. Views of DOE facilities from the surface of the Columbia River are generally blocked by high riverbanks; however, steam plumes from the Energy Northwest facility are visible.

3.2.10.2.2 Proposed Facility Locations

Facilities in the 200 East Area are in the interior of the Hanford Site and cannot be seen from the Columbia River or State Route 24. Views to the east from State Route 240 include fairly flat terrain, with the structures of the 200 East and 200 West Areas in the middle ground with Gable Butte and Gable Mountain visible in the background. Developed areas within the 200 East Area are consistent with a VRM Class IV designation. Natural features of visual interest within a 40-km (25-mi) radius include the Columbia River at 10 km (6.2 mi), Gable Butte at 10 km (6.2 mi), Rattlesnake Mountain at 14 km (8.7 mi), and Gable Mountain at 5.3 km (3.3 mi).

FMEF, the tallest building in the 400 Area, is 30 m (100 ft) tall and can be seen from State Route 240. Developed areas within the 400 Area are consistent with a VRM Class IV designation (DOI 1986a, 1986b). Natural features of visual interest within a 40-km (25-mi) radius include the Columbia River at 6.8 km (4.2 mi), Gable Butte at 27 km (17 mi), Rattlesnake Mountain at 17 km (11 mi), and Gable Mountain at 19 km (12 mi) (Mecca 1997a:18).

3.2.11 Infrastructure

Site infrastructure includes those utilities and other resources required to support construction and continued operation of mission-related facilities identified under the various proposed alternatives.

3.2.11.1 General Site Description

Hanford has numerous research, processing, and administrative facilities. An extensive infrastructure system supports these facilities, as shown in Table 3–12.

Table 3–12. Hanford Sitewide Infrastructure Characteristics

Resource	Current Usage	Site Capacity
Transportation		
Roads (km)	420	420
Railroads (km)	204[a]	204[a]
Electricity		
Energy consumption (MWh/yr)	323,128	2,484,336
Peak load (MW)	60.7	283.6
Fuel		
Natural gas (m^3/yr)	459,200	20,804,000
Oil (l/yr)	9,334,800	14,775,000[b]
Coal (t/yr)	NA[c]	NA[c]
Water (l/yr)	2,754,000,000	8,263,000,000

[a] DOE is in the process of discontinuing rail service to most of Hanford (see Section 3.2.11.1.1).
[b] As supplies get low, more can be supplied by truck or rail.
[c] See Section 3.2.1.1.1.
Key: NA, not applicable.
Source: Teal 1997:4.

3.2.11.1.1 Transportation

Hanford has a network of paved roads, with 104 km (65 mi) of the 420 km (261 mi) of these roads accessible to the public. The site is crossed by State Route 240, which is the main route traveled by the public. Most onsite employees travel Route 4, the primary highway from the Tri-Cities area to most Hanford outer work locations. A recently constructed access road between State Route 240 and the 200 West Area has alleviated peak traffic congestion on Route 4. Access to the outer areas (100 and 200 Areas) is controlled by DOE at the Yakima, Wye, and Rattlesnake barricades (DOE 1996a:3-26; Mecca 1997a:126).

Onsite rail transport to Hanford is provided by a short-line railroad. Hanford's railroad is a Class III Railroad System, as defined by the Federal Railroad Administration. Its common carrier tie is with the Union Pacific Railroad in Richland (DOE 1996a:3-26; Mecca 1997a:126). The site railroad is in transition from DOE ownership to the Port of Benton with a planned date of October 1, 1998. At that time only the southern portion of the rail

line that is connected to and serviced by Union Pacific would be transferred. It is expected that the Port of Benton will also have track rights as far north as the Energy Northwest (formerly WPPSS) reactors. By September 30, 1998, DOE rail operations will be discontinued. There are no current plans for service north of the Energy Northwest reactor site (Sandberg 1998a).

3.2.11.1.2 Electricity

Most site electric power is purchased from the Bonneville Power Administration and routed through substations and switching stations in a manner that provides supply redundancy on the electrical transmission and distribution systems. Bonneville Power Administration electric power is provided to three distinct systems on the Hanford Site, the 100/200 Area System, the 300 Area System, and the 400 Area System (Mecca 1997a:137). Power for the 700, 1100, and 3000 Areas is provided by the city of Richland (DOE 1996b:4-93).

3.2.11.1.3 Fuel

Natural gas, provided by the Cascade Natural Gas Corporation, is used in a few locations at Hanford. Fuel oil and propane are also used in some areas. Oil capacity is only limited by the number of deliveries by truck (DOE 1996a:3-27).

3.2.11.1.4 Water

The Columbia River is the primary source of raw water for Hanford. Average annual river flow through the site is approximately 203 million l/min (54 million gal/min) (Mecca 1997a:126). The Export Water System supplies raw river water to the 100-B, 100-D, 200 East, 200 West, and 251-W potable water filtration and treatment systems. Daily pumping averages about 72 million l/day (19 million gal/day) (Rohl 1994:2-2). Wells supply water to the 400 Area and a variety of low-use facilities at remote locations (Mecca 1997a:126).

3.2.11.1.5 Site Safety Services

The Hanford fire department operates four fire stations within the Hanford Site. The stations are strategically located to ensure minimum response time to all facilities. The fire department also provides the site with ambulance, emergency medical technicians, and advanced first aid-certified firefighters (Mecca 1997a:154).

3.2.11.2 Proposed Facility Locations

A summary of the infrastructure characteristics of the 200 East Area and the 400 Area's FMEF is shown in Table 3–13.

Table 3–13. Hanford Infrastructure Characteristics for 200 East Area and FMEF

	200 East Area		FMEF	
Resource	**Current Usage**	**Capacity**	**Current Usage**	**Capacity**
Electricity				
Energy consumption (MWh/yr)	66,671	345,000	7,300	61,000
Peak load (MW)	16.6	40.0	4.1	26.6
Fuel				
Natural gas (m^3/yr)	NA	NA	NA	NA
Oil (l/yr)	7,294,220[a]	NA[b]	760	18,900[b]
Coal (t/yr)	NA	NA	NA	NA
Water (l/yr)	688,600,000	2,596,000,000	41,690,000	397,950,000

[a] See Sandberg 1998c.
[b] As supplies get low, more can be supplied by truck or rail.
Key: FMEF, Fuels and Materials Examination Facility; NA, not applicable.
Source: Teal 1997:4.

3.2.11.2.1 Electricity

Power to the 100/200 Area electrical system is provided from two sources, the Bonneville Power Administration Midway substation at the northwestern site boundary, and a transmission line from the Bonneville Power Administration Ashe substation. The 100/200 Area electrical system consists of about 80 km (50 mi) of 230-kV transmission lines, six primary substations, about 217 km (135 mi) of 13.8-kV distribution lines, and 124 secondary substations. The 100/200 Area transmission and distribution systems, as with the Bonneville Power Administration source lines, have redundant routings to ensure electrical service to individual areas and designated facilities within those areas (Mecca 1997a:137). The substation providing power to the 200 Area has a peak load capacity of 40 MW (Teal 1997:4).

Primary electric power to the 400 Area is provided by two 115-kV Bonneville Power Administration transmission lines, one from the Bonneville Power Administration Benton substation and the second from the Bonneville Power Administration White Bluffs substation. There is one 13.8-kV tie line from the 300 Area to the 400 Area emergency power system that also provides alternate power for maintenance outages. Redundancy in the distribution lines to designated facilities ensures continuity of service and rerouting of power for maintenance of system components. The approximate lengths of distribution lines in the 400 Area are as follows: 13.8-kV lines, 7.3 km (4.5 mi); 2.4-kV lines, 518 m (1,700 ft); and 480-V lines, 14.6 km (9.1 mi). There are two substations in the 400 Area: 451A, which serves FFTF reactor and associated buildings, and 451B, which serves FMEF and associated buildings (Mecca 1997a:168, 169). The peak load capacity for FMEF is 26.6 MW and the current usage is 4.1 MW (Teal 1997:4).

3.2.11.2.2 Fuel

Coal-fire steam generation facilities have been shut down at Hanford. The conversion to oil-fired sources was completed in 1998 (see Section 3.2.1.1.1). Fuel usage at 200 Area would be about 7,294,220 l/yr (1,926,935 gal/yr) (Sandberg 1998c). Fuel usage and capacity at FMEF are 760 l/yr (201 gal/yr) and 18,900 l/yr (4,993 gal/yr), respectively (Teal 1997:4).

3.2.11.2.3 Water

The 200 East Area is the major consumer of raw water delivered via the Export Water System. That water is received at the 11.4-million-l (3-million-gal) 282-E Reservoir at a capacity of 9,842 l/min (2,600 gal/min). Monthly average potable water flow in the 200 East Area ranges between 3,028 and 3,312 l/min (800 and 875 gal/min). Daily average flow can vary widely, depending primarily on area activity (Rohl 1994:2-5, 2-6).

The 400 Area receives water from three underground deep-water wells. Each of these wells has a pumping capacity of 833 l/min (220 gal/min). Water is pumped to three aboveground storage tanks that have a combined capacity of 3,028,320 l (800,000 gal). The observed flow ranges from 681 l/min (180 gal/min) during the summer months to 284 l/min (75 gal/min) during the winter months (Rohl 1994:2-7).

3-hr averaging, 10 Fg/m^3 for 24-hr averaging, and 2.1 Fg/m^3 for the annual average; and an annual average total suspended particulate concentration of 15 Fg/m^3 (Abbott, Crockett, and Moor 1997:7). Measured concentrations attributable to INEEL are in compliance with applicable guidelines and regulations. Additional information on ambient air quality at INEEL and detailed information on emissions of other pollutants at INEEL are provided in the *INEEL Site Environmental Report for 1995* (Mitchell, Peterson, and Hoff 1996:6-4–6-6).

3.3.1.1.2 Proposed Facility Location

The meteorological conditions for INEEL are considered to be representative of the INTEC area. Primary sources of pollutants at INTEC include the New Waste Calcining Facility and coal-fired steam-generating facilities (Mitchell, Peterson, and Hoff 1996:6-4, 6-5). These facilities are sources of carbon monoxide, nitrogen dioxide, sulfur dioxide, and PM_{10}. The Waste Calcining Facility is a large source of nitrogen dioxide at INEEL.

3.3.1.2 Noise

Noise is unwanted sound that interferes or interacts negatively with the human or natural environment. Noise may disrupt normal activities or diminish the quality of the environment.

3.3.1.2.1 General Site Description

Major noise emission sources within INEEL include various industrial facilities, equipment, and machines (e.g., cooling systems, transformers, engines, pumps, boilers, steam vents, paging systems, construction and materials-handling equipment, and vehicles). Most INEEL industrial facilities are far enough from the site boundary that noise levels at the boundary would not be measurable or would be barely distinguishable from background levels (DOE 1996a:3-112).

Existing INEEL-related noises of public significance are from the transportation of people and materials to and from the site and in-town facilities via buses, trucks, private vehicles, helicopters, and freight trains. Noise measurements along U.S. Route 20 about 15 m (50 ft) from the roadway indicate that the sound levels from traffic range from 64 to 86 dBA and that the primary source is buses (71 to 80 dBA) (Abbott, Brooks, and Martin 1991:64). While few people reside within 15 m (50 ft) of the roadway, the results indicate that INEEL traffic noise might be objectionable to members of the public residing near principal highways or busy bus routes. Noise levels along these routes may have decreased somewhat due to reductions in employment and bus service at INEEL in the last few years. The acoustic environment along the INEEL site boundary in rural areas and at nearby areas away from traffic noise is typical of a rural location: the average day-night average sound level is in the range of 35 to 50 dBA (EPA 1974:B-4). Except for the prohibition of nuisance noise, neither the State of Idaho nor local governments have established any regulations that specify acceptable community noise levels applicable to INEEL (DOE 1996a:F-32).

The EPA guidelines for environmental noise protection recommend an average day-night average sound level of 55 dBA as sufficient to protect the public from the effects of broadband environmental noise in typically quiet outdoor and residential areas (EPA 1974:29). Land-use compatibility guidelines adopted by the Federal Aviation Administration and the Federal Interagency Committee on Urban Noise indicate that yearly day-night average sound levels less than 65 dBA are compatible with residential land uses and levels up to 75 dBA are compatible with residential uses if suitable noise reduction features are incorporated into structures (DOT 1995). It is expected that for most residences near INEEL, the day-night average sound levels are compatible with the residential land use, although for some residences along major roadways noise levels may be higher than 65 dBA.

3.3.1.2.2 Proposed Facility Location

No distinguishing noise characteristics have been identified at the INTEC area. INTEC is far enough—about 12 km (7.5 mi)—from the site boundary that noise levels from the facilities are not measurable or are barely distinguishable from background levels.

3.3.2 Waste Management

Waste management includes minimization, characterization, treatment, storage, transportation, and disposal of waste generated from ongoing DOE activities. The waste is managed using appropriate treatment, storage, and disposal technologies and in compliance with all applicable Federal and State statutes and DOE orders.

3.3.2.1 Waste Inventories and Activities

INEEL manages the following types of waste: HLW, TRU, mixed TRU, LLW, mixed LLW, hazardous, and nonhazardous. HLW would not be generated by surplus plutonium disposition activities at INEEL, and therefore, will not be discussed further. Waste generation rates and the inventory of stored waste from activities at INEEL are provided in Table 3–16. Table 3–17 summarizes the INEEL waste management capabilities. More detailed descriptions of the waste management system capabilities at INEEL are included in the *Storage and Disposition PEIS* (DOE 1996a:3-141–145, E-33–E-48) and the *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE 1995b:2.2-30).

Table 3–16. Waste Generation Rates and Inventories at INEEL

Waste Type	Generation Rate (m^3/yr)	Inventory (m^3)
TRU[a]		
Contact handled	0	39,300
Remotely handled	0	200
LLW	2,624	18,634
Mixed LLW		
RCRA	180	25,734
TSCA	<1	2
Hazardous	835[b]	NA[c]
Nonhazardous		
Liquid	2,000,000[d]	NA[c]
Solid	62,000	NA[c]

[a] Includes mixed TRU waste.
[b] Includes 760 m^3 that is recyclable.
[c] Generally, hazardous and nonhazardous wastes are not held in long-term storage.
[d] Projected annual average generation for 1997–2006.
Key: LLW, low-level waste; NA, not applicable; RCRA, Resource Conservation and Recovery Act; TRU, transuranic; TSCA, Toxic Substances Control Act.
Source: DOE 1996d:15, 16, except hazardous and nonhazardous solid waste (DOE 1996a:3-142, 3-143) and nonhazardous liquid waste (Werner 1997).

EPA placed INEEL on the National Priorities List on December 21, 1989. In accordance with CERCLA, DOE entered into a consent order with EPA and the State of Idaho to coordinate cleanup activities at INEEL under one comprehensive strategy. This agreement integrates DOE's CERCLA response obligations with RCRA

corrective action obligations. Aggressive plans are in place to achieve early remediation of sites that represent the greatest risk to workers and the public. The goal is to complete remediation of contaminated sites at INEEL to support delisting from the National Priorities List by 2019 (DOE 1996a:3-141). More information on regulatory requirements for waste disposal is provided in Chapter 5.

Table 3–17. Waste Management Capabilities at INEEL

			Applicable Waste Type					
Facility Name/Description	**Capacity**	**Status**	**TRU**	**Mixed TRU**	**LLW**	**Mixed LLW**	**Haz**	**Non-Haz**
Treatment Facility (m^3/yr except as otherwise specified)								
INTEC HEPA Filter Leach, m^3/day	0.21	Online		X		X		
INTEC Debris Treatment and Containment, m^3/day	88	Part B permit pending		X		X		
Advanced Mixed Waste Treatment Project	6,500	Planned for 2003		X		X		
[Text deleted.]								
ANL–W Remote Treatment Facility	42	Planned for 2000	X	X	X	X		
ANL–W HFEF Waste Characterization Area	37	Online	X	X				
INTEC Waste Immobilization Facility	48	Planned for 2020		X	X	X		
INTEC Liquid Effluent Treatment and Disposal Facility	11,365	Online				X		
INTEC HLW Evaporator	6,138	Online		X	X	X		
INTEC Process Equipment Waste Evaporator	13,000	Online		X	X	X		
ANL–W Sodium Processing Facility	698	Online				X		
Test Area North Cask Dismantlement	11	Online				X		
WROC - Debris Sizing, kg/hr	1,149	Planned for 2000			X	X		
WROC - Macroencapsulation, kg/hr	2,257	Planned for 1999				X		
WROC - Stabilization, m^3/day	7.6	Online				X		
WERF	49,610	Online			X	X	X	
INTEC Cold Waste Handling Facility	3,700	Online						X
INTEC Sewage Treatment Plant	3,200,000	Online						X
Storage Facility (m^3)								
ANL–W Radioactive Sodium Storage	75	Online		X		X		
ANL–W Sodium Components Maintenance Shop	200	Online				X		
ANL–W Radioactive Scrap and Waste Storage	193	Online	X	X	X	X		

Facility Name/Description	Capacity	Status	Applicable Waste Type: TRU	Mixed TRU	LLW	Mixed LLW	Haz	Non-Haz
ANL–W EBR II Sodium Boiler Drain Tank	64	Online				X		
ANL–W HFEF Waste Characterization Area	37	Online	X	X				
INTEC Tank Farm	12,533	Online		X		X		

Table 3–17. Waste Management Capabilities at INEEL (Continued)

Facility Name/Description	Capacity	Status	Applicable Waste Type: TRU	Mixed TRU	LLW	Mixed LLW	Haz	Non-Haz
INTEC FDP HEPA Storage	25	Online		X		X		
INTEC NWCF HEPA Storage	56	Online		X		X		
INTEC CPP-1619 Storage	45	Online				X	X	
INTEC CPP-1617 Staging	8,523	Online				X	X	
[Text deleted.]								
RWMC Storage Area-1, 2, and R	64,900	Online	X	X	X[a]	X[a]		
RWMC Waste Storage	112,400	Online	X	X	X[a]	X[a]		
RWMC Intermediate-Level Storage	100	Online	X					
[Text deleted.]								
WROC PBF Mixed LLW Storage	129	Online				X	X	
Portable Storage at SPERT IV	237	Online				X	X	
PBF WERF Waste Storage Building	685	Online				X	X	
Test Area North 647 Waste Storage	104	Online				X	X	
Test Area North 628 SMC Container Storage	125	Online				X	X	
Disposal Facility(m^3/yr)								
RWMC Disposal Facility	37,700	Online			X			
CFA Landfill Complex	48,000	Online						X
Percolation Ponds	2,000,000	Online						X

[a] Waste with alpha contamination greater than 10 but less than 100 nCi/g.

Key: ANL–W, Argonne National Laboratory–West; CFA, Central Facilities Area; CPP, Chemical Processing Plant; EBR, Experimental Breeder Reactor; FDP, Fluorinel Dissolution Process; Haz, hazardous; HEPA, high-efficiency particulate air; HFEF, Hot Fuel Examination Facility; HLW, high-level waste; INTEC, Idaho Nuclear Technology and Engineering Center; LLW, low-level waste; NWCF, New Waste Calcining Facility; PBF, Power Burst Facility; RWMC, Radioactive Waste Management Complex; SMC, Specific Manufacturing Complex; SPERT, Special Power Excursion Reactor Test; TRU, transuranic; WERF, Waste Experimental Reduction Facility; WROC, Waste Reduction Operations Complex.

Source: Abbott 1998; Abbott, Crockett, and Moor 1997:20; Depperschmidt 1999; Moor 1998; Werner 1997.

3.3.2.2 Transuranic and Mixed Transuranic Waste

TRU waste generated since 1972 is segregated into contact-handled and remotely handled categories and stored at the Radioactive Waste Management Complex in a form designed for eventual retrieval (DOE 1996a:3-144). Some TRU waste is also stored at the Radioactive Scrap and Waste Facility at ANL–W (DOE 1995b:2.2-36). There is very little TRU waste generated at INEEL. Most of the TRU waste in storage was received from the Rocky Flats Environmental Technology Site (DOE 1996a:3-144). TRU waste will be treated to meet WIPP waste acceptance criteria, packaged in accordance with DOE and DOT requirements, and transported to WIPP

for disposal (DOE 1996a:3-144). The first shipment of TRU waste to WIPP was made in April 1999 (DOE 1999c).

The existing treatment facilities for TRU waste at INEEL are limited to testing, characterization, and repackaging. The planned Waste Characterization Facility will characterize TRU waste and either reclassify it (if it is found to be LLW) for disposal on the site, or prepare it so that it meets WIPP waste acceptance criteria (DOE 1996a:E-35).

The Advanced Mixed Waste Treatment Project will be a private sector treatment facility. This facility shall (1) treat waste to meet WIPP waste acceptance criteria, RCRA Land Disposal Restrictions (LDR), and required Toxic Substances Control Act standards; (2) reduce waste volume and life-cycle cost to DOE; and (3) perform tasks in a safe and environmentally compliant manner (Mitchell, Peterson, and Hoff 1996:3-16). Construction of a mixed LLW Disposal Facility and Plasma Hearth Treatment Facility are being considered to support commercial treatment of mixed TRU waste and alpha-contaminated mixed LLW subject to funding restraints and additional NEPA review (DOE 1996a:E-35).

Waste containing between 10 and 100 nCi/g of transuranic radionuclides is called alpha LLW. Although this waste is technically considered LLW rather than TRU waste, it cannot be disposed of at INEEL because it does not meet all INEEL LLW disposal facility acceptance criteria. Alpha LLW and alpha mixed LLW are managed together as part of the TRU waste program. It is expected that these wastes will be treated by the Advanced Mixed Waste Treatment Project and then disposed of at WIPP (DOE 1995b:2.2-34, 2.2-35).

3.3.2.3 Low-Level Waste

Liquid LLW is either evaporated and processed to calcine or solidified before disposal (DOE 1996a:E-35). INTEC has the capability to treat aqueous LLW. Liquid LLW is concentrated at the INTEC process equipment waste evaporator, with the condensed vapor processed by the Liquid Effluent Treatment and Disposal Facility. The concentrated materials remaining after evaporation are pumped to the INTEC tank farm (DOE 1995b:2.2-39). Some small volumes of liquid LLW are solidified at the Waste Experimental Reduction Facility for disposal at the Radioactive Waste Management Complex. In addition, small volumes of aqueous LLW are discharged to the double-lined pond at the Test Reactor Area for evaporation (DOE 1995b:2.2-39).

Most solid LLW at INEEL is sent to the Waste Experimental Reduction Facility for treatment by incineration, compaction, size reduction, or stabilization before shipment for disposal at the Radioactive Waste Management Complex or offsite disposal facilities (Werner 1997). Disposal occurs in pits and concrete-lined soil vaults in the subsurface disposal area of the Radioactive Waste Management Complex (DOE 1995b:2.2-39). About 40 percent of the LLW generated at INEEL (that contain less than 10 nCi/g of radioactivity) is buried in shallow trenches; the remaining 60 percent at the Radioactive Waste Management Complex following treatment for volume reduction. Additionally, some LLW is shipped off the site to be incinerated, and the residual ash is returned to INEEL for disposal. The Radioactive Waste Management Complex is expected to be filled to capacity by the year 2030 (Mitchell, Peterson, and Hoff 1996:3-26), although some proposals would close the LLW Disposal Facility by 2006 (DOE 1998d:B-4).

3.3.2.4 Mixed Low-Level Waste

Mixed LLW is divided into two categories for management purposes: alpha mixed LLW and beta-gamma mixed LLW. Most of the alpha mixed LLW stored at INEEL is waste that has been reclassified from mixed TRU waste and is managed as part of the TRU waste program. Therefore, this section deals only with beta-gamma mixed LLW (DOE 1995b:2.2-39, 2.2-40).

Mixed LLW, including polychlorinated biphenyls–contaminated LLW, is stored in several onsite areas awaiting the development of treatment methods (DOE 1996a:3-144). Mixed LLW is stored at the Mixed Waste Storage Facility (or Waste Experimental Reduction Facility Waste Storage Building) and portable storage units at the Power Burst Facility area. In addition, smaller quantities of mixed LLW are stored in various facilities at INEEL including the Hazardous Chemical/Radioactive Waste Facility at INTEC, and the Radioactive Sodium Storage Facility and Radioactive Scrap and Waste Storage Facility at ANL–W (DOE 1995b:2.2-41). Although mixed wastes are stored in many locations at INEEL, the bulk of that volume is solid waste stored at the Radioactive Waste Management Complex (DOE 1996a:E-39).

Aqueous mixed LLW is concentrated at INTEC. The condensate from the waste evaporator is then processed by the Liquid Effluent Treatment and Disposal Facility. The concentrated material remaining after evaporation (mixed LLW) is pumped to the INTEC tank farm for storage (DOE 1995a:2.2-42, 2.2-43).

As part of the site treatment plans required by the FFCA, preferred treatment options have been identified to eliminate the hazardous waste component for many types of mixed LLW (DOE 1995b:2.2-42). Mixed LLW is or will be processed to RCRA LDR treatment standards through several treatment facilities. Those treatment facilities and operational status are: (1) Waste Experimental Reduction Facility Incinerator (operational), (2) Waste Experimental Reduction Facility Stabilization (operational), (3) Test Area North cask dismantlement (operational), (4) Sodium Process Facility (operational), (5) High-Efficiency Particulate Air (HEPA) Filter Leach (operational), (6) Waste Reductions Operations Complex Macroencapsulation (October 1999), (7) Waste Reduction Operations Complex Mercury Retort (March 2000), (8) Debris Treatment (September 2000), and (9) Advanced Mixed Waste Treatment Project (March 2003). Commercial treatment facilities are also being considered, as appropriate (Werner 1997). Currently, limited amounts of mixed LLW are disposed of at Envirocare of Utah (Werner 1997).

3.3.2.5 Hazardous Waste

About 1 percent of the total waste generated at INEEL is hazardous waste. Most of the hazardous waste generated annually at INEEL is transported off the site for treatment and disposal (DOE 1995b:2.2-45). Offsite shipments are surveyed to determine that the wastes have no radioactive content (are not mixed waste) (DOE 1996a:3-145). Highly reactive or unstable materials, such as waste explosives, are addressed on a case-by-case basis and are either stored, burned, or detonated as appropriate (DOE 1995b:2.2-46).

3.3.2.6 Nonhazardous Waste

More than 94 percent of the waste generated at INEEL is classified as industrial waste and is disposed of on the site in a landfill complex in the Central Facilities Area and at the Bonneville County landfill (DOE 1995b:2.2-47). The onsite landfill complex contains separate areas for petroleum-contaminated media, industrial waste, and asbestos waste (Werner 1997). The onsite landfill is 4.8 ha (12 acres) and is being expanded by 91 ha (225 acres) to provide capacity for at least 30 years (DOE 1996a:3-145).

The Cold Waste Handling Facility was recently put into operation at INTEC. This system allows increased volumes of nonhazardous waste to be inspected, recycled, shredded, compacted, and segregated, thereby reducing the amount of material sent to disposal (Mitchell, Peterson, and Hoff 1996:3-24).

Sewage is disposed of in surface impoundments in accordance with terms of the October 7, 1992, consent order. Waste in the impoundments is allowed to evaporate; the resulting sludge is placed in the landfill. Solids are separated and reclaimed where possible (DOE 1996a:3-145). Nonhazardous service wastewater generated at INTEC is disposed to percolation ponds at a flow rate of 3.8 million to 7.6 million l/day (1 million to 2 million gal/day) (Werner 1997). The INTEC sanitary sewer system collects and transfers sanitary waste to

the sewage treatment lagoons east of INTEC for treatment and disposal. This system has a capacity of 3,200,000 m^3/yr (4,190,000 yd^3/yr) (Abbott, Crockett, and Moor 1997:20).

3.3.2.7 Waste Minimization

The DOE Idaho Operations Office has an active waste minimization and pollution prevention program to reduce the total amount of waste generated and disposed of at INEEL. This is accomplished by eliminating waste through source reduction or material substitution; by recycling potential waste materials that cannot be minimized or eliminated; and by treating all waste that is generated to reduce its volume, toxicity, or mobility prior to storage or disposal. The DOE Idaho Operations Office published its first waste minimization plan in 1990, which defined specific goals, methodology, responsibility, and achievements of programs and organizations. The achievements and progress have been updated at least annually (DOE 1996a:E-33).

The INEEL waste minimization program has significantly reduced the quantities of hazardous waste generated at INEEL. For example, in 1992, 760 m^3 (994 yd^3) of hazardous waste was recycled. Recyclable hazardous materials include metals (such as bulk lead, mercury, chromium), solvents, fuel, and other waste materials (DOE 1995b:2.2-45). Soon the use of nonhazardous chemicals and the recycling of those for which there is no substitute should nearly eliminate the generation of hazardous waste (DOE 1996a:E-39).

Another goal of the INEEL waste minimization program is to reduce nonhazardous waste generation by 50 percent over the next 5 years (DOE 1996a:3-145). During 1993–1995, INEEL recycled more than 680,400 kg (1.5 million lb) of paper and cardboard (Mitchell, Peterson, and Hoff 1996:3-26). Efforts are also under way to expand the recycling program to include asphalt and metals and to convert scrap wood into mulch (DOE 1995b:2.2-48).

3.3.2.8 Preferred Alternatives From the WM PEIS

Preferred alternatives from the WM PEIS (DOE 1997a:summary, 97) are shown in Table 3–18 for the four waste types analyzed in this SPD EIS. A decision on the future management of these wastes could result in the construction of new waste management facilities at INEEL and the closure of other facilities. Decisions on the various waste types are expected to be announced in a series of RODs to be issued on this WM PEIS. In fact, the TRU waste ROD was issued on January 20, 1998 (DOE 1998a), with the hazardous waste ROD issued on August 5, 1998 (DOE 1998b). The TRU waste ROD states that DOE will develop and operate mobile and fixed facilities to characterize and prepare TRU waste for disposal at WIPP. Each DOE site that has, or will generate, TRU waste will, as needed, prepare and store its TRU waste on the site. The hazardous waste ROD states that most DOE sites will continue to use offsite facilities for the treatment and disposal of major portions of the nonwastewater hazardous waste, with ORR and SRS continuing to treat some of their own hazardous waste on the site in existing facilities where this is economically favorable. More detailed information and DOE's alternatives for the future configuration of waste management facilities at INEEL is presented in the WM PEIS, and the hazardous waste and TRU waste RODs.

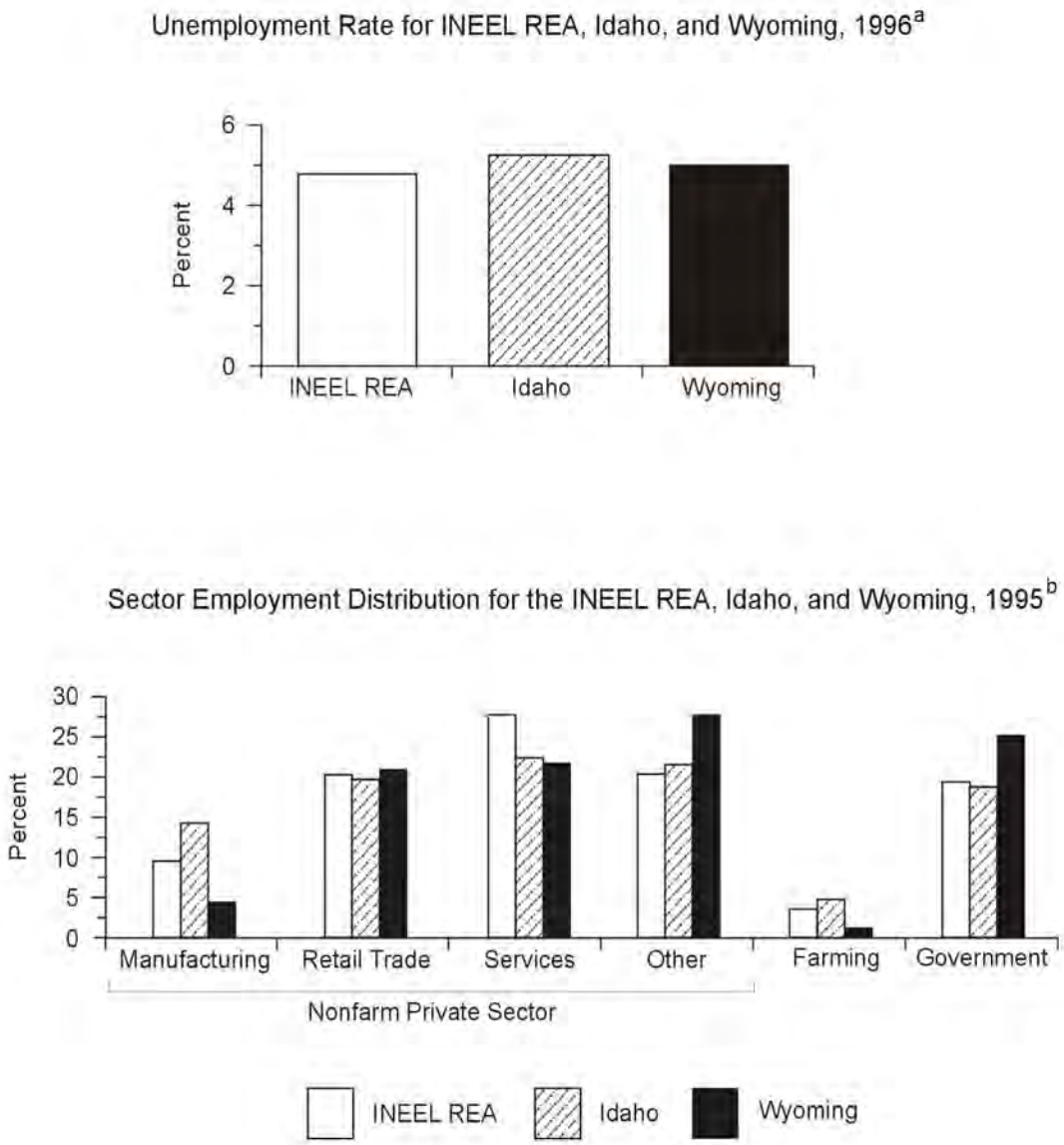
3.3.3 Socioeconomics

Statistics for employment and regional economy are presented for the REA as defined in Appendix F.9, which encompasses 13 counties around INEEL located in Idaho and Wyoming. Statistics for population, housing, community services, and local transportation are presented for the ROI, a four-county area (in Idaho) in which 94.4 percent of all INEEL employees reside as shown in Table 3–19. In 1997, INEEL employed 8,291 persons (about 5.5 percent of the REA civilian labor force) (Werner 1997).

3.3.3.1 Regional Economic Characteristics

Selected employment and regional economy statistics for the INEEL REA, Idaho, and Wyoming are summarized in Figure 3–10. Between 1990 and 1996, the civilian labor force in the REA increased 26 percent to the 1996 level of 150,403. In 1996, the annual unemployment average in the REA was 4.8 percent, which was slightly less than the annual unemployment average for Idaho (5.2 percent) and Wyoming (5 percent) (DOL 1999).

In 1995, service activities represented the largest sector of employment in the REA (27.1 percent). This was followed by retail trade (20.4 percent), and government (19.5 percent). The totals for these employment sectors



[a]DOL 1999.
[b]DOL 1997.

REA Regional economic area

Figure 3–10. Employment and Local Economy for the INEEL Regional Economic Area and the States of Idaho and Wyoming

Table 3–18. Preferred Alternatives From the WM PEIS

Waste Type	Preferred Action
TRU and mixed TRU	DOE prefers the regionalized alternative for treatment and storage of INEEL's TRU waste. Under this alternative, some TRU waste could be received from RFETS for treatment.[a]
LLW	DOE prefers to treat INEEL's LLW on the site. INEEL could be selected as one of the regional disposal sites for LLW.
Mixed LLW	DOE prefers regionalized treatment at INEEL. This includes the onsite treatment of INEEL's wastes and could include treatment of some mixed LLW generated at other sites. INEEL could be selected as one of the regional disposal sites for mixed LLW.
Hazardous	DOE prefers to continue to use commercial facilities for hazardous waste treatment.[b]

[a] ROD for TRU waste (DOE 1998a) states that "each of the Department's sites that currently has or will generate TRU waste will prepare and store its TRU waste on site. . . ."

[b] ROD for hazardous waste (DOE 1998b) selected the preferred alternative at INEEL.

Key: LLW, low-level waste; RFETS, Rocky Flats Environmental Technology Site; TRU, transuranic.

Source: DOE 1997a:summary, 97.

Table 3–19. Distribution of Employees by Place of Residence in the INEEL Region of Influence, 1997

County	Number of Employees	Total Site Employment (Percent)
Bonneville	5,553	67
Bingham	1,077	13
Bannock	615	7.4
Jefferson	583	7
ROI total	7,828	94.4

Source: Werner 1997.

in Idaho were 21.5 percent, 19.6 percent, and 18.7 percent, respectively. The totals for these employment sectors in Wyoming were 21.1 percent, 20.8 percent, and 25 percent, respectively (DOL 1997).

3.3.3.2 Population and Housing

In 1996, the ROI population totaled 213,547. Between 1990 and 1996, the ROI population increased by 10.6 percent, compared with an 17.5 percent increase in Idaho's population (DOC 1997). Between 1980 and 1990, the number of housing units in the ROI increased by 6.7 percent, compared with the 10.2 percent increase in Idaho. The total number of housing units in the ROI for 1990 was 69,760 (DOC 1994). The 1990 ROI homeowner vacancy rate was 2.1 percent compared with the Idaho's rate of 2.0 percent. The ROI renter vacancy rate was 8.3 percent compared with the Idaho's rate of 7.3 percent (DOC 1990a). Population and housing trends are displayed in Figure 3–11.

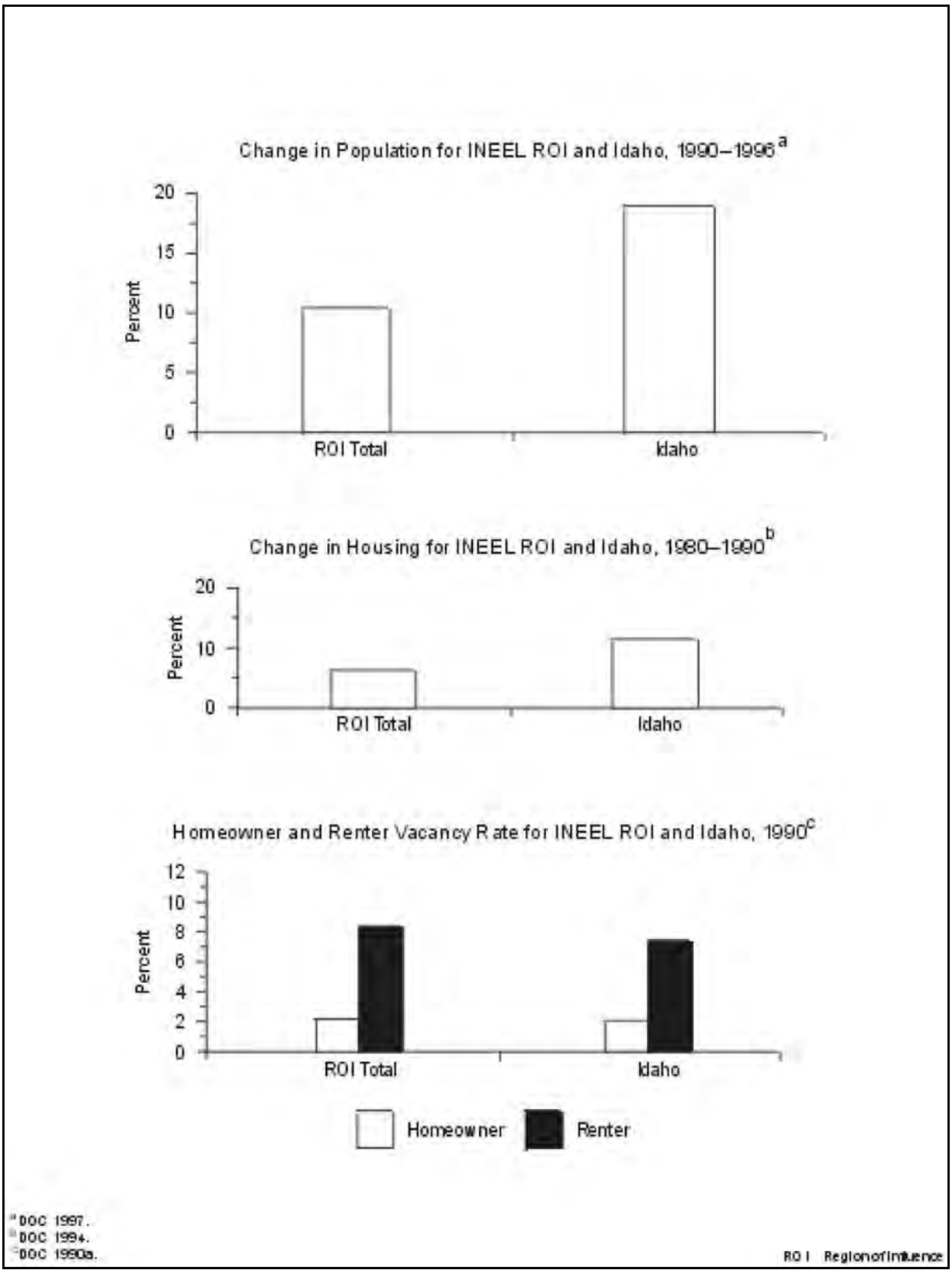


Figure 3–11. Population and Housing for the INEEL Region of Influence and the State of Idaho

3.3.3.3 Community Services

3.3.3.3.1 Education

Thirteen school districts provide public education services and facilities in the INEEL ROI. As shown in Figure 3–12, they operated at between 50 percent (Swan Valley District) and 100 percent (Shelley District) capacity in 1997. In 1997, the average student-to-teacher ratio for the INEEL ROI was 18.8:1 (Nemeth 1997a). In 1990, the average student-to-teacher ratio for Idaho was 12.8:1 (DOC 1990b, 1994).

3.3.3.3.2 Public Safety

In 1997, a total of 475 sworn police officers were serving the four-county ROI. In 1997, the average ROI officer-to-population ratio was 2.2 officers per 1,000 persons (Nemeth 1997b). This compares with the 1990 State average of 1.6 officers per 1,000 persons (DOC 1990b). In 1997, 560 paid and volunteer firefighters provided fire protection services in the INEEL ROI. The average firefighter-to-population ratio in the ROI in 1997 was 2.6 firefighters per 1,000 persons (Nemeth 1997b). This compares with the 1990 State average of 1.2 firefighters per 1,000 persons (DOC 1990b). Figure 3–13 displays the ratio of sworn police officers and firefighters to the population for the INEEL ROI.

3.3.3.3.3 Health Care

In 1996, a total of 329 physicians served the ROI. The average ROI physician-to-population ratio was 1.5 physicians per 1,000 persons as compared with a 1996 State average of 1.7 physicians per 1,000 persons (Randolph 1997). In 1997, there were five hospitals serving the four-county ROI. The hospital bed-to-population ratio averaged 4.6 hospital beds per 1,000 persons (Nemeth 1997c). This compares with the 1990 State average of 3.3 beds per 1,000 persons (DOC 1996:128). Figure 3–13 displays the ratio of hospital beds and physicians to the population for all the counties in the INEEL ROI.

3.3.3.4 Local Transportation

Vehicular access to INEEL is provided by U.S. Routes 20 and 26 to the south and State Routes 22 and 33 to the north. U.S. Routes 20 and 26 and State Routes 22 and 33 all share rights-of-way west of INEEL (see Figure 2–3).

There are two road segments that could be affected by the disposition alternatives: U.S. Route 20 from U.S. Routes 26 and 91 at Idaho Falls to U.S. Route 26 East and U.S. Routes 20 and 26 from U.S. Route 26 East to State Routes 22 and 33.

There are no current road improvement projects affecting access to INEEL; however, there are two planned road improvement projects that could affect future access to INEEL. There are plans to resurface State Route 33 from the intersection of State Routes 28 and 33 to 13 km (8.1 mi) east of this intersection. There are also plans for routine paving of segments along State Route 28 from now until the year 2000 (Bala 1997).

DOE shuttle vans provide transportation between INEEL facilities and Idaho Falls for DOE and contractor personnel. The major railroad in the ROI is the Union Pacific Railroad. The railroad's Blackfoot-to-Arco Branch provides rail service to the southern portion of INEEL. A DOE-owned spur connects the Union Pacific Railroad to INEEL by a junction at Scovill Siding. There are no navigable waterways within the ROI capable of accommodating waterborne transportation of material shipments to INEEL. Fanning Field in Idaho Falls

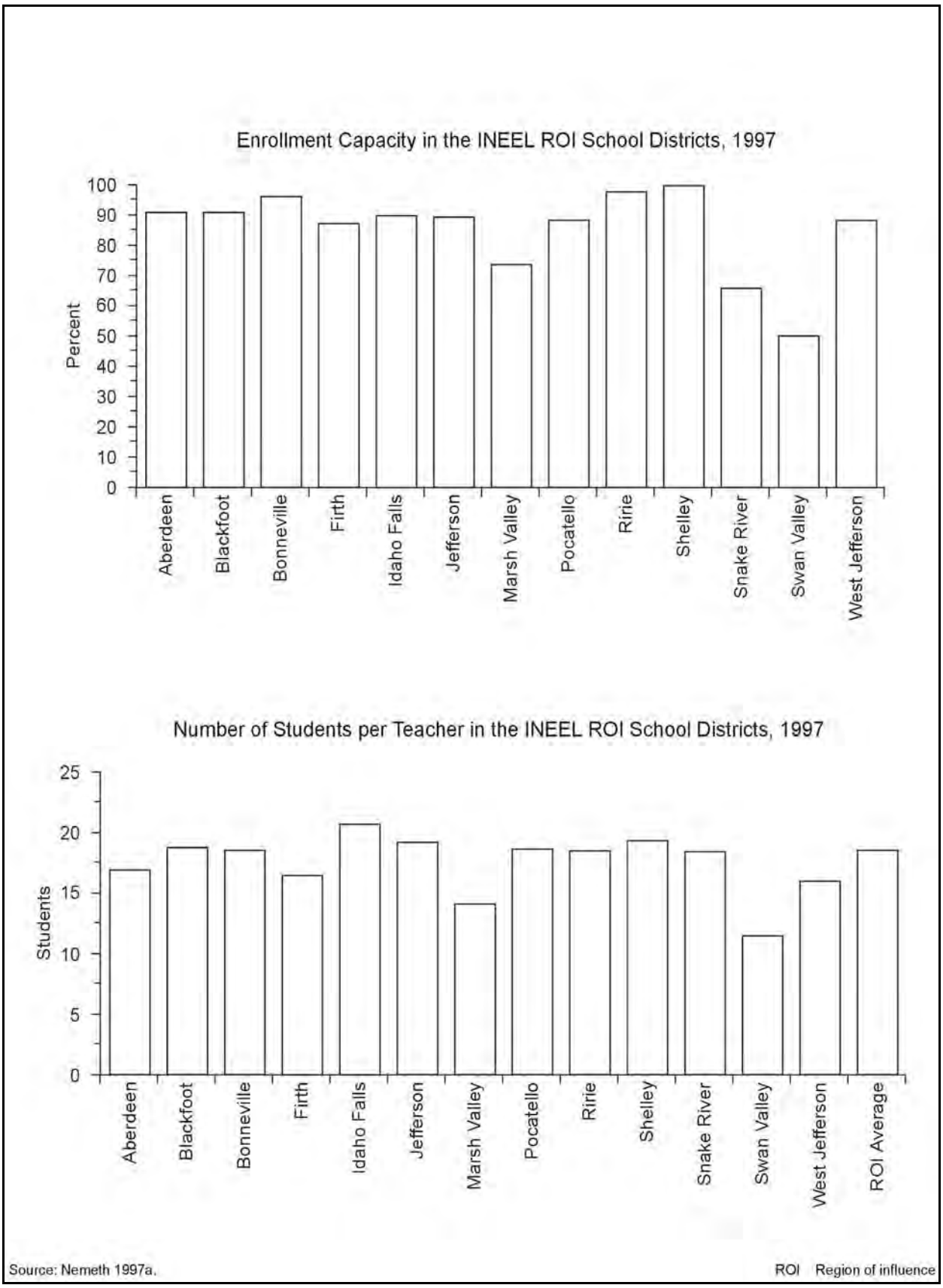


Figure 3–12. School District Characteristics for the INEEL Region of Influence

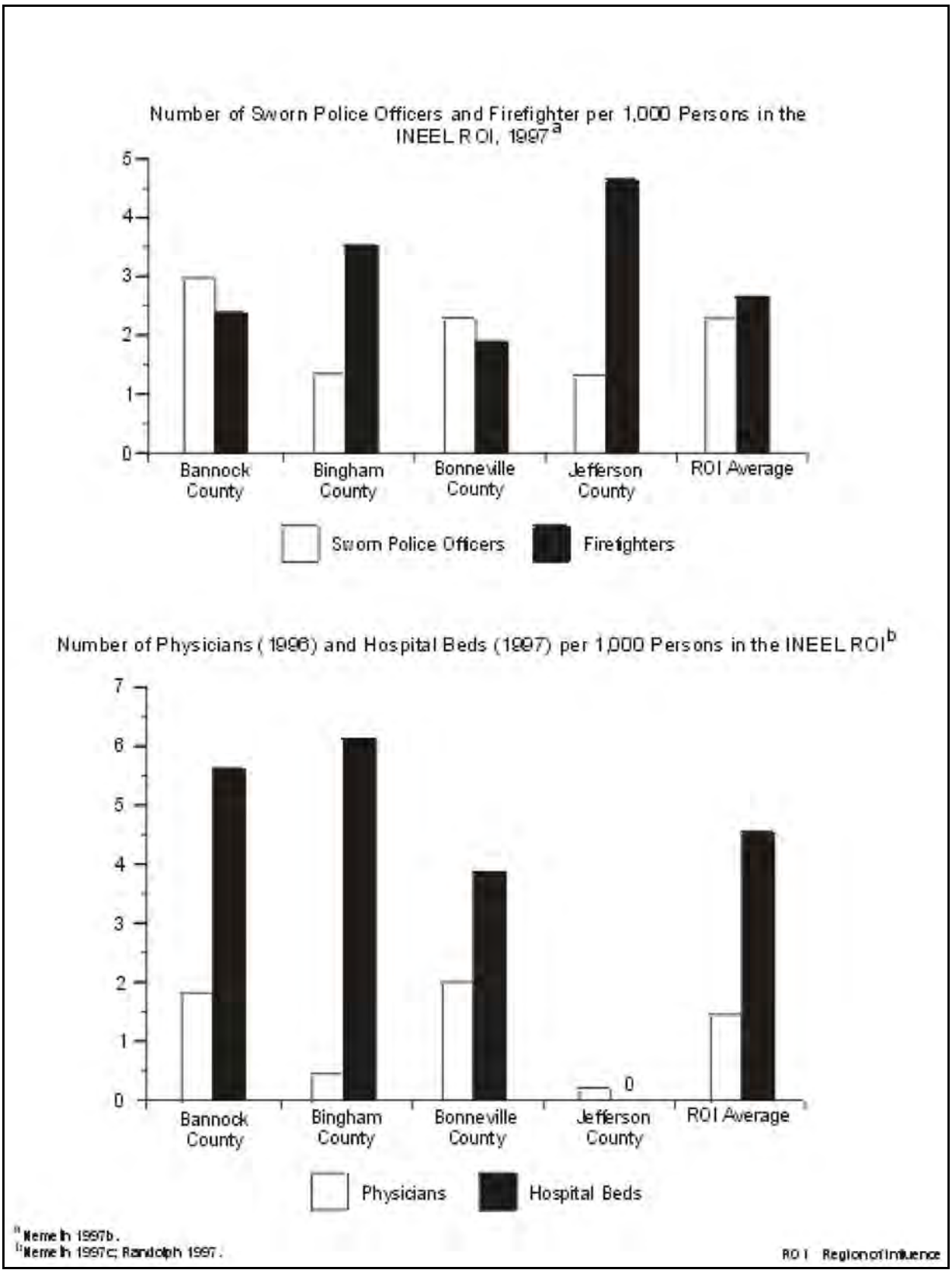


Figure 3–13. Public Safety and Health Care Characteristics for the INEEL Region of Influence

and Pocatello Municipal Airport in Pocatello provide jet air passenger and cargo service for both national and local carriers. Numerous smaller private airports are located throughout the ROI (DOE 1996a).

3.3.4 Existing Human Health Risk

Public and occupational health and safety issues include the determination of potentially adverse effects on human health that result from acute and chronic exposures to ionizing radiation and hazardous chemicals.

3.3.4.1 Radiation Exposure and Risk

3.3.4.1.1 General Site Description

Major sources and levels of background radiation exposure to individuals in the vicinity of INEEL are shown in Table 3–20. Annual background radiation doses to individuals are expected to remain constant over time. The total dose to the population, in terms of person-rem, changes as the population size changes. Background radiation doses are unrelated to INEEL operations.

Table 3–20. Sources of Radiation Exposure to Individuals in the INEEL Vicinity Unrelated to INEEL Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation[a]	
Cosmic radiation	48
External terrestrial radiation	73
Internal terrestrial/cosmogenic radiation	40
Radon in homes (inhaled)	200[b]
Other background radiation[c]	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Air travel	1
Consumer and industrial products	10
Total	426

[a] Mitchell et al. 1997:4-21.
[b] An average for the United States.
[c] NCRP 1987:11, 40, 53.

Releases of radionuclides to the environment from INEEL operations provide another source of radiation exposure to individuals in the vicinity of INEEL. Types and quantities of radionuclides released from INEEL operations in 1996 are listed in *Idaho National Engineering Laboratory Site Environmental Report for Calendar Year 1996* (Mitchell et al. 1997:7-4, 7-5). The doses to the public resulting from these releases are presented in Table 3–21. These doses fall within radiological limits per DOE Order 5400.5 (DOE 1993a:II-1–II-5) and are much lower than those of background radiation.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from INEEL operations in 1996 is estimated to be 1.6×10^{-8}. That is, the estimated probability of this person dying of cancer at some point in the future from radiation exposure associated with 1 year of INEEL operations is less than 2 in 100 million. (It takes several to many years from the time of radiation exposure for a cancer to manifest itself.)

Table 3–21. Radiation Doses to the Public From Normal INEEL Operations in 1996 (Total Effective Dose Equivalent)

	Atmospheric Releases		Liquid Releases		Total	
Members of the Public	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**
Maximally exposed individual (mrem)	10	0.031	4	0	100	0.031
Population within 80 km (person-rem)[b]	None	0.24	None	0	100	0.24
Average individual within 80 km (mrem)[c]	None	0.0020	None	0	None	0.0020

[a] The standards for individuals are given in DOE Order 5400.5 (DOE 1993a:II-1–II-5). As discussed in that order, the 10-mrem/yr limit from airborne emissions is required by the Clean Air Act, and the 4-mrem/yr limit is required by the Safe Drinking Water Act; for this SPD EIS, the 4-mrem/yr value is conservatively assumed to be the limit for the sum of doses from all liquid pathways. The total dose of 100 mrem/yr is the limit from all pathways combined. The 100-person-rem value for the population is given in proposed 10 CFR 834, as published in 58 FR 16268 (DOE 1993b:para. 834.7). If the potential total dose exceeds the 100-person-rem value, it is required that the contractor operating the facility notify DOE.

[b] About 121,500 in 1996.

[c] Obtained by dividing the population dose by the number of people living within 80 km (50 mi) of the site.

Source: Mitchell, Peterson, and Hoff 1996:4-48.

According to the same risk estimator, 1.2×10^{-4} excess fatal cancer is projected in the population living within 80 km (50 mi) of INEEL from normal operations in 1996. To place this number in perspective, it may be compared with the number of fatal cancers expected in the same population from all causes. The 1996 mortality rate associated with cancer for the entire U.S. population was 0.2 percent per year (Famighetti 1998:964). Based on this mortality rate, the number of fatal cancers expected during 1995 from all causes in the population living within 80 km (50 mi) of INEEL was 243. This expected number of fatal cancers is much higher than the 1.2×10^{-4} fatal cancer estimated from INEEL operations in 1996.

INEEL workers receive the same doses as the general public from background radiation, but they also receive an additional dose from working in facilities with nuclear materials. Table 3–22 presents the average dose to the individual worker and the cumulative dose to all workers at INEEL from operations in 1996. These doses fall within the radiological regulatory limits of 10 CFR 835 (DOE 1995a:para. 835.202). According to a risk estimator of 400 fatal cancers per 1 million person-rem among workers[4] (Appendix F.10), the number of projected fatal cancers among INEEL workers from normal operations in 1996 is 0.082.

A more detailed presentation of the radiation environment, including background exposures and radiological releases and doses, is presented in the *Idaho National Engineering Laboratory Site Environmental Report for Calendar Year 1996* (Mitchell et al. 1997). The concentrations of radioactivity in various environmental media (including air, water, and soil) in the site region (on and off the site) are also presented in that report.

3.3.4.1.2 Proposed Facility Location

External radiation doses and concentrations of gross alpha, plutonium, and americium in air have been measured in the INTEC area. In 1996, the annual average dose along the boundary of INTEC was about 180 mrem. If radiation from the "hot spots" along this boundary (e.g., the tree farm) is not included, the dose is reduced to about 150 mrem. This is about 20 mrem higher than the average dose measured at the offsite control locations. Concentrations in air of gross alpha, plutonium 239/240, and americium 241 in 1995 were 5×10^{-4} pCi/m^3, $2.1\times10^{-}$

[4] The risk estimator for workers is lower than the estimator for the public because of the absence from the workforce of the more radiosensitive infant and child age groups.

^{5} pCi/m^3, and 6×10^{-6} pCi/m^3, respectively. The gross alpha value was about three times lower than that measured at the offsite control locations, and the plutonium 239/240 and americium 241

Table 3–22. Radiation Doses to Workers From Normal INEEL Operations in 1996 (Total Effective Dose Equivalent)

	Onsite Releases and Direct Radiation	
Occupational Personnel	**Standard[a]**	**Actual**
Average radiation worker (mrem)	None[b]	125[c]
Total workers (person-rem)[d]	None	205[c]

[a] The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995a:para. 835.202). However, DOE's goal is to maintain radiological exposure as low as is reasonably achievable. It has therefore established an administrative control level of 2,000 mrem/yr (DOE 1994a:2-3); the site must make reasonable attempts to maintain individual worker doses below this level.

[b] No standard is specified for an "average radiation worker"; however, the maximum dose that this worker may receive is limited to that given in footnote "a."

[c] Does not include doses received at the Naval Reactors Facility. The impacts associated with this facility fall under the jurisdiction of the Navy as part of the Nuclear Propulsion Program.

[d] About 1,650 (badged) in 1995.

Source: Abbott, Crockett, and Moor 1997.

values were each about 50 percent higher. In 1996, the concentration of gross alpha was about 1×10^{-3} pCi/m^3 in the INTEC area. No measurements of plutonium or americium in air were reported in this area in 1996 (Mitchell, Peterson, and Hoff 1996:4-10, 4-17, 4-18, 4-28, 4-31; Mitchell et al.1997:4-4, 4-19, 4-21, 4-23).

3.3.4.2 Chemical Environment

The background chemical environment important to human health consists of the atmosphere, which may contain hazardous chemicals that can be inhaled; drinking water, which may contain hazardous chemicals that can be ingested; and other environmental media through which people may come in contact with hazardous chemicals (e.g., surface water during swimming, soil through direct contact, or food). Hazardous chemicals can cause cancer and noncancer health effects. The baseline data for assessing potential health impacts from the chemical environment are addressed in Section 3.3.1.

Effective administrative and design controls that decrease hazardous chemical releases to the environment and help achieve compliance with permit requirements (e.g., air emissions and NPDES permit requirements) contribute to minimizing health impacts on the public. The effectiveness of these controls is verified through the use of monitoring information and inspection of mitigation measures. Health impacts on the public may occur via inhalation of air containing hazardous chemicals released to the atmosphere during normal INEEL operations. Risks to public health from other possible pathways, such as ingestion of contaminated drinking water or direct exposure, are lower than those via the inhalation pathway. At INEEL, the risk to public health from water ingestion and direct exposure pathways is low because surface water is not used for drinking or as a receptor for wastewater discharges.

Baseline air emission concentrations and applicable standards for hazardous chemicals are addressed in Section 3.3.1. These baseline concentrations are estimates of the highest existing offsite concentrations and represent the highest concentrations to which members of the public could be exposed. These concentrations

are in compliance with applicable guidelines and regulations. Information on estimating the health impacts of hazardous chemicals is presented in Appendix F.10.

Exposure pathways to INEEL workers during normal operation may include the inhalation of contaminants in the workplace atmosphere and direct contact with hazardous materials. The potential for health impacts varies among facilities and workers, and available information is insufficient for a meaningful estimate of impacts. However, workers are protected from workplace hazards through appropriate training, protective equipment, monitoring, substitution, and engineering and management controls. INEEL workers are also protected by adherence to OSHA and EPA standards that limit workplace atmospheric and drinking water concentrations of potentially hazardous chemicals. Appropriate monitoring that reflects the frequency and amounts of chemicals used in the operational processes ensures that these standards are not exceeded. Additionally, DOE requires that conditions in the workplace be as free as possible from recognized hazards that cause, or are likely to cause, illness or physical harm. Therefore, workplace conditions at INEEL are substantially better than required by standards.

3.3.4.3 Health Effects Studies

Epidemiological studies were conducted on communities surrounding INEEL to determine whether there are excess cancers in the general population. Two of these are described in more detail in Appendix M.4.4 of the *Storage and Disposition PEIS* (DOE 1996a:M-233, M-234). No excess cancer mortality was reported, and although excess cancer incidence was observed, no association thereof with INEEL was established. A study by the State of Idaho completed in June 1996 found excess brain cancer incidence in the six counties surrounding INEEL, but a follow-up survey concluded that "there was nothing that clearly linked all these cases to one another or any one thing."

No occupational epidemiological studies have been completed at INEEL to date, but several worker health studies were initiated recently at INEEL and another is almost complete. Researchers from the Boston University School of Public Health in cooperation with the National Institute of Occupational Safety and Health (NIOSH), are investigating the effects of workforce restructuring (downsizing) in the nuclear weapons industry. The health of displaced workers will be studied. Under a NIOSH cooperative agreement, the epidemiologic evaluation of childhood leukemia and paternal exposure to ionizing radiation now includes INEEL as well as other DOE sites. Another study began in October 1997, *Medical Surveillance for Former Workers at INEEL*, is being carried out by a group of investigators consisting of the Oil, Chemical, and Atomic Workers International Union, Mt. Sinai School of Medicine, the University of Massachusetts at Lowell, and the Alice Hamilton College. A cohort mortality study of the workforce at INEEL being conducted by NIOSH is not expected to be released until December 1998. DOE has implemented an epidemiologic surveillance program to monitor the health of current INEEL workers. A discussion of this program is given in Appendix M.4.4 of the *Storage and Disposition PEIS* (DOE 1996a:M-233, M-234).

3.3.4.4 Accident History

DOE conducted a study, the *Idaho National Engineering Laboratory Historical Dose Evaluation* (DOE/ID-12119), to estimate the potential offsite radiation doses for the entire operating history of INEEL (DOE 1996a:3-139). Releases resulted from a variety of tests and experiments as well as a few accidents at INEEL. The study concluded that these releases contributed to the total radiation dose during test programs of the 1950s and early 1960s. The frequency and size of releases has declined since that time. There have been no serious unplanned or accidental releases of radioactivity or other hazardous substance at INEEL facilities in the last 10 years of operation.

3.3.4.5 Emergency Preparedness

Each DOE site has established an emergency management program that would be activated in the event of an accident. This program has been developed and maintained to ensure adequate response to most accident conditions and to provide response efforts for accidents not specifically considered. The emergency management program includes emergency planning, preparedness, and response.

Government agencies whose plans are interrelated with the INEEL emergency plan for action include the State of Idaho, Bingham County, Bonneville County, Butte County, Clark County, Jefferson County, the Bureau of Indian Affairs, and the Fort Hall Indian Reservation. INEEL contractors are responsible for responding to emergencies at their facilities. Specifically, the emergency action director is responsible for recognition, classification, notifications, and protective action recommendations. At INEEL, emergency preparedness resources include fire protection from onsite and offsite locations and radiological and hazardous chemical material response. Emergency response facilities include an emergency control center at each facility, at the INEEL warning communication center, and at the INEEL site emergency operations center. Seven INEEL medical facilities are also available to provide routine and emergency service.

DOE has specified actions to be taken at all DOE sites to implement lessons learned from the emergency response to an accidental explosion at Hanford in May 1997. These actions and the timeframe in which they must be implemented are presented in Section 3.2.4.5.

3.3.5 Environmental Justice

Environmental justice concerns the environmental impacts that proposed actions may have on minority and low-income populations, and whether such impacts are disproportionate to those on the population as a whole in the potentially affected area. In the case of INEEL, the potentially affected area includes only parts of central Idaho.

The potentially affected area surrounding INTEC is defined by a circle with an 80-km (50-mi) radius centered at FPF (lat. 43E34'12.5" N, long. 112E55' 55.4" W). The total population residing within that area in 1990 was 119,138. The proportion of the population there that was considered minority was 9.9 percent. The same census data show that the percentage of minorities for the contiguous United States was 24.1, and for the State of Idaho, 7.8 (DOC 1992).

Figure 3–14 illustrates the racial and ethnic composition of the minority population in the potentially affected area centered at FPF. At the time of the 1990 census, Hispanics and Native Americans were the largest minority groups within that area, constituting 6 percent and 2.6 percent of the total population, respectively, during the 1990 census. Asians constituted about 1 percent, and blacks, about 0.3 percent (DOC 1992).

A breakdown of incomes in the potentially affected area is also available from the 1990 census data (DOC 1992). At that time, the poverty threshold was $9,981 for a family of three with one related child under 18 years of age. A total of 14,386 persons (12.2 percent of the total population) residing within the potentially affected area around INTEC reported incomes below that threshold. Data obtained during the 1990 census also show that of the total population of the contiguous United States, 13.1 percent reported incomes below the poverty threshold, and that Idaho reported 13.3 percent.

3.3.6 Geology and Soils

Geologic resources are consolidated or unconsolidated earth materials, including ore and aggregate materials, fossil fuels, and significant landforms. Soil resources are the loose surface materials of the earth in which plants grow, usually consisting of disintegrated rock, organic matter, and soluble salts.

3.3.6.1 General Site Description

The upper 1 to 2 km (0.6 to 1.2 mi) of the crust beneath INEEL is composed of interlayered basalt and sediment. The sediments are composed of fine-grained silts that were deposited by wind; silts, sands, and

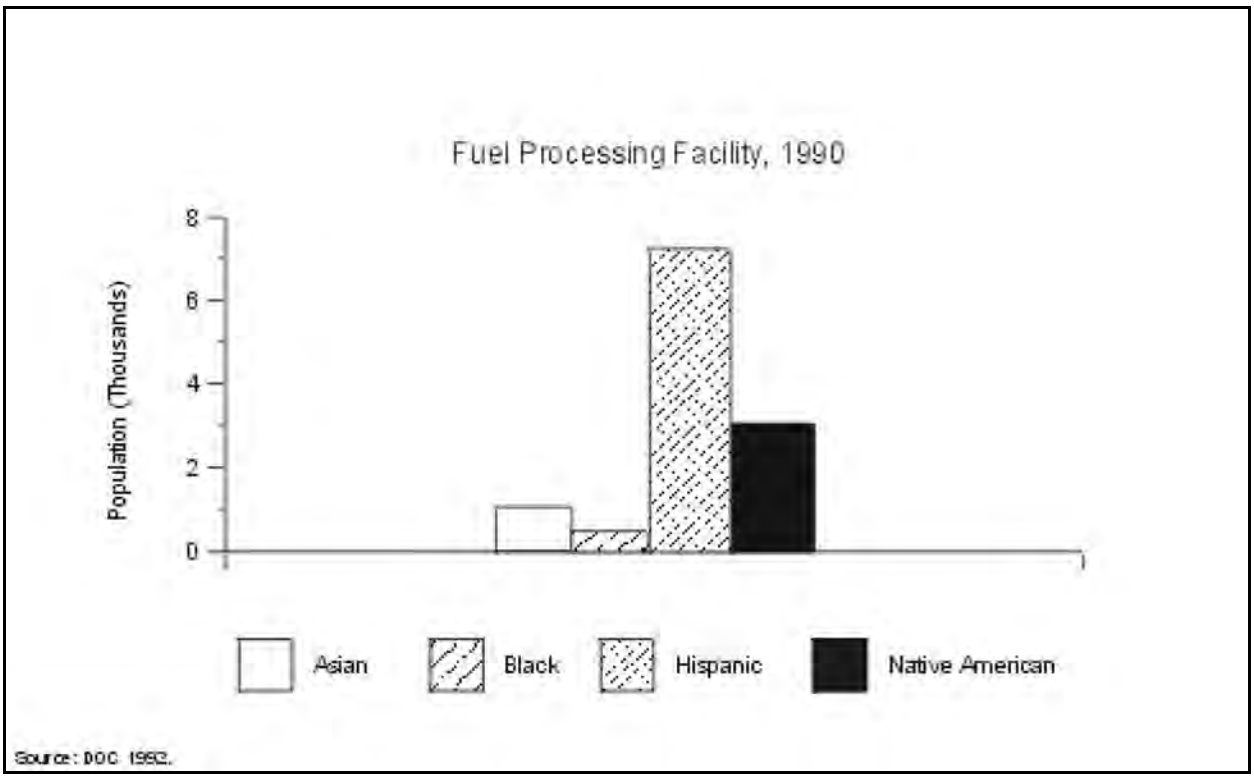


Figure 3–14. Racial and Ethnic Composition of Minorities Around the Fuel Processing Facility at INEEL

gravels deposited by streams; and clays, silts, and sands deposited in lakes. Rhyolitic (granite-like) volcanic rocks of unknown thickness lie beneath the basalt sediment sequence. The rhyolitic volcanic rocks were erupted between 6.5 and 4.3 million years ago (Barghusen and Feit 1995:2.3-17).

Within INEEL, economically viable sand, gravel, and pumice resources have been identified. Several quarries have supplied these materials to various onsite construction projects (DOE 1996a:3-121). Geothermal resources are potentially available in parts of the Eastern Snake River Plain, but neither of two boreholes—INEEL–1 (drilled to a depth of 3,048 m [10,000 ft] to explore for geothermal resources 8 km [5 mi] north of INTEC) and WO–2 (drilled to a depth of 1,524 km [5,000 ft] 4.8 km [3 mi] east of INTEC)—encountered rocks with significant geothermal potential (Abbott, Crockett, and Moor 1997:11).

There is no potential for sinkholes or unstable conditions at INTEC. Lava tubes, which could have adverse effects similar to those of sinkholes, do occur in the INEEL area, but extensive drilling and foundation excavation in the INTEC area over the past few decades has revealed no lava tubes beneath the site. Drilling for foundation engineering investigations at FPF has also revealed no lava tubes (Abbott, Crockett, and Moor 1997:10).

The Arco Segment of the Lost River Fault and the Howe Segment of the Lemhi Fault terminate about 30 km (19 mi) from the INEEL boundary and are considered capable. A capable fault is one that has had movement at or near the ground surface at least once within the past 35,000 years or recurrent movement within the past 500,000 years (DOE 1996a:3-121).

According to the Uniform Building Code, INEEL, located on the Eastern Snake River Plain, is in Seismic Zone 2B, meaning that moderate damage could occur as a result of an earthquake. Historic and recent seismic data cataloged by NOAA, the National Earthquake Information Center, the University of Utah, and the INEEL Seismic Network indicate that earthquakes in the region occur primarily in the Intermountain Seismic Belt and the

Centennial Tectonic Belt. The seismic characteristics of the Eastern Snake River Plain and the adjacent Basin and Range Province are different; the plain has historically experienced few and small earthquakes. No earthquakes have been recorded within about 48 km (30 mi) of the site (DOE 1996a:3-121). An earthquake with a maximum horizontal acceleration of 0.15g is calculated to have an annual probability of occurrence of 1 in 5,000 at a central INEEL location (Barghusen and Feit 1995:2.3-17).

The largest historic earthquake near INEEL took place in 1983 about 107 km (66 mi) to the northwest, near Borah Peak in the Lost River Range. The earthquake had a surface wave magnitude of 7.3 with a resulting peak horizontal ground acceleration of 0.022g to 0.078g at INEEL (Jackson 1985:385). An earthquake of greater than 5.5 magnitude can be expected about every 10 years within a 322-km (200-mi) radius of INEEL (DOE 1996a:3-121).

Volcanic hazards at INEEL can come from sources inside or outside the Snake River Plain. Most of the basaltic volcanic activity occurred at the Craters of the Moon National Monument 20 km (12 mi) southwest of INEEL between 4 million and 2,100 years ago. The probability of volcanic activity affecting facilities at INEEL is very low. In fact, the Volcanism Working Group for the *Storage and Disposition PEIS* (DOE 1996a) estimated that the conditional probability of basaltic volcanism affecting a south-central INEEL location is at most once per 40,000 years. The rhyolite domes along the Axial Volcanic Zone formed between 1.2 million and 300,000 years ago and have a recurrence interval of about 200,000 years. Therefore, the probability of future dome formation affecting INEEL facilities is also very low (DOE 1996a:3-121–3-123).

INEEL soils are derived from volcanic and clastic rocks from nearby highlands. In the southern part of the site, the soils are gravelly to rocky and generally shallow. The northern portion is composed mostly of unconsolidated clay, silt, and sand. No prime farmland lies within the INEEL boundaries. Generally, the soils are acceptable for standard construction techniques (DOE 1996a:3-107, 3-123). More detailed descriptions of the geology and the soil conditions at INEEL are included in the *Storage and Disposition PEIS* (DOE 1996a:3-121–3-123).

3.3.6.2 Proposed Facility Location

The nearest capable fault is in the South Creek Segment of the Lemhi Fault, about 26 km (16 mi) north of INTEC. All soil near INTEC was originally fine loam over a sand or sand-cobble mix deposited in the floodplain of the Big Lost River. However, all soils within the INTEC fences have been disturbed. The soils beneath the INTEC area are not subject to liquefaction because of the high content of gravel mixed with the alluvial sands and silts. In addition, the sediments are not saturated (Abbott, Crockett, and Moor 1997:10).

3.3.7 Water Resources

3.3.7.1 Surface Water

Surface water includes marine or freshwater bodies that occur above the ground surface, including rivers, streams, lakes, ponds, rainwater catchments, embayments, and oceans.

3.3.7.1.1 General Site Description

Three intermittent streams drain the mountains near INEEL: Big Lost River, Little Lost River, and Birch Creek. These intermittent streams carry snowmelt in the spring and are usually dry by midsummer. Several years can pass before any offsite waters enter DOE property. Big Lost River and Birch Creek are the only streams that regularly flow onto INEEL. Little Lost River is usually dry by the time it reaches the site because of upstream use of the flow for irrigation. None of the rivers flow from the site to offsite areas. Big Lost River discharges

into the Big Lost River sinks, and there is no surface discharge from these sinks (Barghusen and Feit 1995:2.3-2, 2.3-21; DOE 1996a:3-115).

Big Lost River has been classified by the State of Idaho for domestic and agricultural use, cold water biota development, salmon spawning, primary and secondary recreation, and other special resource uses. Surface waters, however, are not used for drinking water on the site, nor is any wastewater discharged directly to them. Moreover, there are no surface water rights issues at INEEL, because INEEL facilities currently neither discharge directly to, nor make withdrawals from, these water bodies. None of the rivers have been classified as a Wild and Scenic River. Flood diversion facilities constructed in 1958 secured INEEL from the 300-year flood (DOE 1995b:4.8-1–4.8-5; 1996a:3-115).

3.3.7.1.2 Proposed Facility Location

There are no named streams within INTEC—only unnamed drainage ditches to carry storm flows away from buildings and facilities at the site. Outside INTEC, the only surface water is a stretch of Big Lost River. This is an intermittent stream that flows only after rainfall events or in the spring, when it carries snowmelt from the nearby mountains (Abbott, Crockett, and Moor 1997:5). A summary of water quality data for Big Lost River in the vicinity of INEEL is provided in the *Storage and Disposition PEIS* and shows no unusual concentrations of the parameters analyzed (DOE 1996a:3-115–3-117).

Flooding scenarios that involve the failure of McKay Dam and high flows in the Big Lost River have been evaluated. The results indicate that in the event of a failure of this dam, flooding would occur at INTEC and other facilities at INEEL. The low velocity and shallow depth of the water, however, would not pose a threat of structural damage to the facilities. Localized flooding can occur due to rapid snowmelt and frozen ground conditions, but none has been reported at INTEC (Barghusen and Feit 1995:2.3-21, 2.3-23). A study of the 100-year flood has been completed by the U.S. Geological Survey. The study indicates that the only INEEL facility that would be flooded is the northern part of INTEC and its entrance road. The depth of water over Lincoln Boulevard near its intersection with Monroe Boulevard is estimated at 0.12 to 0.70 m (0.4 to 2.3 ft) (Berenbrock and Kjelstrom 1998:11, 12). The 500-year flood has not been studied (Abbott, Crockett, and Moor 1997:7). However, the probable maximum flood has been calculated, as shown on Figure 3–15 (DOE 1997b).

Purgeable organics such as 1,1-dichloroethylene, toluene, and 1,1,1-trichloroethane have been detected in wells near INTEC. Metals, including arsenic, barium, lead, mercury, selenium, and silver, were also found in samples from wells. Inorganic chemicals such as sodium and chloride have been found in these samples. Maximum values for tritium in samples from three wells averaged 23,700 pCi/l; and maximum strontium 90 values averaged 53 pCi/l (Abbott, Crockett, and Moor 1997:11, 12). These values exceed the drinking water standards for tritium and strontium 90 of 20,000 pCi/l and 8 pCi/l, respectively. The results of groundwater modeling and baseline risk assessment will be used to identify the release sites requiring further evaluation. If necessary, removal actions may be taken to prevent further migration of contaminants to the Snake River Plain Aquifer (Mitchell et al. 1997:3-5). Sanitary waste with no potential for radioactive contamination is treated in the INTEC Sewage Treatment Facility (CPP–615). This facility has a Wastewater Land Application Permit from the State of Idaho and does not discharge to surface waters, but allows land application of treated sanitary sewage. The only effluent criteria associated with flows to the sewage ponds are the amounts of total suspended solids and nitrogen released to the ponds. All compliance points for the ponds are in wells downgradient from the ponds, and the maximum allowable concentrations are similar to those in the National Primary and Secondary Drinking Water Standards (Abbott, Crockett, and Moor 1997:9, 10). Drainage from corridors, roof and floor drains, and condensate from process heating, and heating, ventilation, and air

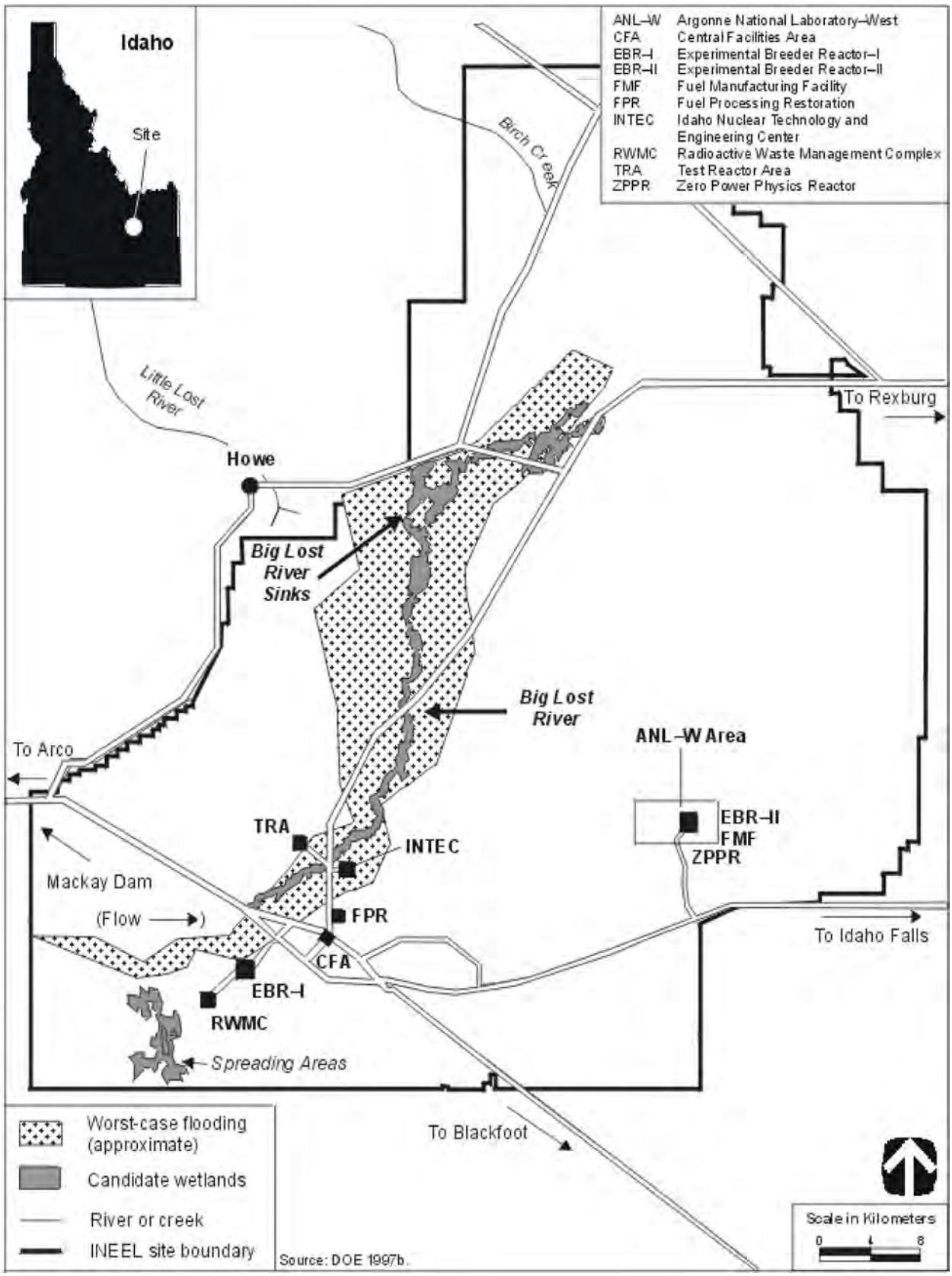


Figure 3–15. Flood Area for the Probable Maximum Flood–Induced Overtopping Failure of the Mackay Dam

conditioning systems with very low potential for radiological contamination are routed to the INTEC service waste system. Service Waste Percolation Pond 1 (SWP–1), southeast of Building CPP–603, has a surface area about of 18,400 m^2 (198,000 ft^2) and is 4.9 m (16 ft) deep. Service Waste Pond 2, immediately west of SWP–1, has a surface area of 46 m^2 (495 ft^2). Both ponds are fenced to keep out wildlife (Abbott, Crockett, and Moor 1997:9).

Consideration is being given to relocating the percolation pond to reduce the potential impacts on a contaminated perched water zone. Consideration is also being given to obtaining an NPDES permit to allow direct discharge into Big Lost River. These actions are independent of the proposed action analyzed in this SPD EIS and would be preceded by appropriate NEPA documentation (Abbott, Crockett, and Moor 1997:10).

3.3.7.2 Groundwater

Aquifers are classified by Federal and State authorities according to use and quality. The Federal classifications include Class I, II, and III groundwater. Class I groundwater is either the sole source of drinking water or is ecologically vital. Class IIA and IIB are current or potential sources of drinking water (or other beneficial use), respectively. Class III is not considered a potential source of drinking water and is of limited beneficial use.

3.3.7.2.1 General Site Description

The Snake River Plain aquifer is classified by EPA as a Class I sole source aquifer. It lies below the INEEL site and covers about 24,860 km^2 (9,600 mi^2) in southeastern Idaho. This aquifer serves as the primary drinking water source in the Snake River Basin and is believed to contain 1.2 quadrillion to 2.5 quadrillion l (317 trillion to 660 trillion gal) of water. Recharge of the groundwater comes from Henry's Fork of the Snake River, Big Lost River, Little Lost River, and Birch Creek. Rainfall and snowmelt also contribute to the aquifer's recharge (DOE 1996a:3-115–3-117).

Groundwater generally flows laterally at a rate of 1.5 to 6.1 m/day (5 to 20 ft/day). It emerges in springs along the Snake River from Milner to Bliss, Idaho. Depth to the groundwater table ranges from about 60 m (200 ft) below ground in the northeast corner of the site to about 300 m (1,000 ft) in the southeast corner (DOE 1995b:4.8-5; 1996a:3-117).

Perched water tables occur below the site. These perched water tables tend to slow the migration of pollutants that might otherwise reach the Snake River Plain aquifer (DOE 1996a:3-117).

INEEL has a large network of monitoring wells—about 120 in the Snake River Plain aquifer and another 100 drilled in the perched zone. The wells are used for monitoring to determine the compliance of specific actions with requirements of RCRA and CERCLA, as well as routine monitoring to evaluate the quality of the water in the aquifer. The aquifer is known to have been contaminated with tritium; however, the concentration dropped 93 percent between 1961 and 1994, possibly due to the elimination of tritium disposal, radioactive decay, and dispersion throughout the aquifer. Other known contaminants include cesium 137, iodine 129, strontium 90, and nonradioactive compounds such as TCE. Components of nonradioactive waste entered the aquifer as a result of past waste disposal practices. Elimination of groundwater injection exemplifies a change in disposal practices that has reduced the amount of these constituents in the groundwater (DOE 1996a:3-117, 3-119).

From 1982 to 1985, INEEL used about 7.9 billion l/yr (2.1 billion gal/yr) from the Snake River Plain aquifer, the only source of water at INEEL. This represents less than 0.3 percent of the groundwater withdrawn from that aquifer. DOE holds a Federal Reserved Water Right for the INEEL site that permits a pumping capacity of approximately 2.3 m^3/s (80 ft^3/s) with a maximum water consumption of 43 billion l/yr (11 billion gal/yr). INEEL's priority on water rights dates back to its establishment in 1950 (DOE 1996a:3-119).

3.3.7.2.2 Proposed Facility Location

Generally, the groundwater near INEEL, including INTEC, flows from the north and northeast to the south and southwest (Barghusen and Feit 1995:2.3-23).

Water for the INTEC is supplied by two deep wells located in the northwest corner of the INTEC. The wells are about 180 m (590 ft) deep and about 36 cm (14 in) in diameter (Abbott, Crockett, and Moor 1997:9). These wells can each supply up to approximately 11,000 1/min (3,000 gal/min) of water for use in the INTEC fire water, potable water, treated water, and demineralized water systems (Werner 1997). Pumping has little effect on the level of the groundwater, because the withdrawals are so small relative to the volume of water in the aquifer and the amount of recharge available. The production wells at INTEC have historically contained measurable quantities of strontium 90. In 1992, the highest concentration was 1 pCi/l, compared with the EPA maximum Primary Drinking Water Standard of 8 pCi/l. Sampling has yielded similar results over time (Barghusen and Feit 1995:2.3-23–2.3-29).

3.3.8 Ecological Resources

Ecological resources are defined as terrestrial (predominantly land) and aquatic (predominantly water) ecosystems characterized by the presence of native and naturalized plants and animals. For the purposes of this SPD EIS, those ecosystems are differentiated in terms of habitat support of threatened, endangered, and other special-status species—that is, “nonsensitive” versus “sensitive” habitat.

3.3.8.1 Nonsensitive Habitat

Nonsensitive habitat comprises those terrestrial and aquatic areas of the site that typically support the region’s major plant and animal species.

3.3.8.1.1 General Site Description

INEEL is dominated by fairly undisturbed shrub-steppe vegetation that provides important habitat for nearly 400 plant species and numerous animal species native to the region’s cool desert environment. Facilities and operating areas occupy 2 percent of INEEL, and approximately 60 percent of the surrounding area is used by sheep and cattle for grazing (DOE 1996a:3-125). Six broad vegetative categories representing nearly 20 distinct habitats have been identified on the INEEL site. Approximately 90 percent of INEEL is covered by shrub-steppe vegetation, which is dominated by big sagebrush, saltbrush, rabbitbrush, and native grasses, and contains a diversity of forbs (Figure 3–16) (DOE 1997b:44).

The large, undeveloped tracts of land used by INEEL for safety and security buffers also provide important habitat for plants and animals. Because INEEL is at the mouth of several mountain valleys, large numbers of mammals and migratory birds of prey are funneled onto the site. During some winters, thousands of pronghorn antelope and sage grouse can be found in the low and big sagebrush communities in the northern region. The juniper communities in the northwestern and southwestern regions provide important nesting areas for raptors and songbirds (DOE 1996a:3-125; 1997b:42).

Animal species found at INEEL include 2 species of amphibians, more than 225 species of birds, 6 species of fish, 44 species of mammals, and 11 species of reptiles (Reynolds 1999). Commonly observed animals include the short-horned lizard, gopher snake, sage sparrow, Townsend’s ground squirrel, and black-tailed

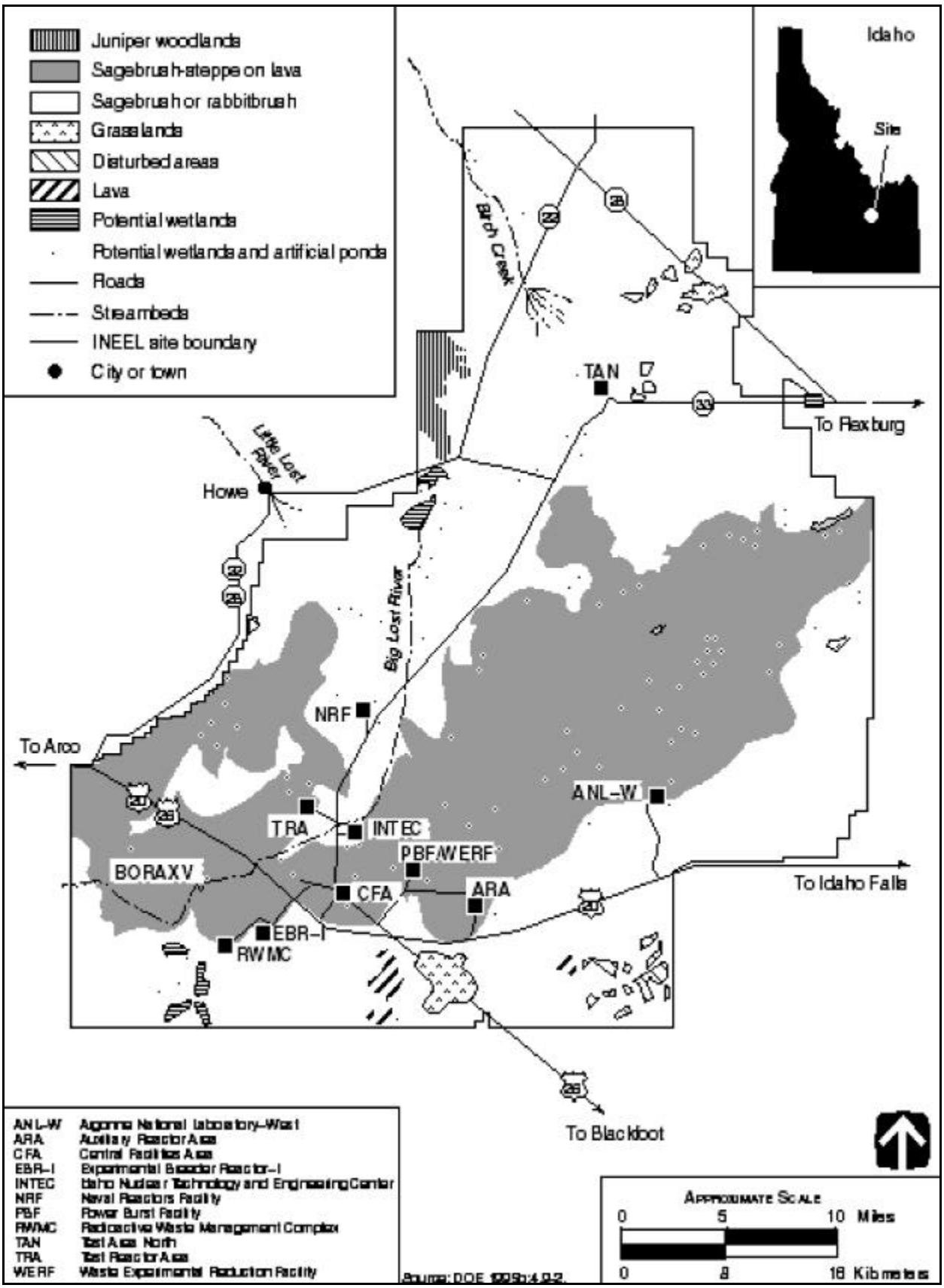


Figure 3–16. Generalized Habitat Types at INEEL

jackrabbit (DOE 1996a:3-125). Important game animals that reside at INEEL include sage grouse, mule deer, and elk. Roughly 30 percent of Idaho's pronghorn antelope population uses INEEL as winter range. Hunting of pronghorn antelope and elk is permitted under controlled conditions to reduce damage to crops on private lands and is restricted to within about 0.8 km (0.5 mi) inside the property boundary of INEEL (DOE 1995b:4.2-1; 1996a:3-125). Predators observed on the INEEL site include bobcats, mountain lions, badgers, and coyotes (DOE 1997b:42).

Aquatic habitat is limited to three intermittent streams (Big Lost River, Little Lost River, and Birch Creek) that drain into four sinks in the north-central portion of INEEL and to a number of liquid-waste disposal ponds. When water from the Big Lost River does flow on the site, several species of fish are observed: brook trout, rainbow trout, mountain whitefish, speckled dace, shorthead sculpin, and kokanee salmon (DOE 1996a:3-125).

3.3.8.1.2 Proposed Facility Location

INTEC is an industrial facility with most land surfaces being disturbed, bare ground (85 percent) or facilities and pavement (13 percent). Natural areas are limited to those areas outside the fenced boundary, mainly sagebrush-steppe on lava, sagebrush, rabbitbrush, and grasslands. The onsite areas are not vegetated except for grasses, shrubs, and trees associated with lawns and landscaping, and weedy annuals and grasses commonly found in disturbed areas. These areas, as well as buildings and wastewater treatment ponds, are used by a number of species. Accordingly, animal species potentially present in the immediate area surrounding FPF are primarily limited to those species adapted to disturbed industrial areas, such as small mammals (e.g., mice, rabbits, and ground squirrels), birds (e.g., sparrows and finches), and reptiles (e.g., lizards). A comprehensive list of species potentially present within INTEC and the surrounding area is presented in the Waste Area Grouping 3 (WAG3) risk assessment work plan developed by Rodriguez et al. (1997) (Werner 1997:WAG3 Report Summary). There are no known aquatic species or habitat within the immediate environs of FPF (Abbott, Crockett, and Moor 1997:15).

3.3.8.2 Sensitive Habitat

Sensitive habitat comprises those terrestrial and aquatic (including designated wetlands) areas of the site that support threatened and endangered, State-protected, and other special-status plant and animal species.[5]

3.3.8.2.1 General Site Description

Nearly all INEEL wetland habitats, with the exception of playa wetlands, are impacted by water management and diversion activities on and off the site. Agricultural demands and flood control diversions, combined with low regional precipitation, prevent permanent water in the Big Lost River and Birch Creek drainages, thus limiting the "classic" wetlands to inordinately wet periods. The Big Lost River and Birch Creek drainages support unique riparian habitats that are important to a diversity of desert animals and breeding birds (DOE 1997b:43, 44). Riparian vegetation, primarily willow and cottonwood, provides nesting habitat for hawks, owls, and songbirds (DOE 1996a:3-125). The only permanent source of surface water on INEEL is manmade ponds where flows are sustained through facility operations. These ponds represent important habitat on INEEL that would not exist otherwise (DOE 1997b:43, 44).

Nineteen threatened, endangered, and other special-status species listed by the Federal Government or the State of Idaho may be found in the vicinity of INEEL, as shown in Table 3.4.6–1 in the *Storage and Disposition PEIS* (DOE 1996a:3-128).

[5] The Federal Government defines threatened and endangered species in the Endangered Species Act, and wetlands in 33 CFR 328.3.

3.3.8.2.2 Proposed Facility Location

There are no known wetlands within the immediate environs of INTEC (Abbott, Crockett, and Moor 1997:15). Manmade percolation ponds that receive permitted facility effluent and hold water intermittently are known to support the boreal chorus frog and aquatic invertebrates when water is present. Several wetland plant species have been identified in percolation ponds south of INTEC (Werner 1997:WAG3 Report Summary). INTEC does not provide critical habitat for any of the 14 threatened, endangered, or other special-status species listed in Table 3–23 that may occur in the area (Werner 1997:WAG3 Report Summary).

Table 3–23. Threatened and Endangered Species, Species of Concern, and Sensitive Species Occurring or Potentially Occurring in Areas Surrounding INTEC

Common Name	Scientific Name	Federal Status	State Status
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Endangered
Black tern	*Chlidonias niger*	Species of Concern	Not listed
Burrowing owl	*Athene cunicularia*	Species of Concern	Not listed
Ferruginous hawk	*Buteo regalis*	Species of Concern	Protected
Loggerhead shrike	*Lanius ludovicianus*	Species of Concern	Not listed
Northern goshawk	*Accipiter gentilis*	Species of Concern	Sensitive
Peregrine falcon	*Falco peregrinus*	Endangered	Endangered
Trumpeter swan	*Cygnus buccinator*	Species of Concern	Species of Special Concern
White-faced ibis	*Plegadis chihi*	Species of Concern	Not listed
Mammals			
Long-eared myotis	*Myotis evotis*	Species of Concern	Not listed
Pygmy rabbit	*Brachylagus (Sylvilagus) idahoensis*	Species of Concern	Species of Special Concern
Small-footed myotis	*Myotis subulatus*	Species of Concern	Not listed
Townsend's western big-eared bat	*Plecotus townsendii*	Species of Concern	Species of Special Concern
Plants			
Lemhi milkvetch	*Astragalus aquilonius*	Not listed	Global (Rare) Priority 3
Sepal-tooth dodder	*Cuscuta denticulata*	Not listed	State Priority 1
Spreading gilia	*Ipomopsis polycladon*	Not listed	State Priority 2
Unknown	*Catapyrenium congestum*	Not listed	Sensitive
Winged-seed evening primrose	*Camissonia pterosperma*	Not listed	Sensitive
Reptiles			
Northern sagebrush lizard	*Sceloporus graciosus*	Species of Concern	Not listed

Key: INTEC, Idaho Nuclear Technology and Engineering Center.
Source: Ruesink 1998; Stephens 1998, 1999; Werner 1997:WAG3 Report Summary.

The northern sagebrush lizard and three bat species of special concern are believed to have the greatest potential for occurrence within the environs of INTEC. This is based on a survey conducted in 1996 to evaluate the presence of suitable habitat for threatened and endangered species and species of concern. Bat usage of the area is likely to be limited to aerial hunting activities around the INTEC sewage disposal and percolation ponds. The sewage disposal and percolation ponds are routinely used by wildlife, and these facilities and a portion of the Big

Lost River are within 1 km (0.6 mi) of FPF. The extent of potential usage of facility habitats by the northern sagebrush lizard is unknown (Werner 1997:WAG3 Report Summary).

3.3.9 Cultural and Paleontological Resources

Cultural resources are human imprints on the landscape and are defined and protected by a series of Federal laws, regulations, and guidelines. INEEL has a well-documented record of cultural and paleontological resources. Guidance for the identification, evaluation, recordation, curation, and management of these resources is included in the *Final Draft Idaho National Engineering Laboratory Management Plan for Cultural Resources* (Miller 1995). There have been 1,506 cultural resource sites and isolated finds identified, including 688 prehistoric sites, 38 historic sites, 753 prehistoric isolates, and 27 historic isolates (DOE 1996a:3-129). While many significant cultural resources have been identified, only about 4 percent of the area within the INEEL site has been surveyed (DOE 1996a:3-129). Most surveys have been conducted near major facility areas in conjunction with major modification, demolition, or abandonment of site facilities.

Cultural sites are often occupied continuously or intermittently over substantial time spans. For this reason, a single location (sites) may contain evidence of use during both historic and prehistoric periods. In the discussions that follow, the numbers of prehistoric and historic resources are presented; the sum of these resources may be greater than the total number of sites reported due to this dual-use history at sites. Therefore, where the total number of sites reported is less than the sum of prehistoric and historic sites certain locations were used during both periods.

3.3.9.1 Prehistoric Resources

Prehistoric resources are physical properties that remain from human activities that predate written records.

3.3.9.1.1 General Site Description

Prehistoric resources identified at INEEL are generally reflective of Native American hunting and gathering activities. Resources appear to be concentrated along the Big Lost River and Birch Creek, atop buttes, and within craters or caves. They include residential bases, campsites, caves, hunting blinds, rock alignments, and limited-activity locations such as lithic and ceramic scatters, hearths, and concentrations of fire-affected rock. Most sites have not been formally evaluated for nomination to the National Register, but are considered to be potentially eligible. Given the rather high density of prehistoric sites at INEEL, additional sites are likely to be identified as surveys continue (DOE 1996a:3-129).

3.3.9.1.2 Proposed Facility Location

The INTEC area has been subject to a number of archaeological survey projects over the past two decades. Most of these investigations have been concentrated around the perimeter of the site and along existing roadways or power line corridors. Survey coverage in the area around Building 691 is complete. The inventory of identified resources includes campsites and isolated artifacts reflecting Native American hunting and gathering activities, as well as resources reflective of more recent attempts at homesteading and agriculture (Abbott, Crockett, and Moor 1997:16).

Most of the area near FPF has been surveyed, except for a small area east of the railroad tracks. Six archaeological resources have been identified within the surveyed area. Most of the sites are prehistoric and historic isolates that are not likely to yield additional information and are therefore not likely to be potentially eligible for National Register nomination (Abbott, Crockett, and Moor 1997:16).

3.3.9.2 Historic Resources

Historic resources consist of physical properties that postdate the existence of written records. In the United States, historic resources are generally considered to be those that date no earlier than 1492.

3.3.9.2.1 General Site Description

Thirty-eight historic sites and 27 historic isolates have been identified at INEEL. These resources are representative of European-American activities, including fur trapping and trading, immigration, transportation, mining, agriculture, and homesteading, as well as more recent military and scientific/engineering R&D activities. Examples of historic resources include Goodale's Cutoff (a spur of the Oregon Trail), remnants of homesteads and ranches, irrigation canals, and a variety of structures from the World War II era. Experimental Breeder Reactor I, the first reactor to achieve a self-sustaining chain reaction using plutonium instead of uranium as the principal fuel component, is listed on the National Register and is designated a National Historic Landmark. Many other INEEL structures built between 1949 and 1974 are considered eligible for the National Register because of their exceptional scientific and engineering significance and their major role in the development of nuclear science and engineering since World War II. According to current studies, additional historic sites are likely to exist in unsurveyed portions of INEEL (DOE 1996a:3-129).

3.3.9.2.2 Proposed Facility Location

In the study area near INTEC are two historic sites, a homestead and nearby trash dump, that may be eligible for nomination to the National Register. These sites are potential sources of information on Carey Land Act–sponsored agricultural activities in the region (Abbott, Crockett, and Moor 1997:16).

A historic resource inventory of all buildings within INTEC is being conducted and will likely identify additional historic structures built between 1949 and 1974. Because it was constructed after 1974, FPF is not considered to be historic (Abbott, Crockett, and Moor 1997:16).

3.3.9.3 Native American Resources

Native American resources are sites, areas, and materials important to Native Americans for religious or heritage reasons. In addition, cultural values are placed on natural resources such as plants, which have multiple purposes within various Native American groups. Of primary concern are concepts of sacred space that create the potential for land-use conflicts.

3.3.9.3.1 General Site Description

Native American resources at INEEL are associated with the two groups of nomadic hunters and gatherers that used the region at the time of European-American contact: the Shoshone and Bannock. Both of these groups used the area that now encompasses INEEL as they harvested floral and faunal resources and obsidian from Big Southern Butte or Howe Point. Because INEEL is considered part of the Shoshone-Bannock Tribes' ancestral homeland, it contains many localities that are important for traditional, cultural, educational, and religious reasons. This includes not only prehistoric archaeological sites, which are important in a religious or cultural heritage context, but also features of the natural landscape and air, plant, water, or animal resources that have special significance (DOE 1996a:3-129).

3.3.9.3.2 Proposed Facility Location

INTEC and the surrounding area may contain Native American resources. The existence and significance of any resources near INTEC would be established in direct consultation with the Shoshone and Bannock Tribes. INEEL recently initiated general consultation with the Shoshone and Bannock Tribes, and a working agreement was established (Abbott, Crockett, and Moor 1997:16, B-1, B-2). Consultations (see Chapter 5 and Appendix O) were initiated with appropriate Native American groups to determine any concerns associated with the actions evaluated in this SPD EIS.

3.3.9.4 Paleontological Resources

Paleontological resources are the physical remains, impressions, or traces of plants or animals from a former geological age.

3.3.9.4.1 General Site Description

Paleontological remains consist of fossils and their associated geologic information. The region encompassing INEEL has abundant and varied paleontological resources, including plant, vertebrate, and invertebrate remains from soils and lake and river sediments, and organic materials found in caves and archaeological sites (DOE 1995b:4.4-5).

3.3.9.4.2 Proposed Facility Location

Vertebrate fossils recovered from the Big Lost River floodplain consist of isolated bones or teeth from large mammals of the Pleistocene or Ice Age. These fossils were discovered during excavations and well-drilling operations. A single mammoth tooth was salvaged during the excavation of a percolation pond immediately south of INTEC. Other fossils have been recorded in the vicinities of the Test Reactor Area and Naval Reactors Facility. Occasional skeletal elements of fossil mammoth, horse, and camel have been retrieved from the Big Lost River diversion dam and Radioactive Waste Management Complex on the southwestern side of INEEL, and from river and alluvial fan gravels and Lake Terreton sediments near Test Area North (Abbott, Crockett, and Moor 1997:16).

3.3.10 Land Use and Visual Resources

3.3.10.1 Land Use

Land may be characterized by its potential for the location of human activities (land use). Natural resource attributes and other environmental characteristics could make a site more suitable for some land uses than for others. Changes in land use may have both beneficial and adverse effects on other resources (biological, cultural, geological, aquatic, and atmospheric).

INEEL is situated on approximately 2,300 km^2 (890 mi^2) of land in southeastern Idaho (DOE 1997b). INEEL is owned by the Federal Government and administered, managed, and controlled by DOE (DOE 1996a:3-107). It is primarily within Butte County, but portions of the site are also in Bingham, Jefferson, Bonneville, and Clark Counties. The site is roughly equidistant from Salt Lake City, Utah, and Boise, Idaho.

3.3.10.1.1 General Site Description

Lands surrounding INEEL are owned by the Federal Government, the State of Idaho, and private parties. Regional land uses include grazing, wildlife management, rangeland, mineral and energy production, recreation, and crop

production. Approximately 60 percent of the surrounding area is used by sheep and cattle for grazing. Small communities and towns near the INEEL boundaries include Mud Lake to the east; Arco, Butte City, and Howe to the west; and Atomic City to the south (DOE 1995b:4.2-5). Two National Natural Landmarks border INEEL: Big Southern Butte (2.4 km [1.5 mi] south) and Hell's Half Acre (2.6 km [1.6 mi] southeast) (DOE 1996a:3-107). A portion of Hell's Half Acre National Natural Landmark is designated as a Wilderness Study Area. The Black Canyon Wilderness Study Area is also adjacent to INEEL (DOE 1996a:3-107).

Land-use categories at INEEL include facility operations, grazing, general open space, and infrastructure such as roads. Generalized land uses at INEEL and vicinity are shown in Figure 3–17. Facility operations include industrial and support operations associated with energy research and waste management activities. Land is also used for recreation and environmental research associated with the designation of INEEL as a National Environmental Research Park. Much of INEEL is open space that has not been designated for specific use. Some of this space serves as a buffer zone between INEEL facilities and other land uses. About 2 percent of the total INEEL site area (46 km^2 [18 mi^2]) is used for facilities and operation (DOE 1995b:4.2-1). Approximately 9,000 ha (22,240 acres) or 4 percent of the total acreage at INEEL is available for radioactive waste management facilities (DOE 1997a:vol. I, 4-20). Public access to most facilities is restricted. Approximately 6 percent of the INEEL site, or 140 km^2 (54 mi^2), is public roads and utilities that cross the site. Recreational uses include public tours of general facility areas and Experimental Breeder Reactor I (a National Historic Landmark), and controlled hunting, which is generally restricted to 0.8 km (0.5 mi) within the INEEL boundary. Between 1,210 km^2 (467 mi^2) and 1,420 km^2 (548 mi^2) are used for cattle and sheep grazing. A 3.6-km^2 (1.4-mi^2) portion of this land, at the junction of Idaho State Highways 28 and 33, is used by the U.S. Sheep Experiment Station as a winter feedlot for about 6,500 sheep (DOE 1995b:4.2-1).

INTEC is about 4.8 km (3 mi) north of the Central Facilities Area. The plant is situated on approximately 85 ha (210 acres) within the perimeter fence. An additional 22 ha (54 acres) of the plant area lie outside the fence (DOE 1997b). The INTEC complex houses reprocessing facilities for Government-owned defense and research spent fuels. Facilities at INTEC include spent fuel storage and reprocessing areas, a waste solidification facility and related waste storage bins, remote analytical laboratories, and a coal-fired steam-generating plant.

DOE land-use plans and policies applicable to INEEL include the *INEL Institutional Plan for FY 1994–1999* and the *INEL Technical Site Information Report* (DOE 1995b:vol. 2, part A, 4.2-1). The *Institutional Plan* provides a general overview of INEEL facilities, strategic program descriptions, and major construction projects, and identifies specific technical programs and capital equipment needs. The *Information Report* (DOE 1995b:vol. 2, part A) presents a 20-year master plan for development activities at the site. Land-use planning for INEEL administrative and laboratory facilities located in the city of Idaho Falls is subject to Idaho Falls planning and zoning restrictions (DOE 1996a:3-107).

All county plans and policies encourage development adjacent to previously developed areas to minimize the need for infrastructure improvements and to avoid urban sprawl. Because INEEL is remote from most developed areas, INEEL lands and adjacent areas are not likely to experience residential and commercial development, and no new development is planned near the site. Recreational and agricultural uses, however, are expected to increase in the surrounding area in response to greater demand for recreational areas and the conversion of rangeland to cropland (DOE 1995b:4.2-5).

The Fort Bridger Treaty of July 3, 1868, secured the Fort Hall Reservation as the permanent homeland of the Shoshone-Bannock Peoples. According to the treaty, tribal members reserved rights to hunting, fishing, and gathering on surrounding unoccupied lands of the United States. While INEEL is considered occupied land, it was recognized that certain areas on the INEEL site have significant cultural and religious significance to

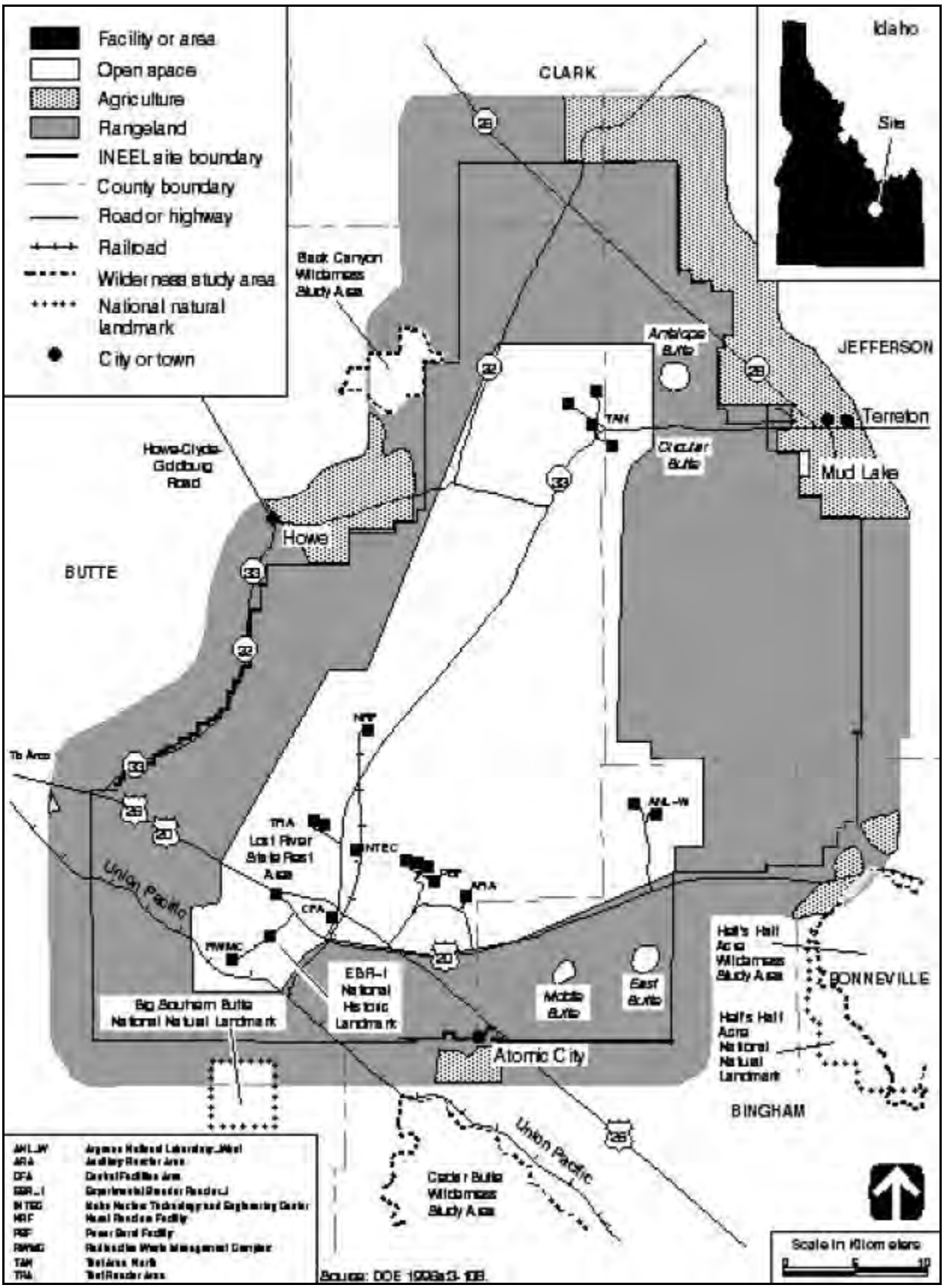


Figure 3–17. Generalized Land Use at INEEL and Vicinity

the tribes. A *1994 Memorandum of Agreement with the Shoshone-Bannock Tribes* (DOE 1994b:1) provides tribal members access to the Middle Butte to perform sacred or religious ceremonies or other educational or cultural activities.

3.3.10.1.2 Proposed Facility Location

FPF is not currently being used and is being maintained on standby. This building, the largest at INTEC, is in the middle of an area of several warehouse and administrative facilities. The land, currently disturbed, is designated for waste-processing operations. FPF is 12 km (7.5 mi) from the nearest site boundary.

3.3.10.2 Visual Resources

Visual resources are natural and human-created features that give a particular landscape its character and aesthetic quality. Landscape character is determined by the visual elements of form, line, color, and texture. All four elements are present in every landscape; however, they exert varying degrees of influence. The stronger the influence exerted by these elements in a landscape, the more interesting the landscape. The more visual variety that exists with harmony, the more aesthetically pleasing the landscape.

3.3.10.2.1 General Site Description

The INEEL site is bordered on the north and west by the Bitterroot, Lemhi, and Lost River mountain ranges. Volcanic buttes near the southern boundary of INEEL can be seen from most locations on the site. INEEL generally consists of open desert land predominantly covered by large sagebrush and grasslands. Pasture and farmland border much of the site.

Ten facility areas are on the INEEL site. Although INEEL has a master plan, no specific visual resource standards have been established. INEEL facilities have the appearance of low-density commercial/industrial complexes widely dispersed throughout the site. Structure heights range from about 3 to 30 m (10 to 100 ft); a few stacks and towers reach 76 m (250 ft). Although many INEEL facilities are visible from highways, most facilities are more than 0.8 km (0.5 mi) from public roads (DOE 1995b:4.5-1). The operational areas are well defined at night by the security lights.

The Craters of the Moon National Monument is about 20 km (12 mi) southwest of INEEL's western boundary. It includes a designated Wilderness Area, which must maintain Class I air quality standards. Lands adjacent to the site, under BLM jurisdiction, are designated as VRM Class II areas (DOE 1995b:4.5-2). This designation obliges preservation and retention of the existing character of the landscape. Lands within the INEEL site are designated as VRM Classes III and IV, the most lenient classes in terms of modification (DOE 1995b:4.5-2). The Black Canyon Wilderness Study Area, adjacent to INEEL, is under consideration by BLM for Wilderness Area designation, approval of which would result in an upgrade of its VRM class from Class II to Class I (DOE 1995b:4.5-2; DOI 1986a, 1986b). The Hell's Half Acre Wilderness Study Area is about 2.6 km (1.6 mi) southeast of INEEL's eastern boundary. This area, famous for its lava flows and hiking trails, is managed by BLM.

3.3.10.2.2 Proposed Facility Location

While FPF is the largest building on the site, the tallest structure is the stack connected to INTEC; it is 76 m (250 ft) tall. INTEC is visible in the middle ground from State Highways 20 and 26, with Saddle Mountain in the background. The character of INTEC is consistent with a VRM Class IV designation (DOI 1986a, 1986b). Natural features of visual interest within a 40-km (25-mi) radius include Big Lost River at 0.8 km (0.5 mi), Big Southern Butte National Natural Landmark at 20 km (12 mi), Saddle Mountain at 40 km (25 mi), Middle Butte

at 18 km (11 mi), Hell's Half Acre Wilderness Study area at 35 km (22 mi) and East Butte at 23 km (14 mi) (Abbott, Crockett, and Moor 1997:4).

3.3.11 Infrastructure

Site infrastructure includes those utilities and other resources required to support construction and continued operation of mission-related facilities identified under the various proposed alternatives.

3.3.11.1 General Site Description

INEEL has extensive production, service, and research facilities. An extensive infrastructure supports these facilities, as shown in Table 3–24.

Table 3–24. INEEL Sitewide Infrastructure Characteristics

Resource	Current Usage	Site Capacity
Transportation		
Roads (km)	445[a]	445[a]
Railroads (km)	48	48
Electricity		
Energy consumption (MWh/yr)	232,500	394,200
Peak load (MW)	42	124
Fuel		
Natural gas (m^3/yr)	NA	NA
Oil (l/yr)[b]	5,820,000	16,000,000[c]
Coal (t/yr)	11,340	11,340[c]
Water (l/yr)	6,000,000,000[d]	43,000,000,000[e]

[a] Includes paved and unpaved roads.
[b] Includes fuel oil and propane.
[c] As supplies get low, more can be supplied by truck or rail.
[d] See Werner 1997:2.
[e] See DOE 1995b:vol. II, part A, 4.13-1.
Key: NA, not applicable.
Source: DOE 1996a:3-110.

3.3.11.1.1 Transportation

The road network at INEEL provides for onsite transportation; the railroads for deliveries of large volumes of coal and oversized structural components. Commercial shipments are by truck and plane, but some bulk materials are transported by train, and waste by truck and train (DOE 1995b:vol. I, 4.11-1).

About 140 km (87 mi) of paved surface has been developed out of the 445 km (277 mi) of roads on the site, including about 29 km (18 mi) of service roads that are closed to the public. Most of the roads are adequate for the current level of normal transportation activity and could handle increased traffic volume (DOE 1995b:vol. I, 4.11-1).

Idaho Falls receives railroad freight service from Butte, Montana, to the north, and from Pocatello, Idaho, and Salt Lake City, Utah, to the south. The Union Pacific Railroad's Blackfoot-to-Arco Branch crosses the southern portion of INEEL and provides rail service to the site. This branch connects with a DOE spur line at the Scoville

Siding, then links with developed areas within INEEL. Rail shipments to and from INEEL usually are limited to bulk commodities, spent nuclear fuel, and radioactive waste (DOE 1995b:vol. I, 4.11-3).

3.3.11.1.2 Electricity

Commercial electric power is supplied to INEEL from the Antelope substation through two feeders to the federally owned Scoville substation, which supplies electric power directly to the site electric power distribution system. Electric power supplied by Idaho Power Company is generated by hydroelectric generators along the Snake River in southern Idaho and by the Bridger and Valmy coal-fired thermal electric generation plants in southwestern Wyoming and northern Nevada (DOE 1995b:vol. II, part A, 4.13-2). Characteristics of this power pool are summarized in Table 3.4.2–2 of the *Storage and Disposition PEIS* (DOE 1996a:3-111).

The average electrical availability at INEEL is about 394,200 MWh/yr; the average usage, about 232,500 MWh/yr. The peak load capacity for INEEL is 124 MW; the current peak load usage, about 42 MW (DOE 1996a:3-110).

3.3.11.1.3 Fuel

Fuels consumed at INEEL include several liquid petroleum fuels, coal, and propane gas. All fuels are transported to the site for storage and use. Fuel storage is provided for each facility, and the inventories are restocked as necessary (DOE 1995b:vol. II, part A, 4.13-2). The current site usage is about 5.8 million l/yr (1.5 million gal/yr). The current site usage of coal is about 11,340 t/yr (12,500 tons/yr) (DOE 1996a:3-110). If additional coal or fuel oil were needed during the year, it could be shipped onto the site.

3.3.11.1.4 Water

The Snake River Plain Aquifer is the source of all water at INEEL (DOE 1996a:3-119). The water is provided by a system of about 30 wells, together with pumps and storage tanks. That system is administered by DOE, which holds the Federal Reserved Water Right for the site of 43 billion 1/yr (11 billion gal/yr) (DOE 1995b:vol. II, part A, 4.13-1). The current site usage is 6 billion 1/yr (1.6 billion gal/yr) (Werner 1997:2).

3.3.11.1.5 Site Safety Services

DOE operates three fire stations at INEEL. These stations are at the north end of Test Area North, at ANL–W, and in the Central Facilities Area. Each station has a minimum of one engine company capable of supporting any fire emergency in its assigned area. The fire department also provides the site with ambulance, emergency medical technician, and hazardous material response services (DOE 1995b:vol. II, part A, 4.13-3).

3.3.11.2 Proposed Facility Location

A separate utility tunnel running off the main INTEC utility tunnel was completed and water, steam condensate, air, and other lines have been completed up to, and in some cases into, FPF when this facility was built. A summary of the infrastructure characteristics of INTEC is presented as Table 3–25.

3.3.11.2.1 Electricity

Electric power for INTEC is routed into the main electrical room from a 14-kV feeder in Unit Substation 2, north of the building. The current capacity available for INTEC is 262,800 MWh/yr (Abbott, Crockett, and Moor 1997:20).

Table 3–25. INEEL Infrastructure Characteristics for INTEC

Resource	Current Usage	Capacity
Electricity		
Energy consumption (MWh/yr)	60,000	262,800
Peak load (MW)	9.2[a]	31.4[b,c]
Fuel		
Natural gas (m^3/yr)	NA	NA
Oil (l/yr)	757,000	1,112,720[d,e]
Coal (t/yr)	13,000	NA[e]
Water (l/yr)	45,420,000	227,100,000

[a] Demand.
[b] Equivalent to 30 MW continuous use per year.
[c] Based on a 95 percent power factor.
[d] Available capacity is INTEC tank storage capacity in liters.
[e] As supplies get low, more can be supplied by truck or rail.
Key: INTEC, Idaho Nuclear Technology and Engineering Center; NA, not applicable.
Source: Abbott, Crockett, and Moor 1997:20; Werner 1997:1.

3.3.11.2.2 Fuel

Fuel oil and propane are supplied from INTEC. The current capacity of fuel oil and propane is approximately 1.1 million l/yr (291,000 gal/yr); the usage, approximately 757,000 l/yr (200,000 gal/yr) (Abbott, Crockett, and Moor 1997:20).

3.3.11.2.3 Water

Water service is available through connection to the INTEC water supply system, which obtains its water from two deep wells located north of the INTEC main process area. The water withdrawn from the Snake River Plain Aquifer is a small fraction of the available supply (Abbott, Crockett, and Moor 1997:9). The current annual capacity of water available for FPF is about 230 million l/yr (61 million gal/yr); and the current usage for the facility is about 45 million l/yr (12 million gal/yr) (Werner 1997:1).

3.4 PANTEX PLANT

Pantex is in Carson County along U.S. Highway 60 and lies about 27 km (17 mi) northeast of downtown Amarillo, Texas (Figure 2–4). Pantex lies in the Texas Panhandle on the Llano Estacado (staked plains) portion of the Great Plains. The topography at Pantex is relatively flat, characterized by rolling grassy plains and natural playa basins. The term "playa" is used to describe the more than 17,000 ephemeral lakes in the Texas Panhandle, usually less than 1 km (0.6 mi) in diameter, that receive water runoff from the surrounding area. The region is a semiarid farming and ranching area. Pantex is surrounded by agricultural land, but several significant industrial facilities are also nearby (DOE 1996a:3-146).

Pantex was first used by the U.S. Army for loading conventional ammunition shells and bombs from 1942 to 1945. In 1951, the Atomic Energy Commission arranged to begin rehabilitating portions of the original plant and constructing new facilities for nuclear weapons operations. The current missions are shown in Table 3–26. Weapons assembly, disassembly, and stockpile surveillance activities involve handling (but not processing) of encapsulated uranium, plutonium, and tritium, as well as a variety of nonradioactive hazardous or toxic chemicals (DOE 1996a:3-146).

Table 3–26. Current Missions at Pantex

Mission	Description	Sponsor
Plutonium storage	Provide storage of pits from dismantled nuclear weapons	Assistant Secretary for Defense Programs
High explosive(s) components	Manufacture for use in nuclear weapons	Assistant Secretary for Defense Programs
Weapons assembly	Assemble new nuclear weapons for the stockpile	Assistant Secretary for Defense Programs
Weapons maintenance	Retrofit, maintain, and repair stockpile weapons	Assistant Secretary for Defense Programs
Quality assurance	Stockpile quality assurance testing and evaluation	Assistant Secretary for Defense Programs
Weapons disassembly	Disassemble stockpile weapons as required	Assistant Secretary for Defense Programs
Test and training programs	Assemble nuclear weapon-like devices for training	Assistant Secretary for Defense Programs
Weapons dismantlement	Dismantle nuclear weapons no longer required	Assistant Secretary for Defense Programs
Development support	Provide support to design agencies as requested	Assistant Secretary for Defense Programs
Waste management	Waste treatment, storage, and disposal	Assistant Secretary for Defense Programs
Environmental management	Environmental restoration activities	Assistant Secretary for Environmental Management

Source: DOE 1996a:3-146.

DOE Activities. All DOE activities at Pantex, except for environmental restoration programs, fall under the DOE Office of the Assistant Secretary for Defense Programs. Historically, DOE's mission for Pantex primarily included assembly and delivery to the U.S. Department of Defense (DoD) of a variety of nuclear weapons. Today, the primary roles of Pantex are the disassembly of U.S. nuclear weapons being returned to DOE by DoD, maintenance and repair of nuclear weapons, and storage of plutonium pits. These operations are in compliance with the negotiated downsizing of the U.S. and the former Soviet nuclear forces (DOE 1996a:3-147).

Other activities that have been, and will continue to be, conducted under DOE's national security mission include certain maintenance and monitoring activities of the remaining nuclear weapons stockpile, modification and assembly of existing nuclear weapons systems, and production of high-explosive components for nuclear weapons. DOE also conducts quality evaluation of weapons, quality assurance testing of weapons components, and R&D supporting nuclear weapons activities at the plant. DOE's national security responsibilities are mandated by statutes, Presidential directives, and congressional authorization and appropriations (DOE 1996a:3-147).

The change in mission emphasis from assembly to disassembly of nuclear weapons has caused an increase in some waste streams. Waste management operations at Pantex in the near term would add facilities to enhance capabilities to adequately handle existing waste streams. Improved facilities for hazardous waste staging, treatment, and storage would be coupled with increased use of commercial offsite facilities to treat mixed waste streams. Upon completion of the current backlog of dismantlements due to stockpile reduction, waste generation is likely to decrease (DOE 1996a:3-147).

Non-DOE Activities. Texas Tech University pursues agricultural activities on both DOE-owned and DOE-leased property (DOE 1996a:3-147).

3.4.1 Air Quality and Noise

3.4.1.1 Air Quality

Air pollution refers to any substance in the air that could harm human or animal populations, vegetation, or structures, or that unreasonably interferes with the comfortable enjoyment of life and property. Air pollutants are transported, dispersed, or concentrated by meteorological and topographical conditions. Air quality is affected by air pollutant emission characteristics, meteorology, and topography.

3.4.1.1.1 General Site Description

The climate at Pantex and the surrounding region is characterized as semiarid with hot summers and rather cold winters. The average annual temperature in the Amarillo region is 13.8 EC (56.9 EF); temperatures range from an average daily minimum of -5.7 EC (21.8 EF) in January to an average daily maximum of 32.8 EC (91.1 EF) in July. The average annual precipitation is 49.8 cm (19.6 in). Prevailing winds at Pantex are from the south. The average annual windspeed is 6 m/s (13.5 mph) (NOAA 1994a). Additional information related to meteorology and climatology at Pantex is presented in Appendix F of the *Storage and Disposition PEIS* (DOE 1996a:F-11, F-12) and in the site environmental information document (M&H 1996a:6-1–6-19).

Pantex is within the Amarillo-Lubbock Intrastate AQCR #211. None of the areas within Pantex and this AQCR are designated as nonattainment areas with respect to the NAAQS for criteria air pollutants (EPA 1997e). Applicable NAAQS and Texas State ambient air quality standards are presented in Table 3–27.

There are no PSD Class I areas within 100 km (62 mi) of Pantex. None of the facilities at Pantex have been required to obtain a PSD permit (DOE 1996f:4-118–4-120).

The primary emission sources of criteria pollutants at Pantex are the steam plant boilers, the explosives-burning operation, and emissions from onsite vehicles. Emission sources of hazardous or toxic air pollutants include the high-explosives synthesis facility, the explosives-burning operation, paint spray booths, miscellaneous laboratories, and other small operations (DOE 1996f:4-134). The boilers and high-explosives synthesis facility operate under air permits from the Texas Natural Resource Conservation Commission (TNRCC). The paint

Table 3–27. Comparison of Ambient Air Concentrations From Pantex Sources With Most Stringent Applicable Standards or Guidelines, 1993

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	Concentration (Fg/m^3)
Criteria pollutants			
Carbon monoxide	8 hours	10,000[b]	161
	1 hour	40,000[b]	924
Nitrogen dioxide	Annual	100[b]	0.90
Ozone	8 hours	157[c]	(d)
PM_{10}	Annual	50[b]	8.73
	24 hours	150[b]	88.5
$PM_{2.5}$	3-year annual	15[c]	(e)
	24 hours (98th percentile over 3 years)	65[c]	(e)
Sulfur dioxide	Annual	80[b]	<0.01
	24 hours	365[b]	<0.01
	3 hours	1,300[b]	<0.01
	30 minutes	1,048[f]	<0.01
Other regulated pollutants			
Hydrogen sulfide	30 minutes	112[f]	(g)
Total suspended particulates	3 hours	200[f]	(h)
	1 hour	400[f]	(h)
Hazardous and other toxic compounds			
Benzene	1 hour	75[i]	19.4[j]
	Annual	3[i]	0.0547
[Text deleted.]			

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period. The National Ambient Air Quality Standards (NAAQS) (EPA 1997a), other than those for ozone, particulate matter, lead, and those based on annual averages, are not to be exceeded more than once per year. The 1-hr ozone standard is attained when the expected number of days per year with maximum hourly average concentrations above the standard is #1. The 1-hr ozone standard applies only to nonattainment areas. The 8-hr ozone standard is attained when the 3-year average of the annual fourth-highest daily maximum 8-hr average concentration is less than or equal to 157 Fg/m^3. The 24-hr particulate matter standard is attained when the expected number of days with a 24-hr average concentration above the standard is #1. The annual arithmetic mean particulate matter standard is attained when the expected annual arithmetic mean concentration is less than or equal to the standard.

[b] Federal and State standard.

[c] Federal standard.

[d] Not directly emitted or monitored by the site.

[e] No data is available with which to assess $PM_{2.5}$ concentrations.

[f] State standard.

[g] No sources identified at the site.

[h] No site boundary concentrations from Pantex facilities presented in the *Final EIS for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*.

[i] TNRCC effects-screening levels are "tools" used by the Toxicology and Risk Assessment Staff to evaluate impacts of air pollutant emissions. They are not ambient air standards. If ambient levels of air contaminants exceed the screening levels, it does not necessarily indicate a problem, but would trigger a more indepth review. The levels are set where no adverse effect is expected.

[j] Concentration reported as a 30-min average.

Note: The NAAQS also includes standards for lead. No sources of lead emissions have been identified for any of the alternatives presented in Chapter 4. Emissions of other air pollutants not listed here have been identified at Pantex, but are not associated with any of the alternatives evaluated. These other air pollutants are quantified in the *Final EIS for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE 1996f). EPA recently revised the ambient air

quality standards for particulate matter and ozone. The new standards, finalized on July 18, 1997, changed the ozone primary and secondary standards from a 1-hr concentration of 235 Fg/m^3 (0.12 ppm) to an 8-hr concentration of 157 Fg/m^3 (0.08 ppm). During a transition period while States are developing State implementation plan revisions for attaining and maintaining these standards, the 1-hr ozone standard will continue to apply in nonattainment areas (EPA 1997b:38855). For particulate matter, the current PM_{10} annual standard is retained, and two $PM_{2.5}$ standards are added. These standards are set at a 15-Fg/m^3 3-year annual arithmetic mean based on community-oriented monitors and a 65 Fg/m^3 3-year average of the 98th percentile of 24-hr concentrations at population-oriented monitors. The revised 24-hr PM_{10} standard is based on the 99th percentile of 24-hr concentrations. The existing PM_{10} standards will continue to apply in the interim period (EPA 1997c:38652).
Source: DOE 1996f:4-127–4-133; EPA 1997a; TNRCC 1997a, 1997b.

spray booths, miscellaneous laboratories, and other small operations are allowed under TNRCC standard exemptions. The explosive-burning operation is allowed under the TNRCC hazardous waste permit (DOE 1997c:21, 22).

With the exception of thermal treatment of high explosives at the burning ground, most stationary sources of nonradioactive atmospheric releases are fume hoods and building exhaust systems, some of which have HEPA filters for control of particulate emissions. Table 3–27 presents the ambient air concentrations attributable to sources at Pantex, which are based on emissions for the year 1993. These emissions were modeled using meteorological data from 1988 (DOE 1996f:4-123) and represent maximum output conditions. Actual annual emissions for some pollutants are somewhat less than these levels, and the estimated concentrations bound the actual Pantex contribution to ambient levels. Only those pollutants that would be emitted for any of the surplus plutonium disposition alternatives are presented. Additional information on ambient air quality at Pantex and detailed information on emissions of other pollutants at Pantex are discussed in the *Final EIS for the Continued Operation of Pantex* (DOE 1996f:4-117–4-135, B-3–B-61) and the 1996 *Environmental Report for Pantex Plant* (DOE 1997c:21, 22, 78–84). Concentrations of nonradiological air pollutants shown in Table 3–27 are in compliance with applicable regulations or are below applicable health effects-screening levels, the concentration of hazardous air pollutants determined by TNRCC to have minimal effect on human health and the environment.

Measurements of PM_{10} and various volatile organic compounds are made at Pantex. During 1993, only one 24-hr PM_{10} measurement exceeded the NAAQS level, while in 1994 the PM_{10} NAAQS level was exceeded 1 day in January and 1 day in June. Windblown dust is indicated as a major contributor to some of these exceedances. The concentrations of carbon monoxide, sulfur dioxide, and nitrogen dioxide from Pantex—combined with those from background (non-Pantex) sources—are expected to be in compliance with the ambient air quality standards. Measured concentrations of 1-2-dibromoethane exceeded the effects-screening levels once in 1995. However, monitoring in the last quarter of 1995 and 1996 showed that all organic compounds measured were below their respective effects-screening levels (DOE 1996f:4-121–4-123; M&H 1997:8, 12, 35–37). 1-2-dibromoethane is not emitted at Pantex. The air quality monitoring program is described in the annual site environmental monitoring reports (DOE 1997c).

Annual PM_{10} measured concentrations during 1995 were less than 24 Fg/m^3 at all monitoring locations, and except one measurement of 170 Fg/m^3 during a grass fire, 24-hr PM_{10} measured concentrations were below 129 Fg/m^3 (TNRCC 1997c:13–15).

3.4.1.1.2 Proposed Facility Location

The meteorological conditions described for Pantex are considered to be representative of the Zone 4 West area. Primary sources of pollutants in Zone 4 West include a standby diesel electric generator, drum sampling, and bulk handling of chemicals (DOE 1996f:B-10–B-29).

3.4.1.2 Noise

Noise is unwanted sound that interferes or interacts negatively with the human or natural environment. Noise may disrupt normal activities or diminish the quality of the environment.

3.4.1.2.1 General Site Description

Major noise emission sources within Pantex include various industrial facilities, equipment, and machines (e.g., cooling systems, transformers, engines, pumps, boilers, steam vents, construction and materials-handling equipment, vehicles), as well as small arms firing, alarms, and explosives detonation. Most Pantex industrial

facilities are far enough from the site boundary that noise levels from these sources at the boundary are barely distinguishable from background noise. However, some noise from explosives detonation can be heard at residences north of the site, and small arms weapons firing can be heard at residences to the west (DOE 1996a:3-153, 1996f:4-161–4-170).

The acoustic environment along the Pantex boundary and at nearby residences away from traffic noise is typical of a rural location. The day-night average sound levels are in the range, 35 to 50 dBA, that is typical of rural areas (EPA 1974:B-4). Noise survey results in areas adjacent to Pantex indicate that ambient sound levels are generally low, with natural sounds and distant traffic being the primary sources. Traffic, aircraft, trains, and agricultural activities result in higher short-term levels (M&H 1996a:11-1–11-19). Traffic is the primary source of noise at the site boundary and at residences near roads. Traffic noise is expected to dominate sound levels along major roads in the area, such as U.S. Route 60. The residents most likely to be affected by noise from plant traffic along Pantex access routes are those living along Farm-to-Market (FM) 2373 and FM 683 (DOE 1996a:3-153).

Measurements of equivalent sound levels for traffic noise and other sources along the roads bounding Pantex are 53 to 62 dBA for FM 2373 at about 400 m (1300 ft) from the road; 51 to 58 dBA for FM 293 at about 70 m (230 ft); 44 to 65 dBA for FM 683 at about 40 m (130 ft); and 51 dBA for U.S. Route 60 at about 225 m (740 ft). These levels are based on a limited number of 30-min samples taken during peak and offpeak traffic periods; mostly at locations within the site boundary (M&H 1996a:11-11–11-15). The levels represent the range of daytime traffic noise levels at residences near the site.

Other sources of noise include aircraft, wind, insect activity, and agricultural activity. Except for the prohibition of nuisance noise, neither the State of Texas nor local governments have established any regulations that specify acceptable community noise levels applicable to Pantex (DOE 1996a:F-32).

The EPA guidelines for environmental noise protection recommend an average day-night sound level of 55 dBA as sufficient to protect the public from the effects of broadband environmental noise in typically quiet outdoor and residential areas (EPA 1974:29). Land-use compatibility guidelines adopted by the Federal Aviation Administration and the Federal Interagency Committee on Urban Noise indicate that yearly day-night average sound levels less than 65 dBA are compatible with residential land uses and levels up to 75 dBA are compatible with residential uses if suitable noise reduction features are incorporated into structures (DOT 1995). It is expected that for most residences near Pantex, the day-night average sound level is less than 65 dBA and is compatible with the residential land use.

3.4.1.2.2 Proposed Facility Location

No distinguishing noise characteristics of Zone 4 West have been identified. Zone 4 West is far enough—1.8 km (1.1 mi)—from the site boundary that noise levels from the facilities are barely distinguishable from background levels.

3.4.2 Waste Management

Waste management includes minimization, characterization, treatment, storage, transportation, and disposal of waste generated from ongoing DOE activities. The waste is managed using appropriate treatment, storage, and disposal technologies and in compliance with all applicable Federal and State statutes and DOE orders.

3.4.2.1 Waste Inventories and Activities

Pantex manages the following types of waste: LLW, mixed LLW, hazardous, and nonhazardous. TRU waste and mixed TRU waste are not normally generated and no HLW is currently generated at Pantex. Waste generation rates and the inventory of stored waste from activities at Pantex are provided in Table 3–28. Table 3–29 summarizes Pantex waste management capabilities. More detailed descriptions of the waste management system capabilities at Pantex are included in the *Storage and Disposition PEIS* (DOE 1996a:3-180–3-183, E-49–E-62) and the *Final EIS for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components* (DOE 1996f:4-229).

Table 3–28. Waste Generation Rates and Inventories at Pantex

Waste Type	Generation Rate (m^3/yr)	Inventory (m^3)
TRU[a]		
Contact handled	0	0[b]
Remotely handled	0	0
LLW	139	208
Mixed LLW	24[c]	135
Hazardous	486[c,d]	153[e,f]
Nonhazardous		
Liquid	473,125[g]	NA[f]
Solid	8,007[c]	311[e,f,h]

[a] Includes mixed TRU waste.
[b] DOE 1997d:1-2.
[c] DOE 1997c:19.
[d] Includes TSCA-regulated wastes.
[e] DOE 1996f:4-233.
[f] Generally, hazardous and nonhazardous wastes are not held in long-term storage.
[g] King 1997a.
[h] Largely composed of asbestos waste.

Key: LLW, low-level waste; NA, not applicable; TRU, transuranic; TSCA, Toxic Substances Control Act.

Source: DOE 1996e:15, 16, except as notes.

EPA placed Pantex on the National Priorities List on May 31, 1994. Currently, environmental restoration activities are conducted in compliance with CERCLA and a RCRA permit issued in April 1991, and modified in February 1996. Environmental restoration activities are expected to be completed in 2000 (DOE 1996a:3-180). More information on regulatory requirements for waste disposal is provided in Chapter 5.

3.4.2.2 Transuranic and Mixed Transuranic Waste

Pantex does not generate or manage TRU waste as a result of normal operations, although there are procedures in place to manage TRU waste if it is generated. The small quantity of TRU waste (<1 m^3) that was stored in Building 12-24 was moved to LANL pending disposal at WIPP (DOE 1997d:1-2).

3.4.2.3 Low-Level Waste

Compactible solid LLW is processed at the LLW Compactor and stored along with the noncompactible materials for shipment to the Nevada Test Site (NTS), where most LLW is disposed of, or to a commercial vendor. Some liquid LLW has been solidified, but more development is required in this area. Much liquid

Table 3–29. Waste Management Capabilities at Pantex

			Applicable Waste Type					
Facility Name/Description	**Capacity**	**Status**	**TRU**	**Mixed TRU**	**LLW**	**Mixed LLW**	**Haz**	**Non-Haz**
Treatment Facility (m^3/yr)								
11-09 South - Scintillation Vial Crusher/Segregator	Variable[a]	Online[b]			X			
11-09 South - Sort/Segregation and Decontamination Activities	Variable[a]	Online[b]			X	X		
11-09 South - Fluorescent Bulb Crusher	Variable[a]	Online[b]					X	
12-17 - Evaporator for Tritiated Water	Campaign	Online			X			
12-19 East - Rotary Evaporator Vacuum Distillation Units (2)	Campaign	Online						X
12-19 East - Fractional Distillation Unit	Campaign	Online						X
12-19 East - HE Precipitation Process	Campaign	Online						X
12-42 - Compactor/Drum Crusher	Variable[a]	Online[b]			X			
16-18 - HWTPF	750	Planned for 1999			X	X	X	
16-18 - HWTPF Waste Compacting	90	Planned for 1999			X	X	X	X
16-18 - HWTPF Drum Crushing	208	Planned for 1999			X	X	X	X
16-18 - HWTPF Wastewater Evaporation System	45	Planned for 1999			X			
16-18 - HWTPF Misc Drum Operations (including neutralization and filtration)	Various	Planned for 1999			X	X	X	
16-18 - HWTPF Drum Rinsing System	45	Planned for 1999					X	
16-18 - HWTPF Fluorescent Bulb Crusher	12	Planned for 1999					X	
16-18A - Solvent Recovery Unit	348	Planned for 1999					X	
16-18A - Scintillation Vial Crushing	90	Planned for 1999			X			X
Burning Ground Thermal Processing Units	Variable[c]	Online				X	X	
Wastewater Treatment Facility	946,250	Online						X

Facility Name/Description	Capacity	Status	Applicable Waste Type					
			TRU	Mixed TRU	LLW	Mixed LLW	Haz	Non-Haz
Storage Facility (m^3)								
11-07A & B Pads - Container Storage Areas	402	Online			X	X	X	X
11-07 North Pad - Container Storage Unit	125	Online			X	X	X	X

Table 3–29. Waste Management Capabilities at Pantex (Continued)

Facility Name/Description	Capacity	Status	Applicable Waste Type					
			TRU	Mixed TRU	LLW	Mixed LLW	Haz	Non-Haz
11-09 North Building - Container Storage Area	379	Online			X	X	X	X
16-16 Building - Hazardous Waste Staging Facility	1,047	Online			X	X	X	X
Disposal Facility (m^3)								
Construction Debris Landfill (Zone 10)	21,208	Online						X

[a] Capacity included in HWTPF.
[b] Unit will move to HWTPF when operational in 1999.
[c] Permit limitations are per burning event.
Key: Haz, hazardous; HE, high explosives; HWTPF, Hazardous Waste Treatment and Processing Facility; LLW, low-level waste; TRU, transuranic.
Source: King 1997b; Lemming 1998; M&H 1997:28.

LLW is currently being evaporated. The remaining liquid LLW is being stored on the site awaiting a treatment process (Jones 1999).

Pantex is presently approved to ship seven LLW streams to NTS for disposal. Previous approvals of two waste streams were deactivated due to changes in the characterization of the wastes, but the requests for approval are being updated and reviewed and approval is expected. Requests for the approval of two additional waste streams are being prepared for submittal, and several other waste streams are being studied and considered for submittal. These wastes are currently stored on the site. Soil contaminated with depleted uranium has been disposed of at a commercial facility, and the possibility for disposal of other LLW at commercial facilities is being pursued where technically and economically advisable. Radioactively contaminated classified weapon components that cannot be demilitarized and sanitized are sent to the classified LLW repository at NTS (Jones 1999).

3.4.2.4 Mixed Low-Level Waste

Pantex treats mixed LLW in three areas: the Burning Ground, Building 11-9, and Building 12-17 (King 1997b). The Burning Ground is an open-burning area where explosives, explosive-contaminated waste, and explosive-contaminated spent solvents are burned. A large-volume reduction is attained by this treatment, and some wastes are rendered nonhazardous due to elimination of the high-explosive reactivity hazard (DOE 1996a:E-50). Building 11-9 in Zone 11 is permitted for the treatment and processing of mixed LLW and hazardous waste in tanks and containers (DOE 1996f:4-236).

Pantex has developed the *Pantex Plant Federal Facility Compliance Act Compliance Plan* to provide mixed waste treatment capability for all mixed waste streams in accordance with the FFCA of 1992 (DOE 1996a:3-180). Currently, some mixed LLW is stored on the site until it can be profiled and accepted by offsite treatment and disposal facilities, in accordance with the Pantex site treatment plan (DOE 1997c:sec. 2.3.1). The Hazardous Waste Treatment and Processing Facility is being planned to treat mixed waste (DOE 1996a:E-50).

3.4.2.5 Hazardous Waste

Pantex stores some hazardous waste on the site. Most hazardous waste generated at Pantex is shipped off the site for recycle, treatment, or disposal at commercial facilities. High explosives, high-explosive contaminated materials, and high-explosive contaminated solid wastes are burned under controlled conditions at the Burning Ground. Ash, debris, and residue resulting from this burning are transported off the site for approved disposal at a commercial RCRA-permitted facility (DOE 1996a:3-183, E-51). Polychlorinated biphenyls waste is transported to offsite permitted facilities for treatment and disposal (DOE 1996f:4-238).

3.4.2.6 Nonhazardous Waste

Management of solid waste is regulated by TNRCC. Nonhazardous waste generated at Pantex falls into Texas Class 1 or Class 2 designation. Some solid waste (inert and insoluble materials like certain scrap metals, bricks, concrete, glass, dirt, and certain plastics and rubber items that are not readily degradable) is designated as Class 2 nonhazardous waste and is disposed on the site in the Construction Debris Landfill in Zone 10. The onsite landfill is approved for both Class 2 and Class 3 wastes. The remainder of the Class 2 nonhazardous waste generated at Pantex is sanitary waste such as cafeteria and lunchroom waste, paper towels, and office waste. Most of this waste is disposed off the site at permitted landfills (such as the city of Amarillo landfill), although some goes to offsite commercial incinerators (DOE 1997c:sec. 2.3.1).

Class 1 nonhazardous waste (such as asbestos), though not hazardous by EPA's definition relative to RCRA, is handled in much the same manner as hazardous waste and is sent to offsite treatment or disposal facilities (DOE 1997c:sec. 2.3.1). Medical waste is dispositioned through a commercial vendor who picks up and transports the waste (DOE 1996f:4-238).

Sanitary sewage and some pretreated industrial wastewater are treated by the Wastewater Treatment Facility and discharged to Playa 1 (DOE 1996f:4-238). The treated effluent from the system either evaporates or infiltrates into the ground. Upgrades to the facility and associated collection/conveyance system will help to ensure that effluent limitations are met. Included in this project is the upgrade of the existing sewage treatment lagoon, repair and replacement of deteriorated sewer lines, construction of a closed system to eliminate the use of open ditches for conveyance of industrial wastewater discharges, and improvements to the plant storm-water management system (DOE 1996a:3-183, E-51). Conceptual design of the Wastewater Treatment Facility was completed on January 26, 1998, and the Title I detailed design was scheduled to be completed by June 30, 1999. Award of the actual facility construction contract is scheduled for January 31, 2001; completion of construction of all treatment facility upgrades is scheduled for November 30, 2003 (DOE 1999a).

An environmental assessment (EA) was recently completed for the wastewater treatment plant upgrade (DOE 1999d) and a FONSI was issued (DOE 1999e). As selected in the FONSI, the project to upgrade the existing Wastewater Treatment Facility will essentially involve the construction of a new, zero-discharge facility south of the current facility and outside the 100-year floodplain of Playa 1. Specifically, two new lagoons will be constructed, one serving as a facultative treatment lagoon and the second as an irrigation water storage reservoir and alternate treatment lagoon. The existing Wastewater Treatment Facility lagoon will be retained as a supplemental storage facility for treated wastewater effluent.

Beginning in 2003, instead of being discharged to Playa 1, treated effluents will be disposed of via land application for the irrigation of crops in cooperation with the Texas Tech University Research Farm. Either a subsurface flow system, a center-pivot system, or an overland flow irrigation system will be used to apply effluents (DOE 1999d, 1999e).

3.4.2.7 Waste Minimization

The goals of the Pantex pollution prevention and waste minimization program are to minimize the volume of waste generated to the extent that it is technologically and economically practical; reduce the hazard of waste through substitution or process modification; minimize contamination of real property and facilities; minimize exposure and associated risk to human health and the environment; and ensure safe, efficient, and compliant long-term management of all wastes (DOE 1996a:3-180).

Although an overall increase in waste generation of 49 percent occurred in 1996, this was largely a result of the removal of contaminated soil from ditches as part of the environmental restoration program. In fact, from 1987 to 1996, the generation of routine hazardous waste decreased by more than 99 percent. The generation of other waste types has also been reduced. The goal of reducing the generation of mixed LLW by 50 percent from 1992 levels has already been met. Another goal is to halve the generation of LLW and State-regulated (Class 1) wastes by 1999 (DOE 1997c:sec. 3.5). Pantex also participates in the Clean Texas 2000 pollution prevention program and has committed to a 50 percent reduction in 1987 chemical releases and hazardous waste generation by the year 2000 (DOE 1996f:4-232). Currently, telephone directories, paper, certain plastics, and some steel and aluminum cans are being recycled (DOE 1996a:E-51).

3.4.2.8 Preferred Alternatives From the WM PEIS

Preferred alternatives from the WM PEIS (DOE 1997a:summary, 109) are shown in Table 3–30 for the four waste types analyzed in this SPD EIS. A decision on the future management of these wastes could result in the construction of new waste management facilities at Pantex, and the closure of other facilities. Decisions on the various waste types are expected to be announced in a series of RODs to be issued on this WM PEIS. In fact, the TRU waste ROD was issued on January 20, 1998 (DOE 1998a), with the hazardous waste ROD issued on August 5, 1998 (DOE 1998b). The TRU waste ROD states that DOE will develop and operate mobile and fixed facilities to characterize and prepare TRU waste for disposal at WIPP. Each DOE site that has, or will generate, TRU waste will, as needed, prepare and store its TRU waste on the site. The hazardous waste ROD states that most DOE sites will continue to use offsite facilities for the treatment and disposal of major portions of the nonwastewater hazardous waste, with ORR and SRS continuing to treat some of their own hazardous waste on the site in existing facilities where this is economically favorable. More detailed information on DOE's alternatives for the future configuration of waste management facilities at Pantex is presented in the WM PEIS, and the hazardous waste and TRU waste RODs.

Table 3–30. Preferred Alternatives From the WM PEIS

Waste Type	Preferred Action
TRU and mixed TRU	DOE prefers treatment and storage of Pantex TRU waste at LANL.[a]
LLW	DOE prefers to treat Pantex LLW on the site. DOE prefers to ship Pantex LLW to one of two or three regional disposal sites.
Mixed LLW	DOE prefers to treat mixed LLW generated at Pantex on the site consistent with Pantex's site treatment plan. DOE prefers to ship Pantex mixed LLW to one of two or three regional disposal sites.
Hazardous	DOE prefers to continue to use commercial facilities for hazardous waste treatment.[b]

[a] ROD for TRU waste (DOE 1998a) states that "each of the Department's sites that currently has or will generate TRU waste will prepare and store its TRU waste on site. . . ." The ROD did not specifically address TRU waste generated at Pantex, since there is currently no TRU waste in inventory at Pantex.

[b] ROD for hazardous waste (DOE 1998b) selected the preferred alternative at Pantex.

Key: LANL, Los Alamos National Laboratory; LLW, low-level waste; TRU, transuranic.

Source: DOE 1997a:summary, 26, 109.

3.4.3 Socioeconomics

Statistics for employment and regional economy are presented for the REA as defined in Appendix F.9, which encompasses 32 counties surrounding Pantex in Texas and New Mexico. Statistics for population, housing, community services, and local transportation are presented for the ROI, a three-county area (in Texas) in which 93.8 percent of all Pantex employees reside as shown in Table 3–31. In 1997, Pantex employed 2,944 persons (about 1.3 percent of the REA civilian labor force) (King 1997a).

Table 3–31. Distribution of Employees by Place of Residence in the Pantex Region of Influence, 1997

County	Number of Employees	Total Site Employment (Percent)
Randall	1,629	55.3
Potter	965	32.8
Carson	167	5.7
ROI total	2,761	93.8

Source: King 1997a.

3.4.3.1 Regional Economic Characteristics

Selected employment and regional economy statistics for the Pantex REA are summarized in Figure 3–18. Between 1990 and 1996, the civilian labor force increased 11.6 percent to 234,072. In 1996, the unemployment rate in the REA was 4.6 percent, which was lower than the 5.6 percent unemployment rate in Texas and the 8.1 percent unemployment rate in New Mexico (DOL 1999). In 1995, government activities represented the largest sector of the employment in the REA (21.9 percent). This was followed by retail trade (19.6 percent) and services (18.8 percent). The totals for these employment sectors in Texas were 18.0 percent, 18.7 percent, and 24.7 percent, respectively. The totals for these employment sectors in New Mexico were 22 percent, 20.3 percent, and 26.7 percent, respectively (DOL 1997).

3.4.3.2 Population and Housing

In 1996, the ROI population totaled 212,729. Between 1990 and 1996, the ROI population increased 9.6 percent compared with the 12.2 percent increase in Texas (DOC 1997). Between 1980 and 1990, the number of housing

units in the ROI increased by about 15.8 percent, compared with the 26.3 percent increase in Texas. The total number of housing units within the ROI for 1990 was 83,590 (DOC 1994). The 1990 homeowner vacancy rate for the ROI, 3.3 percent, was similar to the Texas rate of 3.2 percent. The renter vacancy rate, 14.2 percent, was also similar to Texas' 13 percent (DOC 1990a). Population and housing trends in the Pantex ROI are summarized in Figure 3–19.

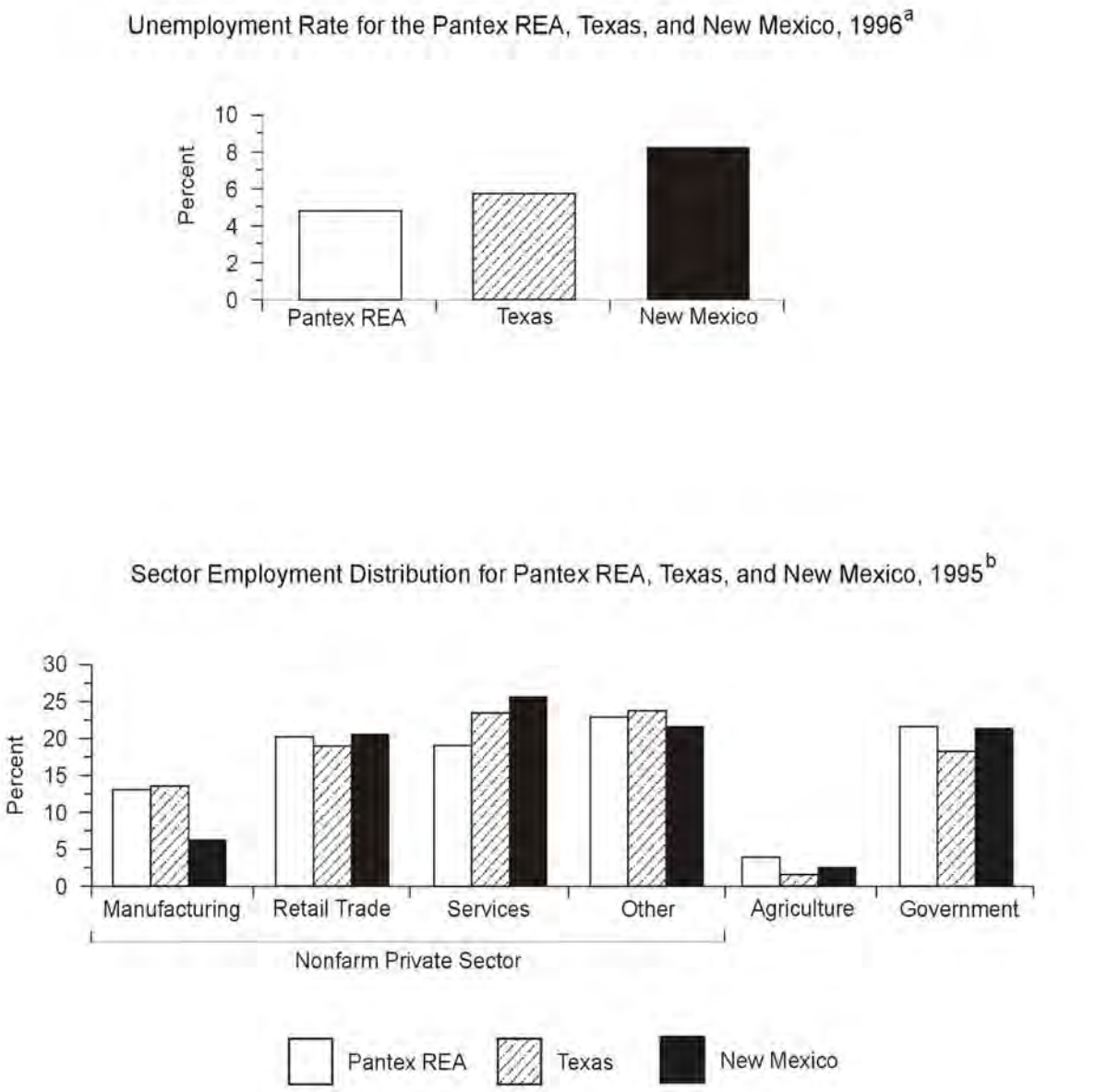
3.4.3.3 Community Services

3.4.3.3.1 Education

Eight school districts provide public education in the Pantex ROI. As shown in Figure 3–20, school districts were operating between 56 and 100 percent of capacity in 1997. In 1997, the average student-to-teacher ratio for the ROI was 15:1 (Nemeth 1997a). In 1990, the average student-to-teacher ratio for Texas was 11.3:1 (DOC 1990b; 1994).

3.4.3.3.2 Public Safety

In 1997, a total of 542 sworn police officers were serving the ROI. The 1997 ROI average officer-to-population ratio was 2.5 officers per 1,000 persons (Nemeth 1997b). This compares with the 1990 State average of 2.0 officers per 1,000 persons (DOC 1990b). In 1997, 487 paid and volunteer firefighters provided fire protection services to the Pantex ROI. The 1997 average ROI firefighter-to-population ratio was 2.3 firefighters per 1,000 persons (Nemeth 1997b). This compares with the1990 State average of 0.9 firefighters per



[a]DOL 1999.
[b]DOL 1997.

REA Regional economic area

Figure 3–18. Employment and Local Economy for the Pantex Regional Economic Area and the States of Texas and New Mexico

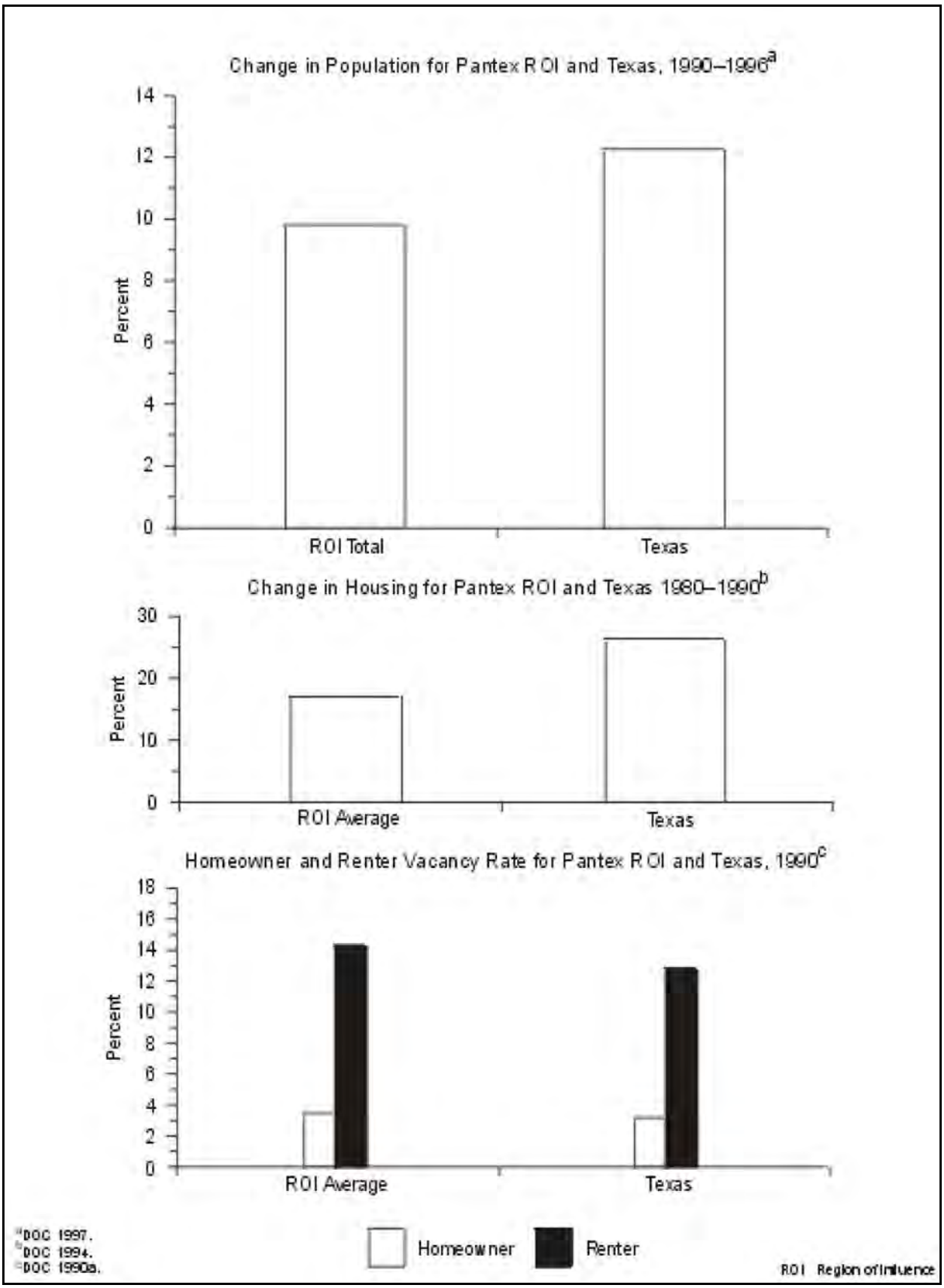
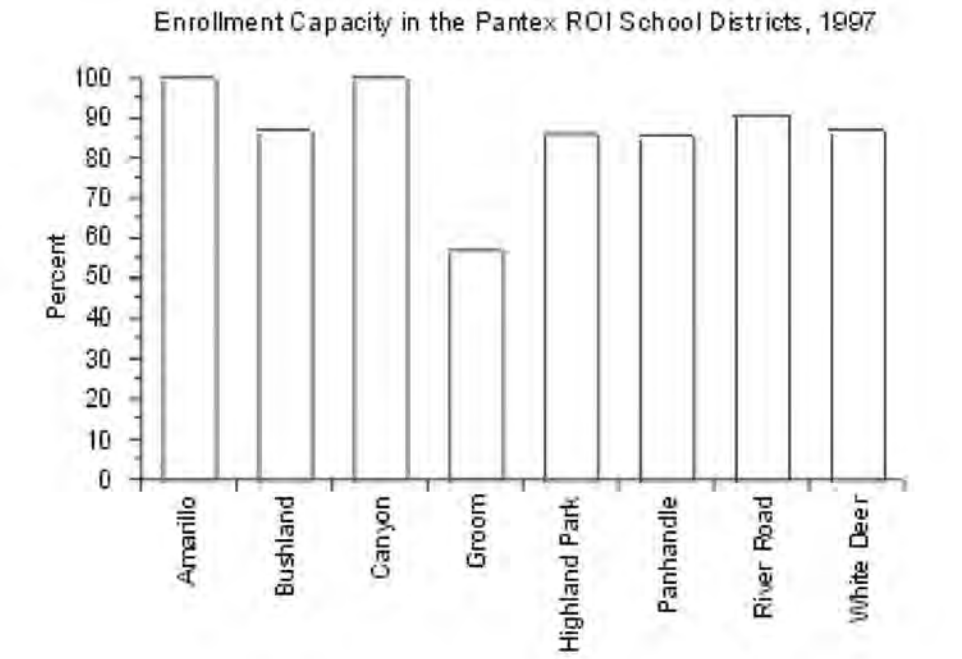
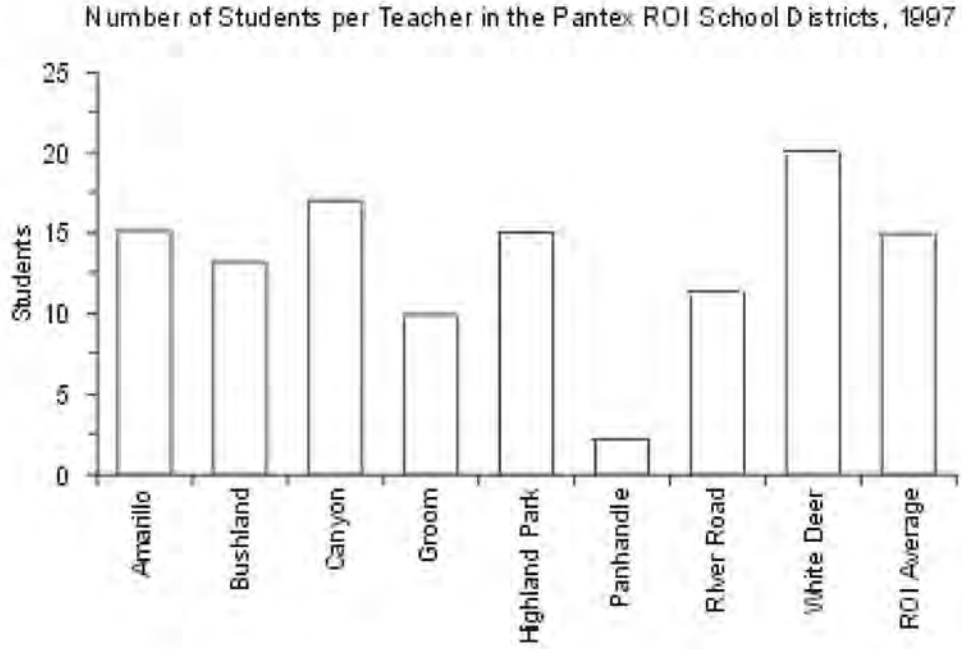


Figure 3–19. Population and Housing for the Pantex Region of Influence and the State of Texas





Source: Nemeth 1997a.

ROI Region of Influence

Figure 3–20. School District Characteristics for the Pantex Region of Influence

1,000 persons (DOC 1990b). Figure 3–21 displays the ratio of sworn police officers and firefighters to the population for the Pantex ROI.

3.4.3.3.3 Health Care

In 1996, a total of 531 physicians served the ROI. The 1996 average physician-to-population ratio in the ROI of 2.5 physicians per 1,000 persons compares with the 1996 State average of 2.2 physicians per 1,000 persons (Randolph 1997). In 1997, six hospitals served the three-county ROI. The 1997 hospital bed-to-population ratio was 5.9 beds per 1,000 persons in the ROI (Nemeth 1997c). This compares with the 1990 State average of 3.4 beds per 1,000 persons (DOC 1996:128). Figure 3–21 displays the ratio of hospital beds and physicians to the population for the Pantex ROI.

3.4.3.4 Local Transportation

Vehicular access to Pantex is provided by FM 683 to the west and FM 2373 to the east. Both roads connect with FM 293 to the north and U.S. Route 60 to the south (see Figure 2–4). Four road segments in the ROI could be affected by route disposition alternatives: I–27 from Local Route 335 at Amarillo to I–40 at Amarillo and FM 683 from U.S. Route 60 to FM 293. The third is FM 2373 from I–40 to U.S. Route 60. The fourth is FM 2373 from U.S. Route 60 to FM U.S. Route 60 (DOE 1996a).

Aside from routine minor preventive maintenance paving, there was one planned road improvement project in 1998 that could affect access onto the Pantex site. This includes the construction of a bridge along FM 1912 over U.S. Route 60. There are also long-range plans to build a bridge at the intersection of FM 2373 and U.S. Route 60. Both of these projects are not expected to be initiated until the year 2000 or beyond (Nipp 1997). Even without these improvements, the road system is more than adequate for current Pantex workloads.Amarillo City Transit provides public transport service to Amarillo, but the service does not extend to Pantex. The major railroad in the Pantex ROI is the Burlington Northern and Santa Fe Railroad, a mainline that forms the southern boundary of Pantex and provides direct access to the site. There are no navigable waterways within the ROI capable of accommodating material transports to the plant.

Amarillo International Airport provides jet air passenger and cargo service from national and local carriers. Several smaller private airports are located throughout the ROI (DOE 1996a).

3.4.4 Existing Human Health Risk

Public and occupational health and safety issues include the determination of potentially adverse effects on human health that result from acute and chronic exposures to ionizing radiation and hazardous chemicals.

3.4.4.1 Radiation Exposure and Risk

3.4.4.1.1 General Site Description

Major sources and levels of background radiation exposure to individuals in the vicinity of Pantex are shown in Table 3–32. Annual background radiation doses to individuals are expected to remain constant over time. The total dose to the population, in terms of person-rem, changes as the population size changes. Background radiation doses are unrelated to Pantex operations.

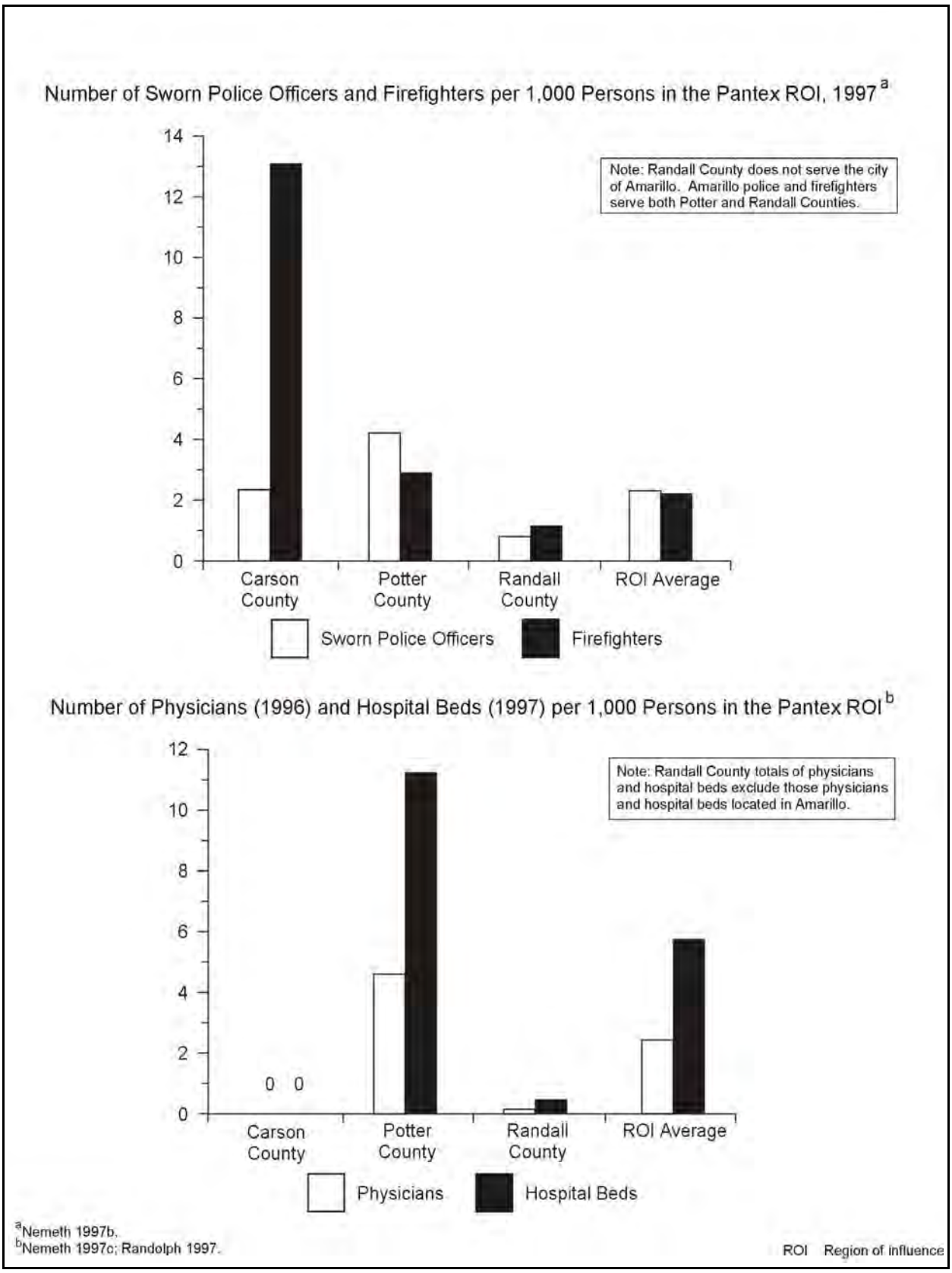


Figure 3–21. Public Safety and Health Care Characteristics for the Pantex Region of Influence

Table 3–32. Sources of Radiation Exposure to Individuals in the Pantex Vicinity Unrelated to Pantex Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation	
Cosmic and external terrestrial radiation[a]	93
Internal terrestrial radiation[b]	39
Radon in homes (inhaled)[b]	200[c]
Other background radiation[b]	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Air travel	1
Consumer and industrial products	10
Total	397

[a] DOE 1997c:65.
[b] NCRP 1987:11, 40, 53.
[c] An average for the United States.

Releases of radionuclides to the environment from Pantex operations provide another source of radiation exposure to people in the vicinity of Pantex. Types and quantities of radionuclides released from Pantex operations in 1996 are listed in the *1996 Environmental Report for Pantex Plant* (DOE 1997c:64). Doses to the public resulting from these releases are given in Table 3–33. These doses fall within radiological limits per DOE Order 5400.5 (DOE 1993a:II-1–II-5) and are much lower than those of background radiation.

Table 3–33. Radiation Doses to the Public From Normal Pantex Operations in 1996 (Total Effective Dose Equivalent)

	Atmospheric Releases		Liquid Releases		Total	
Members of the Public	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**
Maximally exposed individual (mrem)	10	8.8×10^{-5}	4	0	100	8.8×10^{-5}
Population within 80 km (person-rem)[b]	None	2.1×10^{-3}	None	0	100	2.1×10^{-3}
Average individual within 80 km (mrem)[c]	None	7.6×10^{-6}	None	0	None	7.6×10^{-6}

[a] The standards for individuals are given in DOE Order 5400.5 (DOE 1993a:II-1–II-5). As discussed in that order, the 10-mrem/yr limit from airborne emissions is required by the Clean Air Act, and the 4-mrem/yr limit is required by the Safe Drinking Water Act; for this SPD EIS, the 4-mrem/yr value is conservatively assumed to be the limit for the sum of doses from all liquid pathways. The total dose of 100 mrem/yr is the limit from all pathways combined. The 100-person-rem value for the population is given in proposed 10 CFR 834, as published in 58 FR 16268 (DOE 1993b:para. 834.7). If the potential total dose exceeds the 100-person-rem value, it is required that the contractor operating the facility notify DOE.
[b] About 275,000 in 1996.
[c] Obtained by dividing the population dose by the number of people living within 80 km (50 mi) of the site.
Source: DOE 1997c:65.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from Pantex operations in 1996 is estimated to be 4.4×10^{-11}. That is, the estimated probability of this person dying of cancer at some point in the future from radiation exposure associated with 1 year of Pantex operations is less than 5 in 100 billion. (It takes several to many years from the time of radiation exposure for a cancer to manifest itself.)

According to the same risk estimator, 1.1×10^{-6} excess fatal cancer is projected in the population living within 80 km (50 mi) of Pantex from normal operations in 1996. To place this number into perspective, it may be compared with the number of fatal cancers expected in the same population from all causes. The 1996 mortality rate associated with cancer for the U.S. population was 0.2 percent per year (Famighetti 1998:964). Based on this mortality rate, the number of fatal cancers expected to occur during 1996 from all causes in the population living within 80 km (50 mi) of Pantex was 550. This expected number of fatal cancers is much higher than the 1.1×10^{-6} fatal cancer estimated from Pantex operations in 1996.

Pantex workers receive the same dose as the general public from background radiation, but they also receive an additional dose from working in facilities with nuclear materials. Table 3–34 presents the average dose to the individual worker and the cumulative dose to all workers at Pantex from operations in 1996. These doses fall within the radiological regulatory limits of 10 CFR 835 (DOE 1995a:para. 835.202). According to a risk estimator of 400 fatal cancers per 1 million person-rem among workers[6] (Appendix F.10), the number of projected fatal cancers among Pantex workers from normal operations in 1996 is 0.011.

Table 3–34. Radiation Doses to Workers From Normal Pantex Operations in 1996 (Total Effective Dose Equivalent)

	Onsite Releases and Direct Radiation	
Occupational Personnel	**Standard[a]**	**Actual**
Average radiation worker (mrem)	None[b]	8.7
Total workers (person-rem)[c]	None	28

[a] The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995a:para. 835.202). However, DOE's goal is to maintain radiological exposure as low as is reasonably achievable. It has therefore established an administrative control level of 2,000 mrem/yr (DOE 1994a:2-3); the site must make reasonable attempts to maintain individual worker doses below this level.

[b] No standard is specified for an "average radiation worker"; however, the maximum dose that this worker may receive is limited to that given in footnote "a."

[c] About 3,160 in 1996 of which approximately 2,400 were badged.

Source: M&H 1997.

A more detailed presentation of the radiation environment, including background exposures and radiological releases and doses, is presented in the *1996 Environmental Report for Pantex Plant* (DOE 1997c). In addition, the concentrations of radioactivity in various environmental media (including air, water, and soil) in the site region (on and off the site) are presented in that same report.

3.4.4.1.2 Proposed Facility Location

External radiation doses and concentrations of gross alpha and plutonium in air have been measured in Zone 4. In 1996, the annual dose in Zone 4 was about 100 mrem. This is the same as measured at the offsite control location, which indicates that there is no additional dose to workers above background. In that same year, the

[6] The risk estimator for workers is lower than the estimator for the public because of the absence from the workforce of the more radiosensitive infant and child age groups.

Zone 4 concentration in air of plutonium 239/240 was 3.2×10^{-7} pCi/m^3. This value was about one-third less than that measured at the offsite locations (DOE 1997c:67, 77, 79).

3.4.4.2 Chemical Environment

The background chemical environment important to human health consists of the atmosphere, which may contain hazardous chemicals that can be inhaled; drinking water, which may contain hazardous chemicals that can be ingested; and other environmental media through which people may come in contact with hazardous chemicals (e.g., surface water during swimming, soil through direct contact, or food). Hazardous chemicals can cause cancer and noncancer health effects. The baseline data for assessing potential health impacts from the chemical environment are addressed in Section 3.4.1.

Effective administrative and design controls that decrease hazardous chemical releases to the environment and help achieve compliance with permit requirements (e.g., air emissions and NPDES permit requirements) contribute to minimizing health impacts on the public. The effectiveness of these controls is verified through the use of monitoring information and inspection of mitigation measures. Health impacts on the public may occur via inhalation of air containing hazardous chemicals released to the atmosphere during normal Pantex operations. Risks to public health from other possible pathways, such as ingestion of contaminated drinking water or by direct exposure, are lower than those from the inhalation pathway.

Baseline air emission concentrations and applicable standards for hazardous chemicals are addressed in Section 3.4.1. The baseline concentrations are estimates of the highest existing offsite concentrations and represent the highest concentrations to which members of the public could be exposed. All annual concentrations are in compliance with applicable guidelines and regulations. Information on estimating the health impacts of hazardous chemicals is presented in Appendix F.10.

Exposure pathways to Pantex workers during normal operations may include the inhalation of contaminants in the workplace atmosphere and direct contact with hazardous materials. The potential for health impacts varies among facilities and workers, and available information is insufficient for a meaningful estimate of impacts. However, workers are protected from workplace hazards through appropriate training, protective equipment, monitoring, substitution, and engineering and management controls. They are also protected by adherence to OSHA and EPA standards that limit workplace atmospheric and drinking water concentrations of potentially hazardous chemicals. Appropriate monitoring that reflects the frequency and amounts of chemicals used in the operational processes ensures that these standards are not exceeded. Additionally, DOE requires that conditions in the workplace be as free as possible from recognized hazards that cause, or are likely to cause, illness or physical harm. Therefore, workplace conditions at Pantex are substantially better than required by standards.

3.4.4.3 Health Effects Studies

Only one cancer incidence and mortality study was conducted on the general population in communities surrounding Pantex for the period 1981 to 1992, and only one study of workers (employed between 1951 and 1978) has been done. There were no statistically significant increases in mortality among females in the general population during this period, but significant increases in prostate cancer mortality occurred among Potter County and Randall County males, and in leukemia mortality among Carson County males. No statistically significant increases in other types of cancer among males occurred during this period. Significantly fewer deaths were observed in the workforce than would be expected judging from U.S. death rates for cancer, arteriosclerotic heart disease, and digestive diseases. No specific causes of death occurred more frequently than expected. Workers were reported to show a nonstatistically significant excess of brain cancer and leukemia in the study conducted; the small number of cases could be attributed to chance alone. For a more detailed description of the studies reviewed and the findings, and for a discussion of the epidemiologic surveillance program

implemented by DOE to monitor the health of current Pantex workers, refer to Appendix M.4.5 of the *Storage and Disposition PEIS* (DOE 1996a).

3.4.4.4 Accident History

In 1989, during a weapon disassembly and retirement operation, a release of tritium in the assembly cell occurred. Four workers received negligible doses, and a fifth, a somewhat higher, but still low dose of 1.4 mrem. No other incidents involving the accidental release of radioactivity from Pantex have taken place in more than 30 years.

3.4.4.5 Emergency Preparedness

Each DOE site has established an emergency management program that would be activated in the event of an accident. This program has been developed and maintained to ensure adequate response to most accident conditions and to provide response efforts for accidents not specifically considered. The emergency management program includes planning, preparedness, and response.

Pantex has an emergency management plan to protect life and property within the facility, the health and welfare of surrounding areas, and the defense interests of the nation during any credible emergency situation. Formal mutual assistance agreements have been made with the Amarillo fire department, the National Guard, and St. Anthony's Hospital. Under accident conditions, an emergency coordinating team of DOE and Pantex contractor management personnel would initiate the Pantex emergency plan and coordinate all onsite actions.

If offsite areas could be affected, the Texas Department of Public Safety would be notified immediately and would make emergency announcements to the public and local governmental agencies in accordance with Annex R of the *State of Texas Emergency Management Plan*. Pantex has Radiological Assistance Teams equipped and trained to respond to an accident involving radioactive contamination on or off the site. In addition, the Joint Nuclear Accident Coordination Center in Albuquerque, New Mexico, can be called on if needed to mobilize radiation emergency response teams from DOE, DoD, and other participating Federal agencies.

DOE has specified actions to be taken at all DOE sites to implement lessons learned from the emergency response to an accidental explosion at Hanford in May 1997. These actions and the timeframe in which they must be implemented are presented in Section 3.2.4.5.

3.4.5 Environmental Justice

Environmental justice concerns the environmental impacts that proposed actions may have on minority and low-income populations, and whether such impacts are disproportionate to those on the population as a whole in the potentially affected area. In the case of Pantex, the potentially affected area includes only parts of northwestern Texas.

The potentially affected area around Zone 4 West is defined by a circle with an 80-km (50-mi) radius centered at Pantex (lat. 35E20'0.4" N, long. 101E34'22.5" W). The total population residing within that area in 1990 was 266,004. The proportion of the population there that was considered minority was 19.1 percent. The same census data show that the percentage of minorities for the contiguous United States was 24.1, and for the State of Texas, 39.3 (DOC 1992).

Figure 3–22 illustrates the racial and ethnic composition of the minority population in the potentially affected area. At the time of the 1990 census, Hispanics were the largest minority group within that area, constituting 12.8 percent of the population. Blacks constituted about 4.2 percent, and Asians, about 1.3 percent. Native Americans were the smallest group, constituting about 0.8 percent (DOC 1992).

A breakdown of incomes in the potentially affected area is also available from the 1990 census data (DOC 1992). At that time, the poverty threshold was $9,981 for a family of three with one related child under 18 years of age. A total of 39,578 persons (15.2 percent of the total population) residing within the potentially affected area around Zone 4 West reported incomes below that threshold. Data obtained during the 1990 census also show that of

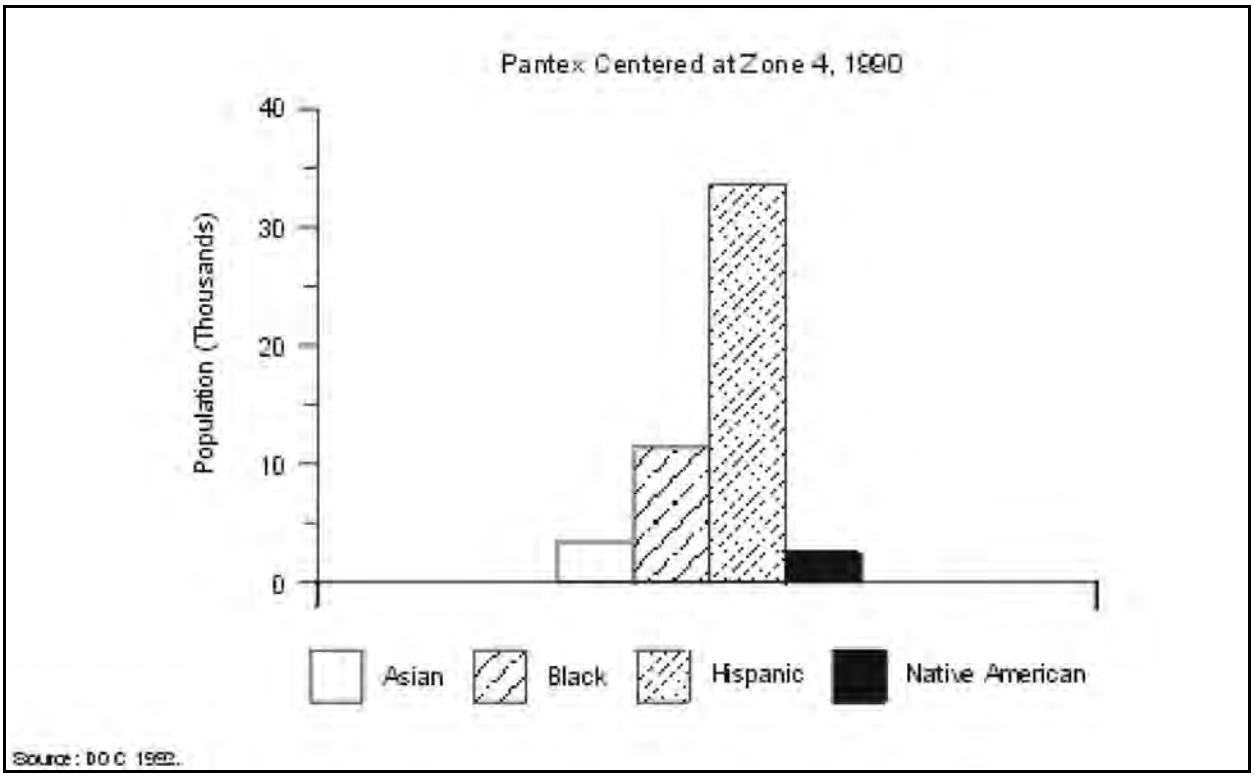


Figure 3–22. Racial and Ethnic Composition of Minorities Around Pantex

the total population of the contiguous United States, 13.1 percent reported incomes below the poverty threshold, and that Texas reported 18.1 percent.

3.4.6 Geology and Soils

Geologic resources are consolidated or unconsolidated earth materials, including ore and aggregate materials, fossil fuels, and significant landforms. Soil resources are the loose surface materials of the earth in which plants grow, usually consisting of disintegrated rock, organic matter, and soluble salts.

3.4.6.1 General Site Description

Pantex is rather flat and includes four playas on DOE property and two playas on land leased from Texas Tech University (M&H 1996a:5-5). The playas are frequently dry, with clay bottoms and depths to about 9 m (30 ft)(DOE 1996a:3-165). (See Section 3.4.7.1 for additional information on these playas.) The primary surface deposits at Pantex are Pullman soils on the Southern High Plains surface and Randall soils in the playas (M&H 1996a:3-1).

The Pullman soils are the soil horizon in the uppermost section of the Quaternary-aged Blackwater Draw Formation. This formation consists of a sequence of buried soil horizons, the upper unit of mostly clay loam and caliche about 3 m (10 ft) thick and a lower unit of silty sand with caliche 10 to 24 m (30 to 80 ft) thick. The Blackwater Draw Formation overlies the Ogallala Formation (M&H 1996a:3-1).

The Ogallala Formation of Tertiary Age regionally consists of alluvial sediments partly occupying paleovalleys, with eolian sediments capping paleouplands and most fluvial deposits. More specifically, the basal, paleovalley

fill materials consist of sands and gravels deposited in a high-energy fluvial environment along with fine sand and silt and laminated-to-massive clay resulting from overbank or floodplain deposition. Eolian sediments overlie and are interbedded with the fluvial deposits and consist of dune sand deposits as well as deposits ranging from fine sand to coarse silt thought to have been deposited as thin sand sheets and loess. Overall, a total of seven distinct lithofacies have been identified in the Ogallala Formation, including gravel; sand and gravel; fluvial sand; find sand and mud; laminated fine sand and silt; and laminated-to-massive clay, eolian sand, and fine sand to coarse silt (Gustavson 1996:1, 5, 17, 34, 48). The top of the formation is capped by the Caprock caliche. Depths to the base of the Ogallala vary considerably, from about 90 m (300 ft) at the southwest corner of the site to about 220 m (720 ft) at the northeast corner of the site (M&H 1996a:3-1). Underlying the Ogallala Formation are sedimentary rocks of the Triassic Dockum Group. This rock is as much as 30 m (100 ft) thick and consists of sandstone, siltstone, and mudstone. The portion of the Triassic Dockum Group near the northeastern corner of Pantex was eroded before the Ogallala was deposited directly on Permian strata (M&H 1996a:19). The Permian strata consist of deposits of salt, shale, limestone, argillaceous (clay-bearing) limestone, and dolomite. No economically viable geologic resources have been identified at Pantex (DOE 1996a:3-165).

Dissolution of salt beds within the Permian strata has resulted in sinkholes and fractures in nearby Armstrong and Hutchinson Counties in Texas. No sinkholes or fractures have been identified in Carson County, where the site is located. Recent work using shallow seismic data has determined that the structure beneath the playas at Pantex and adjacent areas shows the displacement of Ogallala strata. This displacement is attributed to the dissolution of underlying salt beds, an active geologic process in the region (DOE 1996a:3-165). In terms of the life of Pantex, the effects of that process are negligible (M&H 1997:19).

There are no capable faults in the vicinity of Pantex. A capable fault is one that has had movement at or near the ground surface at least once within the past 35,000 years or recurrent movement within the past 500,000-years (DOE 1996a:3-165). No tectonic faulting younger than late Permian is recognized at or near Pantex. An assessment of natural hazards at Pantex found three major subsurface faults and one minor surface fault. The subsurface faults range from 64 to 250 km (40 to 155 mi) in length and are 8 to 40 km (5 to 25 mi) from the plant site. The surface fault is estimated to be 6.4 km (4 mi) long and 32 km (20 mi) northwest of Pantex (M&H 1996a:3-8–3-10).

According to the Uniform Building Code, Pantex is on the boundary zone between Seismic Zones 0 and 1, meaning that little or no damage could occur as a result of an earthquake. This area is fairly free of earthquakes (DOE 1996a:3-165). Between 1906 and 1986, as few as 36 earthquakes were felt by persons in the Texas Panhandle. The strongest reported had a Modified Mercalli Intensity of VI. An earthquake of intensity VI is felt by everyone but causes little damage to competent structures. Many of the earthquake epicenters are associated with the Amarillo Uplift, about 32 km (20 mi) north of Pantex. An earthquake with a maximum horizontal acceleration of 0.17g is calculated to have an annual probability of occurrence of 1 in 5,000 at Pantex (Barghusen and Feit 1995:2.10–14).

There are no volcanic hazards at Pantex because there are no known areas of active volcanism in the Texas Panhandle (DOE 1996a:3-165). The nearest volcanic activity occurred 4,000 to 10,000 years ago in northeast New Mexico (M&H 1996a:3-8).

Pantex is underlain by soils of the Pullman-Randall association, which consists of nearly level to gently sloping, deep noncalcareous clays (i.e., clays containing no calcium carbonate [calcite]) and clay loams. Pullman soils underlie most of the Pantex area, but Randall soils occur in the vicinity of the playas and depressions (DOE 1996a:3-165). The Pullman soil is classified as prime farmland soil (M&H 1997:17). Soils at Pantex are acceptable for standard construction techniques (DOE 1996a:3-165). More detailed descriptions of the geology and the soil conditions at Pantex are included in the *Storage and Disposition PEIS* (DOE 1996a:3-165, 3-166) and the *Environmental Information Document for the Pantex Plant EIS* (M&H 1996a:3-1–3-53).

3.4.6.2 Proposed Facility Location

The soil types near Zone 4 West are Pullman clay loam (0 to 1 percent and 1 to 3 percent slopes) and Osteocyte clay loam (1 to 3 percent slopes). Neither of these soils is subject to liquefaction or is unstable (M&H 1997:17).

3.4.7 Water Resources

3.4.7.1 Surface Water

Surface water includes marine or freshwater bodies that occur above the ground surface, including rivers, streams, lakes, ponds, rainwater catchments, embayments, and oceans.

3.4.7.1.1 General Site Description

Pantex is situated on a flat portion of the Southern High Plains of Texas. No streams or rivers flow through Pantex. Major surface water in the vicinity includes the Canadian River, 27 km (17 mi) north of the plant, Sweetwater Creek and the Salt Fork of the Red River, respectively 80 km (50 mi) and 32 km (20 mi) to the east, and the Prairie Dog Fork of the Red River, 56 km (35 mi) to the south. The Canadian River flows into Lake Meredith about 40 km (25 mi) north of the plant. Water from Lake Meredith is mixed with water pumped from the Ogallala aquifer for use as drinking water for several Southern High Plains cities. No hydrologic connections exist to transport contaminants from Pantex into either the Canadian River or Lake Meredith (M&H 1996a:5-4, 5-5).

The only naturally occurring bodies of water on the plant site are the playas and very small, unnamed, intermittent channels and ditches that may feed storm water into them. There are three playas (Playas 1, 2, and 3) on Pantex property, two (Playas 4 and 5) on the Texas Tech University property, several adjacent to Pantex, and one, called Pantex Lake, on DOE-owned property about 4 km (2.5 mi) northeast of the main portion of Pantex. Pantex Lake received discharges from the old sewage treatment facility from 1942 until the early 1970s; however, flows from the wastewater treatment facility are now discharged to Playa 1 as permitted by the State of Texas and the EPA. Currently, there are no industrial discharges diverted to Pantex Lake, Playa 3, or Playa 5, although all of the playas receive surface water runoff from precipitation events (Barghusen and Feit 1995:2.10-17–2.10-20).

Studies have suggested that most of the recharge of the underlying Ogallala aquifer within the Southern High Plains originates from water stored in the playas. However, the playas are frequently dry because of the high, naturally occurring evaporation rate combined with a rate of infiltration that normally exceeds the rate of inflow. Playas in the area of the plant may be as large as 1,220 m (4,000 ft) in diameter and more than 9 m (30 ft) deep. Most of the playas are floored with a clay accumulation at the bottom that is lens shaped, being thickest in the middle and thinning out toward the edges. These clay floors may contain desiccation cracks up to 1.8 m (6 ft) deep when the floor is dry (Barghusen and Feit 1995:2.10-17).

The only surface waterway that flows throughout the year is the one that receives flow from the Wastewater Treatment Facility and discharges into Playa 1. In 1996, discharge to the waterway was 1,242,400 l/day (328,200 gal/day). The Wastewater Treatment Facility receives and treats sanitary waste flows and some process wastewater flows. Effluent from the Wastewater Treatment Facility is monitored pursuant to the plant's NPDES permit and TNRCC permits. The remaining channels and ditches contain flows only after storm events (DOE 1997c:112).

Industrial and storm-water discharges are authorized by State and Federal permits. Pantex is authorized to discharge wastewater into Playas 1, 2, and 4 under NPDES Permit TX0107107, issued June 1, 1996, and TNRCC Wastewater Discharge Permit 02296, issued June 14, 1996. These permits define the volume and quality

of effluent flows that may be discharged to the playas. Storm water from industrial activities is permitted to be discharged into Playas 1, 2, 3, and 4 by general NPDES Permit TXR00G138, issued February 15, 1995. Pollution prevention plans are required by this permit, which establishes 10 outfalls throughout Pantex where effluent samples are to be taken (M&H 1997:15). Pantex is currently transitioning to the new Multi-Sector General Permit for Storm Water. This permit will require monitoring at 8 storm water outfalls (Weinreich 1997). Pantex is also authorized to discharge storm water from construction activities that disturb more than 2 ha (5 acres) under the "Final NPDES General Permits for Storm Water Discharges from Construction Sites" (57 Federal Register 41176). A notice of intent is filed for each individual construction project and a pollution prevention plan is prepared and implemented. No sampling requirements are associated with these permitted activities (M&H 1997:15). On September 14, 1998 (63 Federal Register 51164), the State of Texas was authorized by EPA to assume administration of the NPDES permit program. While permits already issued by EPA will remain in effect until they expire or are replaced by a TNRCC-issued permit, this will ultimately result in consolidation of the industrial and storm-water discharge permits held by Pantex under the Texas Pollutant Discharge Elimination System (EPA 1998a).

The playas are considered by the State of Texas to be "waters of the State." The Pantex playas have been designated as jurisdictional wetlands, and therefore are also waters of the United States (DOE 1996a:3-157). Including monitoring required by NPDES and TNRCC permits, surface water is monitored for radioactive and nonradioactive parameters at 37 onsite locations, including the playas (DOE 1997c:iii).

Sampling data for surface waters at the site in 1996 showed that concentrations of radionuclides were similar to historical levels and lower than the derived concentration guides for ingested water (DOE 1997c:table 10.2). Moreover, little concern emerged during the monitoring of surface waters, and discharges to them, for a variety of other parameters, including organics, metals, explosives, polychlorinated biphenyls, and pesticides. Toluene was detected twice at the wastewater treatment plant effluent outfall (Outfall 001); however, it was not detected in the plant influent 30 days prior to sampling. No noncompliances were reported at any of the other monitored outfalls or sampling points on the site. Throughout the 1996 sampling season, Pantex Lake was dry, and no samples could be collected (DOE 1997c:116).

On December 2, 1997, EPA issued Mason & Hanger Corporation at Pantex an Administrative Order regarding its NPDES Permit No. TX107107. During 1997, Pantex periodically exceeded some discharge limits set by the permit. The exceedances included ammonia, oil and grease, total suspended solids, and total metals. Although Pantex exceeded the limits set by the EPA permit, based on all available data, the levels of constituents found in the wastewater do not pose a threat to public health or the environment. The Administrative Order required correction of exceedances within 30 days, and for those exceedances that could not be corrected within 30 days, submittal of a corrective action plan. A comprehensive plan was submitted to EPA on December 22, 1997. EPA indicated that it intended to use the plan to develop a negotiated compliance agreement. The complaince agreement was signed on November 24, 1998 by DOE (Battley 1999). Pantex is proceeding with implementation of its corrective action plan. Corrective actions include upgrading the Wastewater Treatment Facility; soil stabilization and erosion control measures; and operational, maintenance, and monitoring program modifications. These engineered solutions are scheduled for completion in the year 2003 (Nava 1998; DOE 1999a).

An EA was recently completed for the wastewater treatment plant upgrade (DOE 1999d) and a FONSI was issued (DOE 1999e). As selected in the FONSI, the project to upgrade the existing Wastewater Treatment Facility will essentially involved the construction of a new, zero-discharge facility south of the current facility and outside the 100-year floodplain of Playa 1. Specifically, two new lagoons will be constructed, one serving as a facultative treatment lagoon and the second as an irrigation water storage reservoir and alternate treatment lagoon. The existing Wastewater Treatment Facility lagoon will be retained as a supplemental storage facility for treated wastewater effluent.

Beginning in 2003, instead of being discharged to Playa 1, treated effluents will be disposed of via land application for the irrigation of crops in cooperation with the Texas Tech University Research Farm. Either a subsurface flow system, a center-pivot system, or an overland flow irrigation system will be used to apply effluents (DOE 1999d, 1999e).

Water rights in Texas fall under the Doctrine of Prior Appropriations. Under this doctrine, the user who first appropriates water for a beneficial use has priority in the use of available water supplies over a user claiming rights at a later time. Courts also recognize riparian rights legally granted in Spanish-American Agreements. TNRCC is the administrator for water rights and the permit-issuing authority (DOE 1996a:3-160). Because Pantex does not use any surface water, it exerts no surface water rights.

Figure 3–23 shows the surface water drainage basins for each of the playas (DOE 1996f:4-76). Storm-water runoff from the industrialized areas of Pantex collects within the playas and the tailwater pit and does not flow offsite. Storm water that is collected in the tailwater pit at the northeast boundary of the site is pumped to a ditch that flows to Playa 1 (M&H 1996a:5-7). General flooding of some low-lying portions of Pantex could occur as a result of runoff associated with precipitation and the subsequent filling of the playas. Historically, there has been no major flooding at the Pantex site (M&H 1996a:5-17–5-24; 1996b:2-11). There are no federally designated Wild and Scenic Rivers on the site (Barghusen and Feit 1995:2.10-2).

3.4.7.1.2 Proposed Facility Location

Most surface runoff near Zone 4 West flows to Playa 1(M&H 1996b:2-11; 1997:24). However, a very small portion of this area flows to Playa 2. The distance between the proposed surplus plutonium disposition facilities and the drainage basin divide is sufficient to prevent storm-water flows from the proposed facilities from entering Playa 2. Playa 1 has a surface area of 32 ha (79 acres) and Playa 2, 30 ha (74 acres) (M&H 1996a:5-6). A review of flooding maps of the playas indicates that the 100-year flood elevation for Playa 1 is 1,073.4 m (3,522 ft) and for Playa 2 it is 1,074.7 m (3,526 ft). The elevation of the proposed facilities is 1,084 m (3,556 ft) (DOE 1996f:4-77).

Playa 3 is upgradient from the proposed surplus plutonium disposition facilities and the 100-year flood elevation is 1,086.5 m (3,565 ft). The maps indicate that water elevations above that of the 100-year flood would result in sheet overflow at shallow depths in the direction of the proposed facilities. Figure 3–23 shows the approximate extent of the floodplains at Pantex (DOE 1996b:4-76).

Results of surface water quality sampling from 1994 confirm that Pantex was in compliance with all water quality regulations for Playa 1 and that, with the exception of a high water level in Playa 1 in July 1994 attributable to a rainfall event, all permit requirements were met (DOE 1996a:3-157).

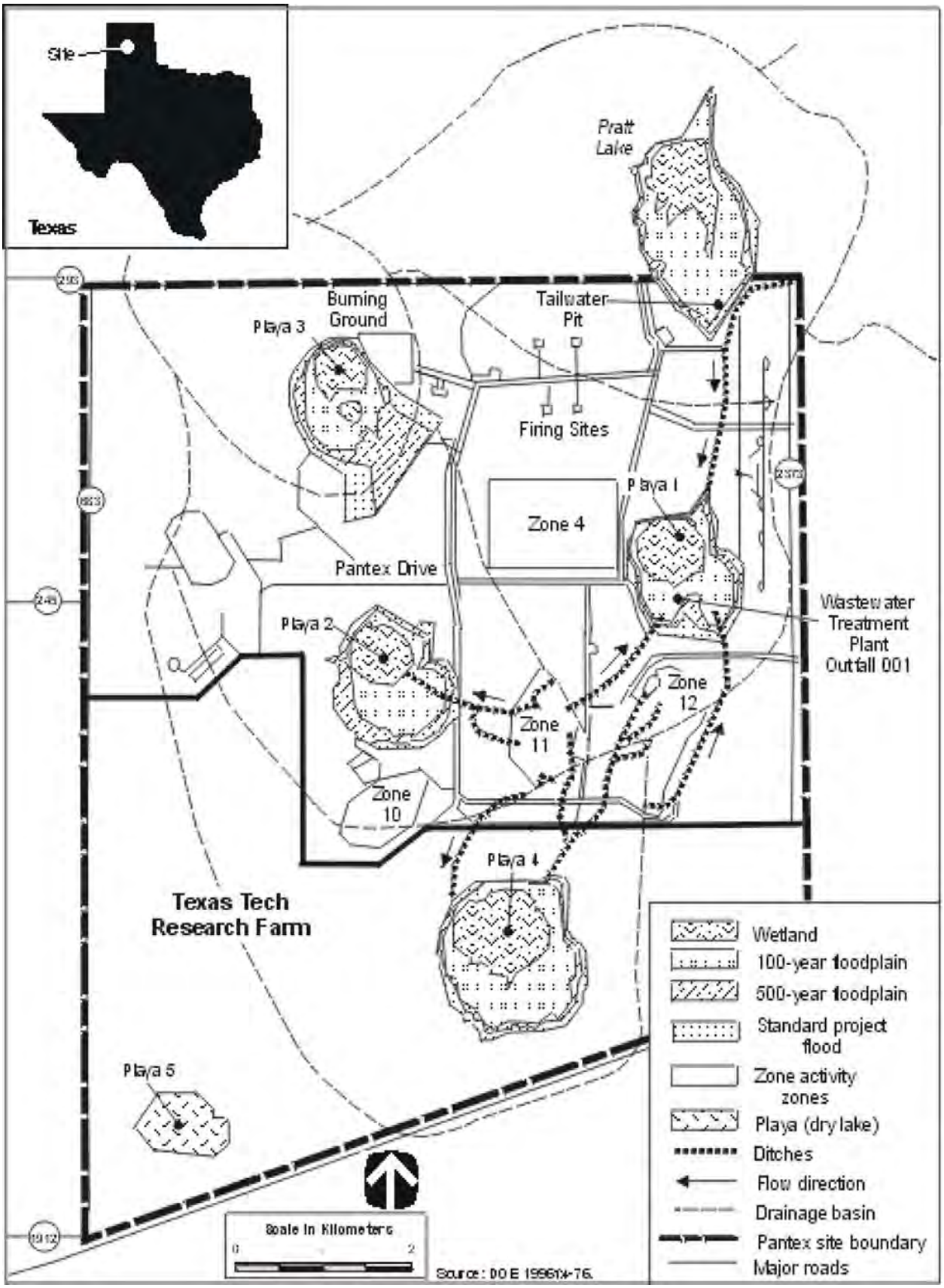


Figure 3–23. Locations of Floodplains and Playas at Pantex

3.4.7.2 Groundwater

Aquifers are classified by Federal and State authorities according to use and quality. The Federal classifications include Class I, II, and III groundwater. Class I groundwater is either the sole source of drinking water or is ecologically vital. Class IIA and IIB are current or potential sources of drinking water (or other beneficial use), respectively. Class III is not considered a potential source of drinking water and is of limited beneficial use.

3.4.7.2.1 General Site Description

The three primary hydrostratigraphic units, (i.e., separate layers of water), in the vicinity of Pantex are the Blackwater Draw Formation, the Ogallala Formation, and the Triassic Dockum Group. The units as a whole constitute the vadose (unsaturated) zone, the saturated perched aquifer zone, and the lower, saturated main aquifer below the site (M&H 1996a:4-1).

The Blackwater Draw Formation has been identified as the most widespread post-Ogallala unit throughout the Southern High Plains. It consists of modified eolian sands and silts interbedded with numerous caliches composed of variably cemented carbonate layers and nodules. The thickness of the Blackwater Draw Formation at Pantex is variable, ranging from 15 to 24 m (50 to 80 ft) (M&H 1996a:4-4).

The High Plains aquifer, commonly referred to as the Ogallala aquifer, underlies the southern part of the Great Plains physiographic province. It is the primary water source for the Texas Panhandle and eastern New Mexico. The Ogallala aquifer in the vicinity of Pantex consists primarily of the saturated lower Ogallala Formation, although water is also produced from strata as old as Permian (M&H 1996a:4-4).

The Ogallala aquifer exists in unconfined conditions. Recharge occurs from precipitation and subsequent infiltration of surface water either through surface soils or through focused recharge from the numerous playas that occur across the area. Direct recharge of the aquifer can occur in those limited areas where the aquifer formation is at the surface, but no outcrops exist at Pantex. Recent evidence supports significant recharge of the aquifer below the playas in the Southern High Plains; however, evidence of such recharge has not been determined for the Ogallala aquifer at Pantex (M&H 1996a:4-1).

Depths to the Ogallala aquifer generally run parallel to the regional land surface, which dips gently from northwest to southeast (M&H 1996a:3-36, 4-15). The depth to the Ogallala aquifer at Pantex varies from about 104 m (341 ft) at the southern boundary to 140 m (459 ft) at the northern boundary (M&H 1997:14). This south-to-north groundwater flow contrasts with the regional northwest-to-southeast trend of the remaining portion of the Southern High Plains. Localized disruption of these generalized flow patterns can occur where significant withdrawals are made, such as near the city of Amarillo Carson County well field about 3.2 km (2 mi) northeast of Pantex (M&H 1996a:4-1).

The Triassic Dockum Group underlying the Ogallala Formation is believed to be as thick as 30 m (100 ft) under Pantex. The lateral extent, thickness, and hydraulic characteristics of this group have not been established beneath Pantex, and well logs usually identify these only as Triassic or red beds (M&H 1996a:4-4, 4-5). However, limited data from regional hydrogeologic studies of the Dockum Group divide it into an upper and a lower section, with only the Lower Dockum Group inferred to exist beneath portions of Carson County, including the southwest portion where Pantex is located. The Lower Dockum Group consists predominantly of fine to coarse-grained sandstones and granular and pebble conglomerate along with mudstone sequences of alluvial, deltaic, and lacustrine origin. It has a thickness of less than 61 m (200 ft) beneath southwestern Carson County, consistent with site-specific data (Dutton and Simpkins 1986:3-4).

The water-bearing stratum of the Lower Dockum Group is the Lower Dockum aquifer. Regionally, the surface of the aquifer lies 91 to 213 m (300 to 700 ft) below the water table of the Ogallala aquifer and below the base of the Ogallala Formation (Dutton and Simpkins 1986:13). Any interconnection between the High Plains (Ogallala) aquifer system and the Lower Dockum aquifer across most of the Southern High Plains is thought to be poor at best, with little current recharge occurring (having ended during the Pleistocene epoch) (Dutton and Simpkins 1986:13, 24). Although at Pantex the upper confining layer of the Lower Dockum aquifer is absent, there are indications that it may be hydraulically connected to the overlying Ogallala aquifer. (M&H 1996a:4-7, 4-15-16).

The two main water-bearing units beneath the plant are the Tertiary Ogallala Formation and the Triassic Dockum Group. Two water-bearing zones in the Ogallala Formation are present beneath the plant. The first is a perched water zone above the main zone of saturation. One of these is present beneath Playa 1. The perched water zones consist of discontinuous perched water lenses, the lateral extent of which has not been fully determined. The second and deeper water-bearing zone is the Ogallala aquifer, which is the primary source of water for drinking, irrigation, and commercial uses (M&H 1996a:4-5). In general, factors such as well yield, depth to water, and high solids content limit production of the Lower Dockum Group aquifer for potable purposes. Irrigation water is supplied by the Dockum Group rather than the Ogallala Formation in locations to the west and south of Pantex, but Ogallala water is reportedly mixed with groundwater from the Dockum Group to meet the potable water needs of a few municipalities (Dutton and Simpkins 1986:3, 21, 22). There are no designated sole source aquifers near Pantex (Barghusen and Feit 1995:2.10-2).

Five production wells in the northeast corner of Pantex provide water for the plant's needs (DOE 1996a:3-162). Pantex water use has decreased during the period from 1991 to 1995 by 231 million l (61 million gal), from a maximum of 848 million l (224 million gal) of water in 1991, to 617 million l (163 million gal) of water in 1995 (M&H 1996a:4-33, 9-8). In 1995, the city of Amarillo produced 23.6 billion l (6.2 billion gal) of water from the Ogallala aquifer via the Carson County well fields. In addition, approximately 101 billion l (27 billion gal) of water were applied for irrigation in Carson County in 1995 (DOE 1996f:4-104).

Groundwater is controlled by the individual landowner in Texas through the Doctrine of Prior Appropriations (DOE 1996a:3-160). TNRCC and the Texas Water Development Board are the two State agencies with major involvement in groundwater fact finding, data gathering, and analysis. Groundwater management is the responsibility of local jurisdictions through Groundwater Management Districts. Pantex is in Panhandle Groundwater District 3, which has the authority to require permits and limit the quantity of water pumped. Historically, the Panhandle Groundwater Conservation District has not limited the quantity of water pumped. However, for wells drilled after July 19, 1995, that produce more than 1,300,000 1/yr (350,000 gal/yr) per acre owned, landowners will be required to obtain a High Production Permit from the Panhandle Groundwater Conservation District (DOE 1996f:4-105).

As described in Section 3.4.10.1, the DOE-owned portion of Pantex is approximately 41 km^2 (4,100 ha or 10,100 acres) in area. Therefore, a High Production Permit would be required if DOE were to exceed approximately 13 billion 1/yr (3.4 billion gal/yr) of groundwater withdrawals. As shown in Table 3–36, the current usage is about 850 million 1/yr (225 million gal/yr), with a system capacity of about 3.8 billion 1/yr (1 billion gal/yr). Further detail on the groundwater resources at Pantex may be found in the *Storage and Disposition PEIS* (DOE 1996a) and the *Environmental Information Document: The Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components EIS* (M&H 1996a).

3.4.7.2.2 Proposed Facility Location

Given the nature and extent of the Ogallala aquifer, the general site description is believed to be representative of conditions beneath Zone 4 West. Water for the proposed facilities would be supplied from the existing site water system, which uses groundwater; no surface water would be used (M&H 1997:13).

3.4.8 Ecological Resources

Ecological resources are defined as terrestrial (predominantly land) and aquatic (predominantly water) ecosystems characterized by the presence of native and naturalized plants and animals. For the purposes of this SPD EIS, those ecosystems are differentiated in terms of habitat support of threatened, endangered, and other special-status species—that is, "sensitive" versus "nonsensitive" habitat.

3.4.8.1 Nonsensitive Habitat

Nonsensitive habitat comprises those terrestrial and aquatic areas of the site that typically support the region's major plant and animal species.

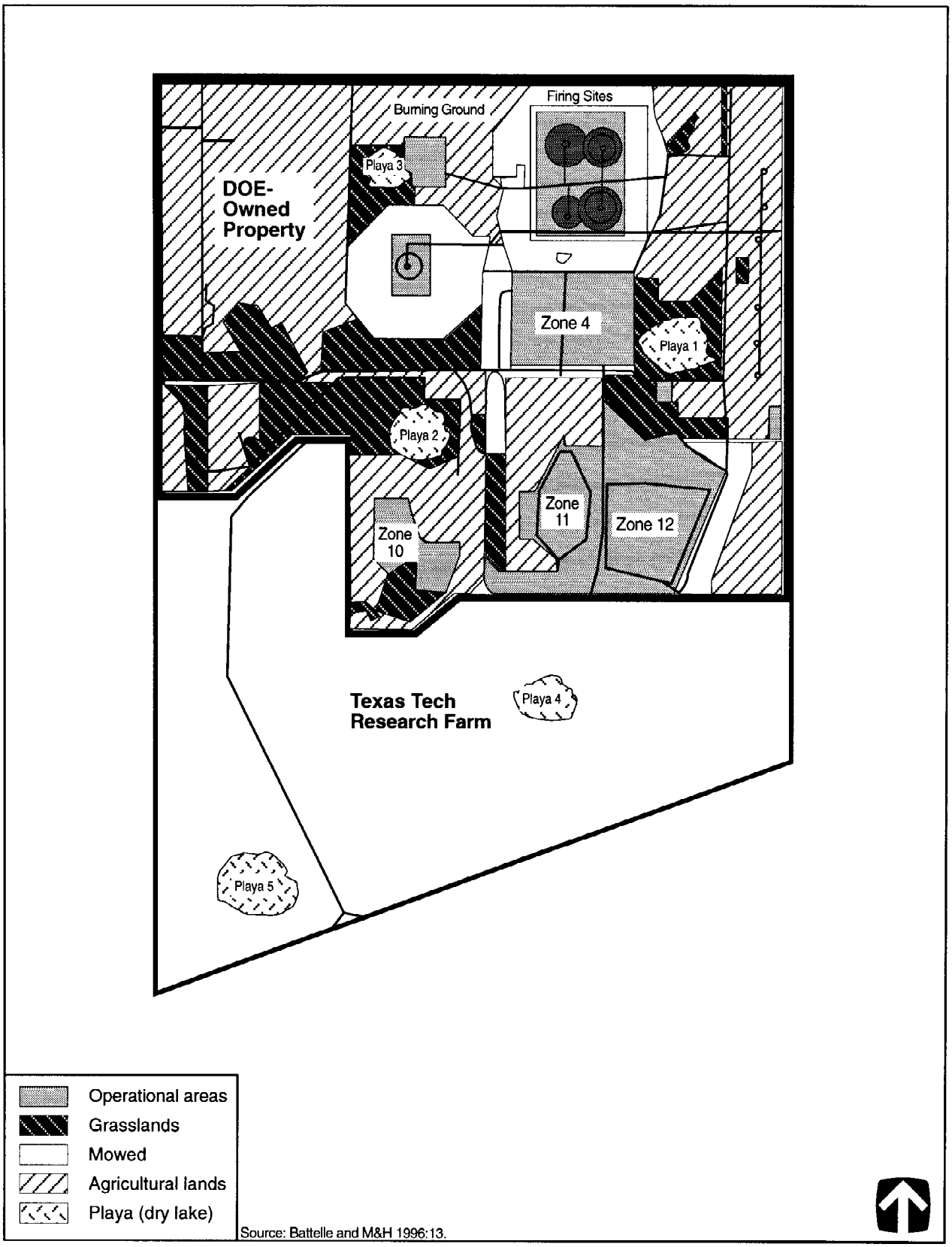
3.4.8.1.1 General Site Description

Pantex is on a treeless portion of the High Plains where 229 plant species and numerous animal species thrive (DOE 1996a:3-166). Short-grass prairie grasslands were the native vegetation until the prairie was converted to agricultural use for crops, grazing, or protective vegetative cover under the Conservation Reserve Program. The few remaining native grassland areas are heavily grazed by livestock. Such grazing has transformed much of the rangeland from the native blue grama-buffalo grass to brush, forbs, or cacti. Essentially all land at Pantex has been managed or disturbed to some degree. The following five basic habitat types have been identified: operational areas, grasslands, mowed areas, agricultural croplands, and playas as shown in Figure 3–24 (Battelle and M&H 1996:8, 11).

Animal species found at Pantex include 7 species of amphibians, 43 species of birds, 19 species of mammals, and 8 species of reptiles. Common bird species known to exist in the vicinity of Pantex include the western meadowlark, mourning dove, horned lark, and several species of sparrows. Raptors on the site include the Swainson's hawk, American kestrel, and burrowing owl. Frequently sighted mammals include the black-tailed jackrabbit, black-tailed prairie dog, and hispid cotton rat. Although hunting is not permitted on the site, game animals include the desert cottontail, northern bobwhite, scaled quail, and numerous waterfowl. Predators present include the badger and coyote (DOE 1996a:3-166).

Aquatic habitats are limited to Playa 1, several wastewater treatment lagoons, and ditches, and five playas that contain water after precipitation events (Playas 2, 3, 4, and 5, and Pantex Lake). Vegetation in these areas is quite variable. Playa 1 receives treated effluent from the wastewater treatment facility, and because of this year round flow supports extensive stands of barewaist cattail, tule, or soft-stemmed bulrush. Playa 2 is nearly covered with smartweeds, while longspike spikerush is the most abundant species at Playa 3. Pantex Lake, the largest playa, supports a large number of species, longspike spikerush and wooly bursage being the most common, as is the case for Playa 4. Playa 5 is on Texas Tech University property and is not influenced by Pantex activities. The diversity of macroinvertebrates is playa-specific, and more than 80 species have been recorded (Battelle and M&H 1996:20–22).

Birds are the most conspicuous animal associated with the playas in terms of numbers, diversity, and biomass. Situated along the central flyway migratory route, the playas provide valuable habitat for migration, wintering, and nesting. The most common wintering ducks are mallards, northern pintails, green-winged teals, and



Source: Battelle and M&H 1996:13.

Figure 3–24. Generalized Habitat Types at Pantex (Main Plant Area)

American wigeons. Species known to breed in playas include the mallard, northern pintail, blue-winged teal, cinnamon teal, northern bobwhite, western meadowlark, yellow-headed blackbird, red-winged blackbird, and ring-necked pheasant (Battelle and M&H 1996:22).

3.4.8.1.2 Proposed Facility Location

The immediate environs of Zone 4 West are mowed for security and fire protection purposes. The security fencing system around Zone 4 West contains bare ground, whereas the interior of the zone contains areas of buffalo grass between structures (M&H 1997:20). An agricultural area northwest of Zone 4 West is regularly planted with winter wheat. South of the zone is a previously cultivated area that has been revegetated with native grass species of buffalo grass, blue grama, and sideoats grama (King 1997a:8). Several animal species could be present in and around Zone 4 West. Mammals sighted in this area include the cottontail rabbit, black-tailed jackrabbit, striped skunk, coyote, and thirteen-lined ground squirrel. Reptiles and amphibians known to inhabit the area include the prairie rattlesnake, Texas horned lizard, Great Plains skink, bull snake, Great Plains toad, plains spadefoot toad, and tiger salamander. Birds found in the area include the western burrowing owl, western meadowlark, western kingbird, eastern kingbird, American kestrel, horned lark, mourning dove, pigeon, grasshopper sparrow, and numerous waterfowl and other species associated with wetlands (King 1997a:8; M&H 1997:20).

3.4.8.2 Sensitive Habitat

Sensitive habitat comprises those terrestrial and aquatic (including designated wetlands) areas of the site that support threatened and endangered, State-protected, and other special-status plant and animal species.[7]

3.4.8.2.1 General Site Description

Playas 1, 2, 3, and 4 and Pantex Lake have been designated by USACE as jurisdictional wetlands and are therefore regulated pursuant to Section 404 of the Clean Water Act (Battelle and M&H 1996:20).

Ten threatened, endangered, or other special-status species listed by the Federal Government or the State of Texas may be found in the vicinity of Pantex, as shown in Table 3.5.6–1 in the *Storage and Disposition PEIS* (DOE 1996a:3-166).

3.4.8.2.2 Proposed Facility Location

Portions of the drainage basins for Playas 1, 2, and 3 lie in or near Zone 4 (see Figure 3-23). Some shorebirds and waterfowl (e.g., grebes, blackbirds, teals, ducks, and heron) nest or feed within the grasslands and cultivated fields associated with these playas (King 1997a; M&H 1997:21).

Although there is no critical habitat for any threatened or endangered species at Pantex, four special-status species may be found within the environs of Zone 4 West, as shown in Table 3–35. The ferruginous hawk is a common winter resident that feeds on prairie dogs and cottontail rabbits. The area west of Zone 4 West is a potential feeding location because of its prairie dog towns. The prairie dogs are removed from this area at least annually. Also associated with the prairie dog towns is the western burrowing owl. Up to 10 pairs have been identified as nesting in the area just west of Zone 4 West. Although not observed anywhere on Pantex since 1996, the swift fox (*Vulpes velox*), a candidate for Federal listing as a threatened or endangered species, may be present

[7] The Federal Government defines threatened and endangered species in the Endangered Species Act, and wetlands in 33 CFR 328.3.

on the site, judging from the historical observation of field indicators in areas adjacent to Zone 4 and Zone 4 West. The Texas horned lizard is fairly common and is seen most frequently around the

Table 3–35. Threatened and Endangered Species, Species of Concern, and Sensitive Species Occurring or Potentially Occurring in Areas Surrounding Zone 4 West

Common Name	Scientific Name	Federal Status	State Status
Birds			
Ferruginous hawk	*Buteo regalis*	Species of Concern	Not listed
Western burrowing owl	*Athene cunicularia hypugea*	Species of Concern	Not listed
Mammals			
Swift fox	*Vulpes velox*	Candidate species	Not listed
Reptiles			
Texas horned lizard	*Phrynosoma cornutum*	Species of Concern	Threatened

Source: M&H 1997:21, 22.

playas. Because it feeds mainly on harvester ants found throughout Pantex, there is a high probability of its occurrence in and around Zone 4 West (M&H 1997:21, 22).

3.4.9 Cultural and Paleontological Resources

Cultural resources are human imprints on the landscape and are defined and protected by a series of Federal laws, regulations, and guidelines. Pantex has a well-documented record of cultural resources. These resources include 69 archaeological sites indicating prehistoric Native American and historic European-American occupation and use. They also include the standing structures, foundations, and other extant features once part of the Pantex Ordnance Plant (1942-1945), the World War II predecessor of Pantex. In addition, many structures and features associated with Cold War era (1951-1991) operations at the plant are included in the cultural resource inventory. Pantex also maintains valuable historic documents, records, and artifacts pertinent to interpretation of the prehistoric and historic human activities conducted on the site (M&H 1996a).

Cultural sites are often occupied continuously or intermittently over substantial time spans. For this reason, a single location (sites) may contain evidence of use during both historic and prehistoric periods. In the discussions that follow, the numbers of prehistoric and historic resources are presented; the sum of these resources may be greater than the total number of sites reported due to this dual-use history at sites. Therefore, where the total number of sites reported is less than the sum of prehistoric and historic sites certain locations were used during both periods.

Approximately 50 percent of Pantex, including DOE-leased and -owned property, has been surveyed for archaeological resources. Both the Texas State Historic Preservation Officer and the Advisory Council on Historic Preservation have agreed that additional archaeological surveys are not required. All World War II buildings, structures, and remains at Pantex have been surveyed and recorded. A building survey and an oral history program on the Cold War period are ongoing. By calendar year 1999, all the plant's cultural resources will be managed under a comprehensive Cultural Resource Management Plan required by the National Historic Preservation Act. Until that time, resources will be effectively managed through existing case-by-case procedures and interim agreements that comply with the act (M&H 1997:26, 27).

3.4.9.1 Prehistoric Resources

Prehistoric resources are physical properties that remain from human activities that predate written records.

3.4.9.1.1 General Site Description

Prehistoric site types identified at Pantex include small temporary campsites and limited-activity locations characterized by surface scatters of artifacts. Archaeological surveys at Pantex have systematically covered about one-half of the facility. About 60 prehistoric sites have been recorded to date on DOE and Texas Tech University property. In consultation with the Texas State Historic Preservation Officer and the Advisory Council on Historic Preservation, DOE has determined that only two prehistoric archaeological sites are potentially eligible for inclusion on the National Register.

3.4.9.1.2 Proposed Facility Location

There are no National Register–eligible sites near Zone 4 West (M&H 1997:26, 27).

3.4.9.2 Historic Resources

Historic resources consist of physical properties that postdate the existence of written records. In the United States, historic resources are generally considered to be those that date no earlier than 1492.

3.4.9.2.1 General Site Description

Historic resources at Pantex include European-American farmstead sites represented by foundations and artifact scatters; World War II era buildings, structures, and foundations; and Cold War era buildings and structures. To date, 12 European-American farmstead sites have been surveyed and recorded. In consultation with the Texas State Historic Preservation Officer and the Advisory Council on Historic Preservation, DOE has determined that these sites are not eligible for inclusion on the National Register. All remaining World War II era buildings, structures, and foundations have been surveyed and recorded. Under the terms of the programmatic agreement executed in October 1996 among DOE, the Texas State Historic Preservation Officer, and the Advisory Council on Historic Preservation (DOE 1996g), plant properties requiring modification are reviewed by plant staff, and appropriate mitigation is completed.

3.4.9.2.2 Proposed Facility Location

According to existing information, it is unlikely that unrecorded historic sites exist within Zone 4 West. If required, additional reviews by the State Historic Preservation Office are expected to be minimal (M&H 1997:27). Inadvertent discoveries will be addressed as discussed in Chapter 5.

3.4.9.3 Native American Resources

Native American resources are sites, areas, and materials important to Native Americans for religious or heritage reasons. In addition, cultural values are placed on natural resources such as plants, which have multiple purposes within various Native American groups. Of primary concern are concepts of sacred space that create the potential for land-use conflicts. The identification of these resources is determined through consultations with potentially affected Native American groups (see Chapter 5 and Appendix O).

3.4.9.3.1 General Site Description

A treaties search has been completed, indicating that four federally recognized Native American tribes, the Kiowa, Comanche, Apache, and Cheyenne-Arapaho Tribes of Oklahoma, are culturally affiliated with the Texas Panhandle region. Pantex staff have contacted these four and six additional tribes: the Mescalero and Jicarilla Apache Tribes, the Caddo Tribe of Oklahoma, the Delaware Tribe of Western Oklahoma, the Wichita and

affiliated tribes, and the Fort Sill Apache Tribe. As a result of these consultations no mortuary remains, associated artifacts, or traditional cultural properties have been identified at Pantex, nor are they likely to be (M&H 1997:27).

3.4.9.3.2 Proposed Facility Location

Zone 4 West does not contain any recognized Native American resources. Consultations (see Chapter 5 and Appendix O) were initiated with appropriate Native American groups to determine any concerns associated with the actions evaluated in this SPD EIS.

3.4.9.4 Paleontological Resources

Paleontological resources are the physical remains, impressions, or traces of plants or animals from a former geological age.

3.4.9.4.1 General Site Description

The surficial geology of the Pantex area consists of silts, clays, and sands of the Blackwater Draw Formation. In other areas of the Southern High Plains, this formation contains Late Pleistocene vertebrate remains including bison, camel, horse, mammoth, and mastodon, with occasional evidence of their use by humans (M&H 1997:27).

3.4.9.4.2 Proposed Facility Location

No paleontological resources have been reported for Zone 4 West.

3.4.10 Land Use and Visual Resources

3.4.10.1 Land Use

Land may be characterized by its potential for the location of human activities (land use). Natural resource attributes and other environmental characteristics could make a site more suitable for some land uses than for others. Changes in land use may have both beneficial and adverse effects on other resources (biological, cultural, geological, aquatic, and atmospheric).

Pantex is in Carson County, approximately 27 km (17 mi) northeast of downtown Amarillo. The operational activities of the site are confined to 60 km^2 (23 mi^2) of land, of which approximately 37 km^2 (14 mi^2) are owned by the Federal Government. The remaining lands are leased from Texas Tech University to provide a safety and security buffer zone. In addition to the Pantex site, DOE owns a 4.4 km^2 (1.7 mi^2) portion of a large playa approximately 6.4 km (4 mi) northeast of the plant (DOE 1996a:3-148).

3.4.10.1.1 General Site Description

Regional land use within an 80-km (50-mi) radius of Pantex is predominately agricultural (DOE 1996f:4-26). Most of this expanse is devoted to rangeland along the Canadian River drainage north of Pantex and in the tributary drainage of the Red River to the south (DOE 1996f:4-26). Cropland, for both irrigated and dry-land crops, is the second largest land-use category behind rangeland. Some private property owners have enrolled their land in the Federal Conservation Reserve Program. Under terms of the program, the land cannot be cultivated or grazed for 10 years (DOE 1996f:4-22). However, most of the land is cultivated. The land surrounding Pantex is rural private property. The closest offsite residences are approximately 48 m (160 ft) from the plant boundary in the western and northeastern sectors (DOE 1996a:3-148).

Commercial, residential, industrial, institutional, and public lands constitute a small part of the total land use within an 80-km (50-mi) radius. These areas are associated mainly with the towns and cities of the region (DOE 1996f:4-26). Amarillo, which is primarily residential, is the largest urban area in the region.

Land-use categories at Pantex include industrial, agricultural, rangeland, open space, and playa areas. Generalized land uses at Pantex and the vicinity are shown in Figure 3–25. Several areas of land not actively committed to Pantex operations are used by Texas Tech University for agricultural purposes. Agricultural activities generally consist of dry farming and livestock grazing. The soil at Pantex contains several types that, according to the Natural Resources Conservation Service have been classified as prime farmland soils (DOE 1996a:3-148).

Approximately 23 percent of the Pantex site has been developed for industrial use (DOE 1996f:4-21). Pantex is divided into four major working areas: manufacturing, high-explosives development, test firing sites, and support facilities. The manufacturing area is devoted to the fabrication of high-explosives components and weapons assembly and disassembly operations. The area in which nuclear weapons operations are conducted covers approximately 80 ha (200 acres) and contains more than 100 buildings (DOE 1983:3-1). This area is surrounded by a security zone.

DOE will manage future land and facility use at Pantex through the land- and facility-use planning process. Guidance for future site development and reuse is based on long-term goals and objectives shared by DOE and stakeholders (DOE 1996f:4-24). Pantex has a *Site Development Plan* that depicts the plant upon completion of the projects outlined in the *Technical Site Information Five Year Plan*. Land resources at Pantex are expected to remain constant with continued leasing of Texas Tech University land for security and safety reasons (M&H 1996a:10-31). *The Integrated Plan for Playa Management at Pantex Plant* provides land-use guidelines for the playas and surrounding areas. This plan is being implemented as a best management plan to protect cultural and natural resources (M&H 1996c:10-41).

Within the State of Texas, land-use planning occurs only at the municipal level. The *1995 City of Amarillo Comprehensive Plan* has designated land for future growth within the city limits (DOE 1996f:4-33). Future residential development is expected to the southwest, away from the Pantex site. The East Planning Area of the city, which extends to within 3.2 km (2 mi) of Pantex, has historically been one of the slower growing residential areas. Because of the presence of the airport and industrial land use in the area, the comprehensive plan encourages compatible rather than residential use (DOE 1996a:3-148). No future land use has been projected by the city of Amarillo or county planning agencies (M&H 1996a:10-31).

No onsite areas are subject to Native American Treaty Rights.

3.4.10.1.2 Proposed Facility Location

Existing land use within Zone 4 West is designated as industrial. It contains the weapons/high-explosives magazines and interim pit storage area (DOE 1996f:4-21). It also supports various DOE nuclear weapons design agencies. The land is currently disturbed and is designated for high-explosives development. Zone 4 is 1.8 km (1.1 mi) from the nearest site boundary.

Areas immediately adjacent to the zone to the north, south, and west are designated as open space. Lands to the east are primarily designated as rangeland and agricultural land. About 0.4 km (0.2 mi) to the east of Zone 4 is the Playa 1 Management Unit. Playa 1 currently receives permitted industrial and sanitary sewage effluents from the wastewater treatment facility as well as storm-water runoff from Zones 4, 11, and 12 (M&H 1996c:4). According to the *Facility Assessment Visual Site Inspection Report* prepared under RCRA (M&H 1996c:4), previous discharges of industrial pollutants into the playa have resulted in its classification as a solid

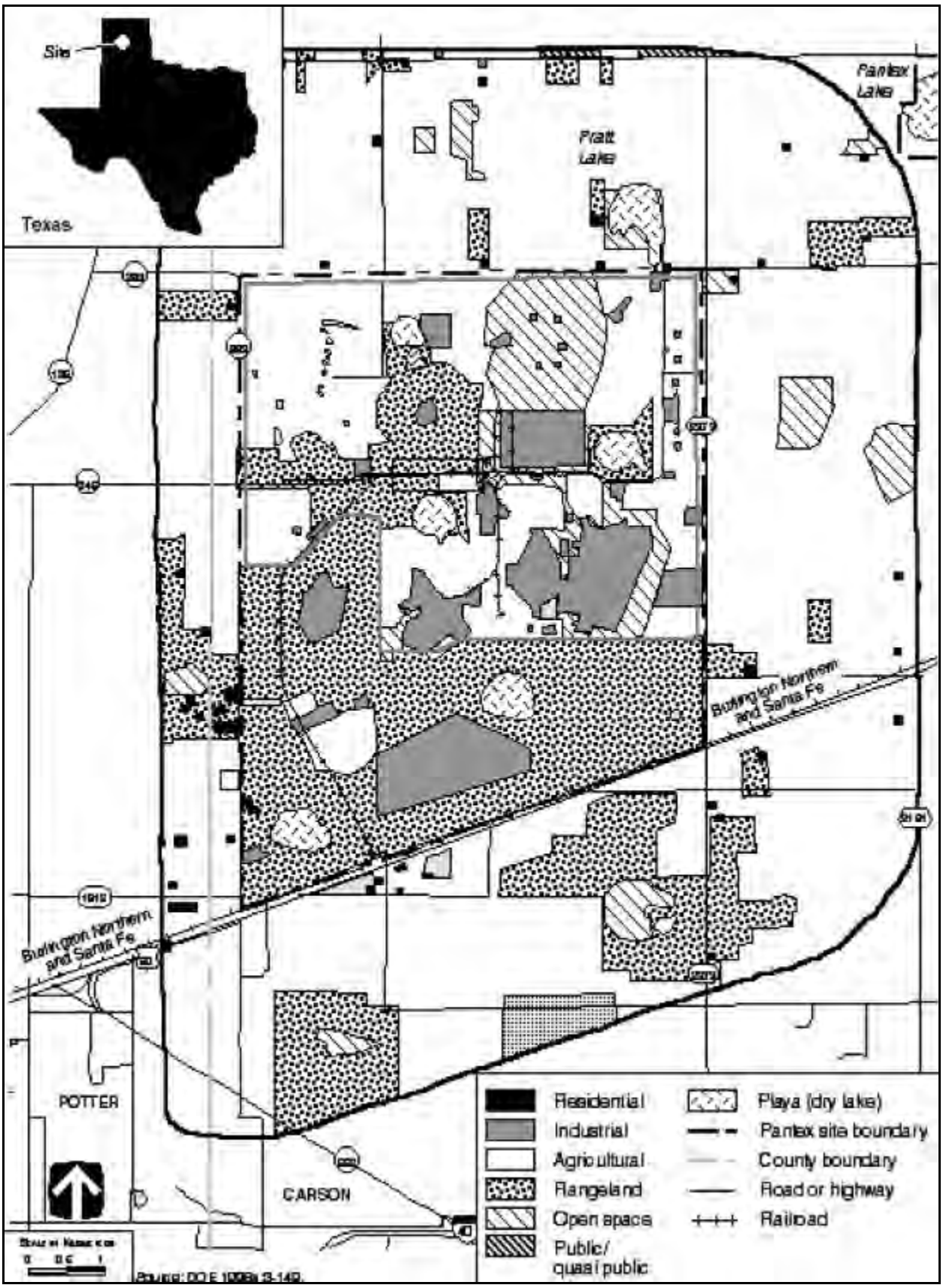


Figure 3–25. Generalized Land Use at Pantex and Vicinity

waste management unit (SWMU). Any activities disturbing the soils within an SWMU, including remedial activities, are regulated under RCRA and require additional management (M&H 1996c:4).

3.4.10.2 Visual Resources

Visual resources are natural and human-created features that give a particular landscape its character and aesthetic quality. Landscape character is determined by the visual elements of form, line, color, and texture. All four elements are present in every landscape; however, they exert varying degrees of influence. The stronger the influence exerted by these elements in a landscape, the more interesting the landscape. The more visual variety that exists with harmony, the more aesthetically pleasing the landscape.

3.4.10.2.1 General Site Description

Pantex is in the treeless Southern High Plains of Texas. It lies in the transition zone between the North Central Plains and the Llano Estacado (staked plains) to the south. The landscape typically consists of cultivated cropland and rangeland. The plant consists of operational facilities and the inactive facilities of the former World War II ammunition plant. These industrial uses are surrounded by cropland and rangeland that blend into the offsite viewscape. The developed areas of Pantex are consistent with a VRM Class IV designation. The remainder of Pantex is consistent with VRM Class III or IV (DOE 1996a:3-148; DOI 1986a, 1986b).

Public access to the plant is strictly controlled. Access to the plant perimeter is limited to three Texas FM roads and U.S. Route 60. The most visible and sensitive vantage point for Pantex facilities is located 2.4 km (1.5 mi) southeast at the intersection of U.S. Route 60 and FM 2373. U.S. Route 60 is part of the Texas Plains Trail, a scenic road on which Pantex is a designated point of interest. From this road, parts of the plant are visible as low clusters of buildings on a flat landscape. The most visible structures include a new water tower in Zone 11, with a height of 45 m (148 ft), and the twin stacks of the steam plant, each with a height of 20 m (65 ft). The tallest structure at Pantex is a 60-m (197-ft) meteorological tower in the northeast corner of the site (Greenly 1999). This tower would normally be visible as a pencil-thin line from a distance of 1.6 km (1 mi) or less. The operations areas are well defined at night by the security lights. Plant facilities are also visible from I–40, a motorist rest area approximately 10 km (6.2 mi) away being the closest vantage point. The view from this point is similar to that described for U.S. Route 60, but because of the greater distance, the plant facilities are more obscure (DOE 1996a:3-148).

3.4.10.2.2 Proposed Facility Location

Zone 4 West, which houses existing industrial facilities, is not visible from U.S. Route 60, including the intersection of U.S. Route 60 and FM 2373. The new water tower and the twin stacks of the steam plant are the features most visible from offsite. Operations areas are well defined at night by the security lights. The closest natural feature of visual interest is Palo Duro Canyon State Park, 45 km (28 mi) to the south. Open space immediately to the west of Zone 4 West is consistent with a VRM Class III or IV designation. Zone 4 West is a developed area consistent with VRM Class IV (DOE 1996a:3-148; DOI 1986a, 1986b; Greenly 1999).

3.4.11 Infrastructure

Site infrastructure includes those utilities and other resources required to support construction and continued operation of mission-related facilities identified under the various proposed alternatives.

3.4.11.1 General Site Description

Pantex has the extensive infrastructure necessary to support operations at the plant. The key components of this infrastructure are summarized in Table 3–36.

Table 3–36. Pantex Sitewide Infrastructure Characteristics

Resource	Current Usage	Site Capacity
Transportation		
Roads (km)	76	76
Railroads (km)	27	27
Electricity		
Energy consumption (MWh/yr)	81,850	420,500
Peak load (MW)	13.6	124
Fuel		
Natural gas (m^3/yr)	12,910,000	248,000,000
Oil (l/yr)	59,960	NA[a]
Coal (t/yr)[b]	NA[b]	NA[b]
Water (l/yr)	851,600,000	3,785,000,000

[a] As supplies get low, more can be supplied by truck or rail.
[b] Coal is not used at Pantex.
Key: NA, not applicable.
Source: King 1997a:5.

3.4.11.1.1 Transportation

An onsite road system of about 76 km (47 mi) of paved surface has been developed (DOE 1996a:3-151). Roads within the plant are classified as either "primary," "secondary," or "tertiary." Primary roads are the main distribution arteries for all traffic outside and within the plant. Secondary roads supplement the primary roads and serve as collector roadways. Both the primary and secondary roads are two-lane, paved arteries. Tertiary roads are frequently single lanes, but some have two lanes when the extra width is justified by traffic volume (M&H 1996a:9-17).

Amarillo is a major rail center on the main lines of the Burlington Northern and Santa Fe, which has internodal facilities in Amarillo. Pantex is connected to the Burlington Northern and Santa Fe system via a spur that enters the plant from the southwest. This spur provides access to the entire system as well as to other railroads (M&H 1996a:9-17, 9-19).

3.4.11.1.2 Electricity

Electrical service for the nine-county region surrounding Pantex is supplied by the Southwestern Public Service Company except for Donley County which is serviced by West Texas Utilities (M&H 1996a:9-1). Generation is mainly from coal, oil, and gas (produced by gas turbines), in order of capacity. The rest comes from nuclear, hydroelectric, and other sources. Pantex draws its power from the West Central Power Pool, characteristics of which are summarized in Table 3.5.2–2 of the *Storage and Disposition PEIS* (DOE 1996a:3-151).

The average electrical availability at Pantex is about 420,500 MWh/yr; the average annual usage, about 81,850 MWh/yr. The peak load capacity for the plant is 124 MW; the current peak load usage, about 13.6 MW (King 1997a:5).

3.4.11.1.3 Fuel

Fuels consumed at Pantex include liquid petroleum fuels and natural gas. Natural gas is supplied by Energas (King 1997a:3). Oil is used as a backup for the Building 16-13 steam boiler. Oil capacity is only limited by the number of deliveries of oil by truck. There is a 89,300-l (23,600-gal) fuel oil storage tank on the site. The current annual site availability of natural gas is about 248 million m^3/yr (8.8 billion ft^3/yr); and the current usage, about 12.9 million m^3/yr (456 million ft^3/yr) (King 1997a:5).

3.4.11.1.4 Water

Water for Pantex is provided by a system of five wells, together with pumps and storage tanks. The volume used by the plant between 1989 and 1995 ranged from 689 million l (182 million gal) to 946 million l (250 million gal) (M&H 1996a:9-7). The water supply system capacity is about 3.8 billion l/yr (1 billion gal/yr); the average usage of domestic water, about 850 million l/yr (225 million gal/yr) (King 1997a:5).

3.4.11.1.5 Site Safety Services

Plant fire protection is provided by the Pantex fire department, which has one onsite fire station. Personnel in the fire department maintain a high level of readiness. A minimum of eight firefighters, three of whom are certified paramedics, are on duty at all times. The fire department maintains two advanced life-support ambulances on the site (M&H 1996a:9-25).

3.4.11.2 Proposed Facility Location

Little current utility usage occurs in Zone 4 West. Given the current usage level of each utility type at Pantex, excess capacity available for Zone 4 West would be as indicated in Table 3–37. There would be an electrical capacity of 338,634 MWh/yr, with a peak load of 110.4 MW; a natural gas capacity of about 235 million m^3/yr (8.3 billion ft^3/yr); and a water capacity of about 3 billion l/yr (775 million gal/yr), with a peak supply of about 8 million l/day (2 million gal/day) (King 1997a:6).

Table 3–37. Pantex Infrastructure Characteristics for Zone 4

Resource	Current Usage	Excess Site Capacity
Electrical		
Energy consumption (MWh/yr)	Negligible	338,634
Peak load (MW)	Negligible	110.4
Fuel		
Natural gas (m^3/yr)	Negligible	235,181,309
Oil (l/yr)	NA	NA[a]
Coal (t/yr)[b]	NA[b]	NA[b]
Water (l/yr)	Negligible	2,933,000,000

[a] As supplies get low, more can be supplied by truck or rail.
[b] Coal is not used at Pantex.
Key: NA, not applicable.
Source: King 1997a:6.

3.5 SRS

SRS is about 19 km (12 mi) south of Aiken, South Carolina (Figure 2–5). First established in 1950, SRS has been involved for more than 40 years in tritium operations and nuclear material production. Today the site includes 16 major production, service, and R&D areas, not all of which are currently in operation (DOE 1996a:3-228).

There are more than 3,000 facilities at SRS, including 740 buildings with 511,000 m^2 (5.5 million ft^2) of floor area. Major nuclear facilities at SRS include fuel and plutonium storage facilities and target fabrication facilities, nuclear material production reactors, chemical separation plants, a uranium fuel processing area, liquid HLW tank farms, a waste vitrification facility, and the Savannah River Technology Center. SRS processes nuclear materials into forms suitable for continued safe storage, use, or transportation to other DOE sites. Tritium recycling facilities at SRS empty tritium from expired reservoirs, purify it to eliminate the helium decay product, and fill replacement reservoirs for nuclear weapons. Filled reservoirs are delivered to Pantex for weapons assembly and directly to DoD to replace expired reservoirs. Historically, DOE has produced tritium at SRS, but none has been produced since 1988 (DOE 1996a:3-228).

DOE Activities. The current missions at SRS are shown in Table 3–38. In the past, the SRS complex produced nuclear materials. The complex consisted of various plutonium storage facilities, five reactors (the C-, K-, L-, P-, and R-Reactors) (all inactive), a fuel and target fabrication plant, two chemical separation plants, a tritium-target processing facility, a heavy water rework facility, and waste management facilities. The K-Reactor (the last operational reactor) has been shut down with no planned provision for restart. SRS is still conducting tritium recycling operations in support of stockpile requirements using retired weapons as the tritium supply source. The separations facilities and F- and H-Canyons are planned to be used through the year 2002 to complete DOE's commitment to the Defense Nuclear Facilities Safety Board regarding stabilization of inventories of unstable nuclear materials (DOE 1996a:3-228).

Table 3–38. Current Missions at SRS

Mission	Description	Sponsor
Plutonium storage	Maintain F-Area plutonium storage facilities	Assistant Secretary for Environmental Management
Tritium recycling	Operate H-Area tritium facilities	Assistant Secretary for Defense Programs
Stabilize targets, spent nuclear fuels, and other nuclear materials	Operate F- and H-Canyons	Assistant Secretary for Environmental Management
Waste management	Operate waste management facilities	Assistant Secretary for Environmental Management
Environmental monitoring and restoration	Operate remediation facilities	Assistant Secretary for Environmental Management
Research and development	Savannah River Technology Center technical support of Defense Programs, Environmental Management, and Nuclear Energy programs	Assistant Secretary for Defense Programs; Assistant Secretary for Environmental Management; Office of Nuclear Energy

Source: DOE 1996a:3-229.

DOE Office of Environmental Management is pursuing a 10-year plan to achieve full compliance with all applicable laws, regulations, and agreements to treat, store, and dispose of existing wastes; reduce generation of new wastes; clean up inactive waste sites; remedied contaminated groundwater; and dispose of surplus facilities (DOE 1996a:3-228).

The Savannah River Technology Center provides technical support to all DOE operations at SRS. In this role, it provides process engineering development to reduce costs, waste generation, and radiation exposure. SRS has an expanding mission to transfer unique technologies developed at the site to industry. SRS is also an active participant in the Strategic Environmental R&D Program formulated to develop technologies to mitigate environmental hazards at DoD and DOE sites (DOE 1996a:3-228).

Non-DOE Activities. Non-DOE facilities and operations at SRS include the Savannah River Forest Station, the Savannah River Ecology Laboratory, and the Institute of Archaeology and Anthropology. The Savannah River Forest Station is an administrative unit of the U.S. Forest Service, which provides timber management, research support, soil and water protection, wildlife management, secondary roads management, and fire management to DOE. The Savannah River Forest Station manages 62,300 ha (154,000 acres), comprising approximately 80 percent of the site area. It has been responsible for reforestation and manages an active timber business. The Savannah River Forest Station assists with the development and updating of sitewide land use plans and provides continual support with site layout and vegetative management. It also assists in long-term wildlife management and soil rehabilitation projects (DOE 1996a:3-228).

The Savannah River Ecology Laboratory is operated for DOE by the Institute of Ecology of the University of Georgia. It has established a center of ecological field research where faculty, staff, and students perform interdisciplinary field research and gain an understanding of the impact of energy technologies on the ecosystems of the southeastern United States. This information is communicated to the scientific community, government agencies, and the general public. In addition to Savannah River Ecology Laboratory studies, the Institute of Archaeology and Anthropology is operated by the University of South Carolina to survey the archaeological resources of SRS. These surveys are used by DOE when planning new facility additions or modifications (DOE 1996a:3-229).

3.5.1 Air Quality and Noise

3.5.1.1 Air Quality

Air pollution refers to any substance in the air that could harm human or animal populations, vegetation, or structures, or that unreasonably interferes with the comfortable enjoyment of life and property. Air pollutants are transported, dispersed, or concentrated by meteorological and topographical conditions. Air quality is affected by air pollutant emission characteristics, meteorology, and topography.

3.5.1.1.1 General Site Description

The SRS region has a temperate climate with short, mild winters and long, humid summers. Throughout the year, the climate is frequently affected by warm, moist maritime air masses. The average annual temperature at SRS is 17.3 EC (63.2 EF); temperatures vary from an average daily minimum of 0 EC (32 EF) in January to an average daily maximum of 33.2 EC (91.7 EF) in July. The average annual precipitation at SRS is about 114 cm (45 in). Precipitation is distributed fairly evenly throughout the year, with the highest in summer and the lowest in autumn. There is no predominant wind direction at SRS. The average annual wind speed at Augusta National Weather Service Station is 2.9 m/s (6.5 mph) (NOAA 1994b). Additional information related to meteorology and climatology at SRS is presented in Appendix F of the *Storage and Disposition PEIS* (DOE 1996a:F-16, F-17) and in the *Savannah River Site Waste Management Environmental Impact Statement* (DOE 1995c:3-21–3-25).

SRS is near the center of the Augusta-Aiken Interstate AQCR #53. None of the areas within SRS and its surrounding counties are designated as nonattainment areas with respect to the NAAQS for criteria air pollutants (EPA 1997f; 1997g). Applicable NAAQS and the ambient air quality standards for the States of South Carolina and Georgia are presented in Table 3–39.

Table 3–39. Comparison of Ambient Air Concentrations From SRS Sources With Most Stringent Applicable Standards or Guidelines, 1994

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	Concentration (Fg/m^3)
Criteria pollutants			
Carbon monoxide	8 hours	10,000[b]	632
	1 hour	40,000[b]	5,010
Nitrogen dioxide	Annual	100[b]	8.8
Ozone	8 hours	157[c]	(d)
PM_{10}	Annual	50[b]	4.8
	24 hours	150[b]	80.6
$PM_{2.5}$	3-year annual	15[c]	(e)
	24 hours (98th percentile over 3 years)	65[c]	(e)
Sulfur dioxide	Annual	80[b]	16.3
	24 hours	365[b]	215
	3 hours	1,300[b]	690
Lead	Calendar quarter	1.5[b]	<0.01
Other regulated pollutants			
Gaseous fluoride	30 days	0.8[f]	(g)
	7 days	1.6[f]	0.11
	24 hours	2.9[f]	0.60
	12 hours	3.7[f]	241
Total suspended particulates	Annual	75[f]	43.3
Hazardous and other toxic compounds			
Benzene	24 hours	150[f]	20.7
[Text deleted.]			

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period. The National Ambient Air Quality Standards (NAAQS) (EPA 1997a), other than those for ozone, particulate matter, and lead, and those based on annual averages, are not to be exceeded more than once per year. The 1-hr ozone standard is attained when the expected number of days per year with maximum hourly average concentrations above the standard is #1. The 1-hr ozone standard applies only to nonattainment areas. The 8-hr ozone standard is attained when the 3-year average of the annual fourth-highest daily maximum 8-hr average concentration is less than or equal to 157 Fg/m^3. The 24-hr particulate matter standard is attained when the expected number of days with a 24-hr average concentration above the standards is #1. The annual arithmetic mean particulate matter standard is attained when the expected annual arithmetic mean concentration is less than or equal to the standard.

[b] Federal and State standard.

[c] Federal standard.

[d] Not directly emitted or monitored by the site.

[e] No data is available with which to assess $PM_{2.5}$ concentrations.

[f] State standard.

[g] No concentration reported.

Note: The NAAQS also includes standards for lead. No sources of lead emissions have been identified for any of the alternatives presented in Chapter 4. Emissions of other air pollutants not listed here have been identified at SRS, but are not associated with any of the alternatives evaluated. These other air pollutants are quantified in the *Storage and Disposition PEIS* (DOE 1996a). EPA recently revised the ambient air quality standards for particulate matter and ozone. The new standards, finalized on July 18, 1997, changed the ozone primary and secondary standards from a 1-hr concentration of 235 Fg/m^3 (0.12 ppm) to an 8-hr concentration of 157 Fg/m^3 (0.08 ppm). During a transition period while States are developing State implementation plan revisions for attaining and maintaining these standards, the 1-hr ozone standard will continue to apply in nonattainment areas (EPA 1997b:38855). For

particulate matter, the current PM_{10} annual standard is retained, and two $PM_{2.5}$ standards are added. These standards are set at a 15-Fg/m^3 3-year annual arithmetic mean based on community-oriented monitors and a 65-F g/m^3 3-year average of the 98th percentile of 24-hr concentrations at population-oriented monitors. The revised 24-hr PM_{10} standard is based on the 99th percentile of 24-hr concentrations. The existing PM_{10} standards will continue to apply in the interim period (EPA 1997c:38652). Values may differ from those of the source document due to rounding.
Source: DOE 1998e:3-14, 1998f:3-26; EPA 1997a; SCDHEC 1996.

There are no PSD Class I areas within 100 km (62 mi) of SRS. None of the facilities at SRS have been required to obtain a PSD permit (DOE 1996a:3-233).

The primary emission sources of criteria air pollutants at SRS are the nine coal-burning boilers and four fuel-oil-burning package boilers that produce steam and electricity, diesel engine-powered equipment, the Defense Waste Processing Facility (DWPF), the In-Tank Precipitation process, groundwater air strippers, the Consolidated Incineration Facility, and various other process facilities. Other emissions and sources include fugitive particulates from coal piles and coal-processing facilities, vehicles, controlled burning of forestry areas, and temporary emissions from various construction-related activities (DOE 1996a:F-17, F-18).

Table 3–39 presents the ambient air concentrations attributable to sources at SRS. These concentrations are based on emissions for the year 1994 (DOE 1998e:3-14; DOE 1998f:3-26). Only those hazardous pollutants that would be emitted for any of the surplus plutonium disposition alternatives are presented. Additional information on ambient air quality at SRS is in the *SRS Environmental Report for 1995* (Arnett and Mamatey 1996:111–114). Concentrations shown in Table 3–39 attributable to SRS are in compliance with applicable guidelines and regulations. Data for 1995 from nearby South Carolina monitors at Beech Island, Jackson, and Barnwell indicate that the NAAQS for particulate matter, lead, ozone, sulfur dioxide, and nitrogen dioxide are not exceeded in the area around SRS (SCDHEC 1995:1, 25, 28, 37–39). Air pollutant measurements at these monitoring locations during 1995 showed for nitrogen dioxide an annual average concentration of 9.4 Fg/m^3; for sulfur dioxide concentrations of 99 Fg/m^3 for 3-hr averaging, 24 Fg/m^3 for 24-hr averaging, and 5 Fg/m^3 for the annual average; for total suspended particulates an annual average concentration of 37 Fg/m^3; and for PM_{10} concentrations of 62 Fg/m^3 for 24-hr averaging and 19 Fg/m^3 for the annual average.

3.5.1.1.2 Proposed Facility Locations

The meteorological conditions described for SRS are considered representative of F-Area. Information on air pollutant emissions from F-Area is included in the overall site emissions discussed previously.

The meteorological conditions described for SRS are considered representative of S-Area. Information on air pollutant emissions from S-Area is included in the previous discussion of overall site emissions. The air pollutant sources in this area include process and diesel generator emissions.

3.5.1.2 Noise

Noise is unwanted sound that interferes or interacts negatively with the human or natural environment. Noise may disrupt normal activities or diminish the quality of the environment.

3.5.1.2.1 General Site Description

Major noise sources at SRS are primarily in developed or active areas and include various industrial facilities, equipment, and machines (e.g., cooling systems, transformers, engines, pumps, boilers, steam vents, paging systems, construction and materials-handling equipment, and vehicles). Major noise emission sources outside of these active areas consist primarily of vehicles and rail operations. Existing SRS-related noise sources of

importance to the public are those related to transportation of people and materials to and from the site, including trucks, private vehicles, helicopters, and trains (DOE 1996a:3-233–3-235).

Another important contributor to noise levels is traffic to and from SRS operations along access highways through the nearby towns of New Ellenton, Jackson, and Aiken. Noise measurements recorded during 1989 and 1990 along State Route 125 in the town of Jackson at a point about 15 m (50 ft) from the roadway indicate that the 1-hr equivalent sound level from traffic ranged from 48 to 72 dBA. The estimated day-night average sound levels along this route were 66 dBA for summer and 69 dBA for winter. Similarly, noise measurements along State Route 19 in the town of New Ellenton at a point about 15 m (50 ft) from the roadway indicate that the 1-hr equivalent sound level from traffic ranged from 53 to 71 dBA. The estimated average day-night average sound levels along this route were 68 dBA for summer and 67 dBA for winter (NUS 1990:3-2–3-6, app. C and F).

Most industrial facilities at SRS are far enough from the site boundary that noise levels from these sources at the boundary would not be measurable or would be barely distinguishable from background levels.

The States of Georgia and South Carolina, and the counties in which SRS is located, have not established any noise regulations that specify acceptable community noise levels, with the exception of a provision in the Aiken County Zoning and Development Standards Ordinance that limits daytime and nighttime noise by frequency band (DOE 1996a:F-33).

The EPA guidelines for environmental noise protection recommend an average day-night average sound level of 55 dBA as sufficient to protect the public from the effects of broadband environmental noise in typically quiet outdoor and residential areas (EPA 1974:29). Land-use compatibility guidelines adopted by the Federal Aviation Administration and the Federal Interagency Committee on Urban Noise indicate that yearly day-night average sound levels less than 65 dBA are compatible with residential land uses and levels up to 75 dBA are compatible with residential uses if suitable noise reduction features are incorporated into structures (DOT 1995). It is expected that for most residences near SRS, the day-night average sound level is less than 65 dBA and is compatible with the residential land use, although for some residences along major roadways noise levels may be higher.

3.5.1.2.2 Proposed Facility Locations

No distinguishing noise characteristics at F-Area have been identified. F-Area is far enough—7.9 km (4.9 mi)—from the site boundary that noise levels from the facilities are not measurable or are barely distinguishable from background levels.

No distinguishing noise characteristics at S-Area have been identified. Observations of sound sources during a summer sound level survey near the fence line of S-Area indicate that typical sources include vehicles, turbines, locomotives, paging systems, and fans (NUS 1990:app. B). S-Area is far enough—9.6 km (6 mi)—from the site boundary that noise levels from these facilities are not measurable or are barely distinguishable from background levels.

3.5.2 Waste Management

Waste management includes minimization, characterization, treatment, storage, transportation, and disposal of waste generated from ongoing DOE activities. The waste is managed according to appropriate treatment, storage, and disposal technologies and in compliance with all applicable Federal and State statutes and DOE orders.

3.5.2.1 Waste Inventories and Activities

SRS manages the following types of waste: HLW, TRU, mixed TRU, LLW, mixed LLW, hazardous, and nonhazardous. HLW would not be generated by surplus plutonium disposition activities at SRS, and therefore, will not be discussed further. Waste generation rates and the inventory of stored waste from activities at SRS are provided in Table 3–40. Table 3–41 summarizes the SRS waste management capabilities. More detailed

Table 3–40. Waste Generation Rates and Inventories at SRS

Waste Type	Generation Rate (m^3/yr)	Inventory (m^3)
TRU[a]		
Contact handled	427	6,977
Remotely handled	4	0
LLW	10,043	1,616
Mixed LLW		
RCRA	1,135	6,940
TSCA	0	110
Hazardous	74	1,416[b]
Nonhazardous		
Liquid	416,100	NA[c]
Solid	6,670	NA[c]

[a] Includes mixed TRU wastes.
[b] Sessions 1997a.
[c] Generally, nonhazardous wastes are not held in long-term storage.
Key: LLW, low-level waste; NA, not applicable; RCRA, Resource Conservation and Recovery Act; TRU, transuranic; TSCA, Toxic Substances Control Act.
Source: DOE 1996d:15, 16, except for hazardous and nonhazardous solid waste (DOE 1996a:3-262, 3-263) and nonhazardous liquid waste (Sessions 1997a).

descriptions of the waste management system capabilities at SRS are included in the *Storage and Disposition PEIS* (DOE 1996a:3-261–3-265, E-97) and the *Savannah River Site Waste Management Final EIS* (DOE 1995c:3-66).

EPA placed SRS on the National Priorities List in December 1989. In accordance with CERCLA, DOE entered into an FFCA with EPA and the State of South Carolina to coordinate cleanup activities at SRS under one comprehensive strategy. The FFCA combines the RCRA Facility Investigation Program Plan with a CERCLA cleanup program titled the *RCRA Facility Investigation/Remedial Investigation Program Plan* (DOE 1996a:3-261). More information on regulatory requirements for waste disposal is provided in Chapter 5.

3.5.2.2 Transuranic and Mixed Transuranic Waste

TRU waste generated between 1974 and 1986 is stored on five concrete pads and one asphalt pad that have been covered with approximately 1.2 m (4 ft) of soil. TRU waste generated since 1986 is stored on 13 concrete pads that are not covered with soil. The TRU waste storage pads are in the Low-Level Radioactive Waste Disposal Facility (DOE 1995c:3-80, 3-81).

A TRU Waste Characterization and Certification Facility is planned and would provide extensive containerized waste certification capabilities. The facility is needed to prepare TRU waste for treatment and to certify TRU waste for disposal at WIPP. Drums that are certified for shipment to WIPP will be placed in interim storage

on concrete pads in E-Area (DOE 1996a:3-264). LLW containing concentrations of TRU nuclides between 10 and 100 nCi (referred to as alpha-contaminated LLW) is managed like TRU waste because its physical and chemical properties are similar and similar procedures will be used to determine its final disposition (DOE 1996a:3-264). WIPP is expected to begin receiving waste from SRS in 2000 (Aragon 1999).

Table 3–41. Waste Management Capabilities at SRS

Facility Name/Description	Capacity	Status	Applicable Waste Type					
			TRU	Mixed TRU	LLW	Mixed LLW	Haz	Non-Haz
Treatment Facility (m^3/yr)								
TRU Waste Characterization/ Certification Facility	1,720	Planned for 2007	X	X				
Consolidated Incineration Facility & Ashcrete Stabilization Facility	4,630 liquid 17,830 solid	Online			X	X	X	
F- and H-Area Effluent Treatment Facility	1,930,000	Online			X	X		
M-, L-, and H-Area Compactors	3,983	Online			X			
Non-Alpha Vitrification Facility	3,090	Planned			X	X	X	
M-Area Liquid Effluent Treatment Facility	999,000	Online				X		
M-Area Vendor Treatment Facility	2,470	Planned				X		
Savannah River Technology Center Ion Exchange Treatment Probe	11,200	Online				X		
E-Area Supercompactor	5,700	Planned			X			
Z-Area Saltstone Facility	28,400	Online				X		
Central Sanitary Wastewater Treatment Facility	1,449,050	Online						X
Storage Facility (m^3)								
TRU Storage Pads	34,400	Online	X	X				
DWPF Organic Waste Storage Tank	568	Online				X		
Liquid Waste Solvent Tanks	454	Planned				X		
M-Area Process Waste Interim Treatment/Storage Facility	8,300	Online				X		
Mixed Waste Storage Facilities (645-2N, -295, -43E)	1,905	Online				X		
Savannah River Technology Center Mixed Waste Storage Tanks	198	Online				X		
Long-Lived Waste Storage Building	1,064	Planned			X			
Solid Waste Storage Pads	2,657	Online				X	X	
Buildings 316-M, 710-B, 645-N, and 645-4N	2,515	Online				X	X	
M-Area Storage Pad	2,160	Online				X		
Disposal Facility (m^3)								
Intermediate-Level Waste Vaults	3,665	Online			X			
Low-Activity Waste Vaults	30,500	Online			X			
LLW Disposal Facility Slit Trenches	26,000	Planned			X			
Z-Area Saltstone Vaults	1,110,000	Online			X			

Key: DWPF, Defense Waste Processing Facility; Haz, hazardous; LLW, low-level waste; TRU, transuranic.
Source: DOE 1996a:E-108–E-112; Miles 1998; Rhoderick 1998; Sessions 1997a, 1997b.

3.5.2.3 Low-Level Waste

Both liquid and solid LLW are treated at SRS. Most aqueous LLW streams are sent to the F- and H-Area Effluent Treatment Facility and treated by filtration, reverse osmosis, and ion exchange to remove the radionuclide contaminants. After treatment, the effluent is discharged to Upper Three Runs Creek. The treatment residuals are concentrated by evaporation and stored in the H-Area tank farm for eventual treatment in the Z-Area Saltstone Facility. In that facility, wastes are immobilized with grout for onsite disposal (DOE 1996a:E-98).

After completion of a series of extensive readiness tests, the Consolidated Incineration Facility began radioactive operations in 1997. The Consolidated Incineration Facility is designed to incinerate both solid and liquid LLW, mixed LLW, and hazardous waste (WSRC 1997a).

Solid LLW is segregated into several categories to facilitate proper treatment, storage, and disposal. Solid LLW that radiates less than 200 mrem/hr at 5 cm (2 in) from the unshielded container is considered low-activity waste. If it radiates greater than 200 mrem/hr at 5 cm (2 in), it is considered intermediate-activity waste. Intermediate-activity tritium waste is intermediate-activity waste with more than 10 Ci of tritium per container. Long-lived waste is contaminated with long-lived isotopes that exceed the waste acceptance criteria for onsite disposal (DOE 1996a:E-99).

Four basic types of vaults and buildings are used for storing the different waste categories: low-activity waste vaults, intermediate-level nontritium vaults, intermediate-level tritium vaults, and the long-lived waste storage building. The vaults are below-grade concrete structures, and the storage building is a metal building on a concrete pad (DOE 1996a:E-99).

Currently, DOE places low-activity LLW in carbon steel boxes and deposits them in the low-activity waste vaults in E-Area. Intermediate-activity LLW is packaged according to waste form and disposed of in the intermediate-level waste vaults in E-Area. Long-lived wastes are stored in the Long-Lived Waste Storage Building in E-Area until treatment and disposal technologies are developed (DOE 1995c:3-75).

Saltstone generated in the solidification of LLW salts extracted from HLW is disposed of in the Z-Area Saltstone Vaults. Saltstone is solidified grout formed by mixing the LLW salt with cement, fly ash, and furnace slag. Saltstone is the highest volume of solid LLW disposed of at SRS. SRS disposal facilities are projected to meet solid LLW disposal requirements, including LLW from off the site, for the next 20 years (DOE 1996a:3-261, 3-264).

3.5.2.4 Mixed Low-Level Waste

The FFCA addresses SRS compliance with RCRA LDR. The FFCA requires DOE facilities storing mixed waste to develop site-specific treatment plans and to submit them for approval (DOE 1996a:3-264, 3-265). The site treatment plan for mixed waste specifies treatment technologies or technology development schedules for all SRS mixed waste (Arnett and Mamatey 1996:50). SRS is allowed to continue to generate and store mixed waste, subject to LDR. Schedules to provide compliance through treatment in the Consolidated Incineration Facility are included in the FFCA (DOE 1996a:3-264).

The SRS mixed waste program consists primarily of safely storing waste until treatment and disposal facilities are available. Mixed LLW is stored in the A-, E-, M-, N-, and S-Areas in various tanks and buildings. These facilities include burial ground solvent tanks, the M-Area Process Waste Interim Treatment/Storage Facility, the Savannah River Technology Center Mixed Waste Storage Tanks, and the DWPF Organic Waste Storage Tank (DOE 1995c:3-81). These South Carolina Department of Health and Environmental Control permitted facilities will remain in use until appropriate treatment and disposal is performed on the waste (DOE 1996a:E-99).

3.5.2.5 Hazardous Waste

Hazardous waste is accumulated at the generating facility for a maximum of 90 days, or stored in DOT-approved containers in three RCRA-permitted hazardous waste storage buildings and on three interim status storage pads in B- and N-Areas. Most of the waste is shipped off the site to commercial RCRA-permitted treatment and disposal facilities using DOT-certified transporters. DOE plans to incinerate up to 9 percent of the hazardous waste (organic liquids, sludge, and debris) in the Consolidated Incineration Facility (DOE 1996a:3-265). In 1995, 72 m^3 (2,538 ft^3) of hazardous waste were sent to onsite storage. Of this amount, 20 m^3 (712 ft^3) were shipped off the site for commercial treatment or disposal (Arnett and Mamatey 1996:48).

3.5.2.6 Nonhazardous Waste

In 1994, the centralization and upgrading of the sanitary wastewater collection and treatment systems at SRS were completed. The program included the replacement of 14 (of 20) aging treatment facilities scattered across the site with a new 3,975 m^3/day (1.1 million gal/day) central treatment facility and connecting them with a new 29 km (18 mi) sanitary sewer system. The central treatment facility treats sanitary wastewater by the extended aeration activated sludge process. The treatment facility separates the wastewater into two forms, clarified effluent and sludge. The liquid effluent is further treated by the nonchemical method of ultraviolet (UV) light disinfection to meet NPDES discharge limitations for the outfall to Fourmile Branch. The sludge is further treated to reduce pathogen levels to meet proposed land application criteria. The remaining sanitary wastewater treatment facilities are being upgraded as necessary by replacing existing chlorination treatment systems with nonchemical UV light disinfection systems to meet NPDES limitations (DOE 1996a:3-265).

SRS has privatized the collection, hauling, and disposal of its sanitary waste (Arnett and Mamatey 1996:48). SRS-generated solid sanitary waste is sent to the Three Rivers Landfill (DOE 1998f:3-42). SRS disposes of other nonhazardous waste that consists of scrap metal, powerhouse ash, domestic sewage, scrap wood, construction debris, and used railroad ties in a variety of ways. Scrap metal is sold to salvage vendors for reclamation. Powerhouse ash and domestic sewage sludge are used for land reclamation. Scrap wood is burned on the site or chipped for mulch. Construction debris is used for erosion control. Railroad ties are shipped off the site for disposal (DOE 1996a:E-100).

3.5.2.7 Waste Minimization

The total amount of waste generated and disposed of at SRS has been and continues to be reduced through the efforts of the pollution prevention and waste minimization program at the site. This program is designed to achieve continuous reduction of waste and pollutant releases to the maximum extent feasible and in accordance with regulatory requirements while fulfilling national security missions (DOE 1996a:E-97). The program focuses mainly on source reduction, recycling, and increasing employee participation in pollution prevention. For example, 1995 nonhazardous solid waste generation was 32 percent below that of 1994, and the disposal volume of other solid waste, including radioactive and hazardous wastes, was 38 percent below 1994 levels. In 1995, SRS achieved a 9 percent reduction in its radioactive waste generation volume compared with 1994. Total solid waste volumes have declined by more than 70 percent since 1991. Radioactive solid waste volumes have declined by about 63 percent, or more than 17,000 m^3 (600,000 ft^3) from 1991 through 1995. In 1995, more than 2,990 t (3,300 tons) of nonradioactive materials were recycled at SRS, including 963 t (1,062 tons) of paper and cardboard (Arnett and Mamatey 1996:16, 41).

3.5.2.8 Preferred Alternatives From the Final WM PEIS

Preferred alternatives from the WM PEIS (DOE 1997a:summary, 117) are shown in Table 3–42 for the four waste types analyzed in this SPD EIS. A decision on the future management of these wastes could result in the

construction of new waste management facilities at SRS and the closure of other facilities. Decisions on the various waste types are expected to be announced in a series of RODs to be issued on this WM PEIS. In fact, the TRU waste ROD was issued on January 20, 1998 (DOE 1998a), with the hazardous waste ROD issued on August 5, 1998 (DOE 1998b). The TRU waste ROD states that DOE will develop and operate mobile and fixed facilities to characterize and prepare TRU waste for disposal at WIPP. Each DOE site that has, or will generate, TRU waste will, as needed, prepare and store its TRU waste on the site. The hazardous waste ROD states that

Table 3–42. Preferred Alternatives From the WM PEIS

Waste Type	Preferred Action
TRU and mixed TRU	DOE prefers the regionalized alternative for onsite treatment and storage of SRS contact-handled TRU waste. Under this alternative, some contact-handled TRU waste could be received from ORR for treatment and storage.[a]
LLW	DOE prefers to treat SRS LLW on the site. SRS could be selected as one of the regional disposal sites for LLW.
Mixed LLW	DOE prefers regionalized treatment at SRS. This includes the onsite treatment of SRS waste and could include treatment of some mixed LLW generated at other sites. SRS could be selected as one of the regional disposal sites for mixed LLW.
Hazardous	DOE prefers to continue to use commercial facilities for hazardous waste treatment.[b]

[a] ROD for TRU waste (DOE 1998a) states that "each of the Department's sites that currently has or will generate TRU waste will prepare and store its TRU waste on site. . . ."

[b] ROD for hazardous waste (DOE 1998b) selected a modified preferred alternative that includes continued onsite treatment at SRS where this is economically favorable.

Key: LLW, low-level waste; ORR, Oak Ridge Reservation; TRU, transuranic.

Source: DOE 1997a:summary, 117.

most DOE sites will continue to use offsite facilities for the treatment and disposal of major portions of the nonwastewater hazardous waste, with ORR and SRS continuing to treat some of their own hazardous waste on the site in existing facilities where this is economically favorable. More detailed information and DOE's alternatives for the future configuration of waste management facilities at SRS is presented in the WM PEIS and the hazardous waste and TRU waste RODs.

3.5.3 Socioeconomics

Statistics for employment and regional economy are presented for the REA as defined in Appendix F.9, which encompasses 15 counties around SRS located in Georgia and South Carolina. Statistics for population, housing, community services, and local transportation are presented for the ROI, a five-county area in which 90.7 percent of all SRS employees reside as shown in Table 3–43. In 1997, SRS employed 15,032 persons (about 5.8 percent of the REA civilian labor force) (Knox 1997).

Table 3–43. Distribution of Employees by Place of Residence in the SRS Region of Influence, 1997

County	Number of Employees	Total Site Employment (Percent)
Aiken	6,981	53.9
Columbia	1,881	14.5
Richmond	1,755	13.5
Barnwell	932	7.2
Edgefield	210	1.6
ROI total	11,759	90.7

Source: Knox 1997.

3.5.3.1 Regional Economic Characteristics

Selected employment and regional economy statistics for the SRS REA are summarized in Figure 3–26. Between 1990 and 1996, the civilian labor force in the REA increased 3.6 percent to the 1996 level of 257,101. In 1996, the unemployment rate in the REA was 7.6 percent, which is greater than the unemployment rates for Georgia (4.6 percent) and South Carolina (6 percent) (DOL 1999).

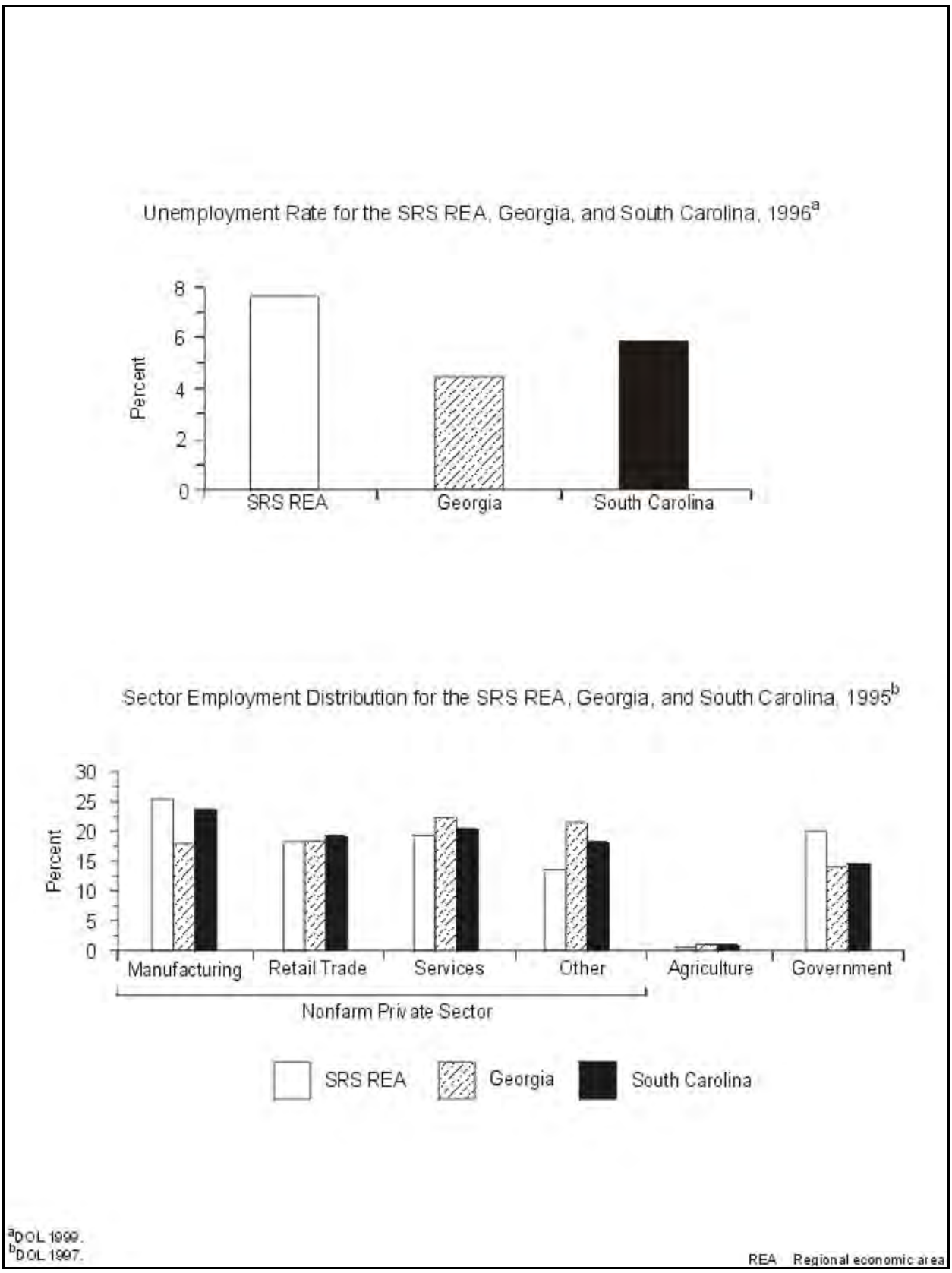


Figure 3–26. Employment and Local Economy for the SRS Regional Economic Area and the States of Georgia and South Carolina

In 1995, manufacturing represented the largest sector of employment in the REA (25.6 percent). This was followed by government (20.9 percent) and service (19.9 percent) activities. The total for these employment sectors in Georgia was 17.5 percent, 16.8 percent, and 23 percent, respectively. The total for these employment sectors in South Carolina was 23.3 percent, 17.3 percent, and 20.5 percent, respectively (DOL 1997).

3.5.3.2 Population and Housing

In 1996, the ROI estimated population totaled 453,778. From 1990 to 1996, the ROI population increased by 8.6 percent, compared with a 13 percent increase in Georgia's population and a 5.7 percent increase in South Carolina's population (DOC 1997). Between 1980 and 1990, the number of housing units in the ROI increased by 25.1 percent, compared with the 30.1 percent increase in Georgia and the 23.5 percent increase in South Carolina. The total number of housing units within the ROI for 1990 was 165,443 (DOC 1994). The 1990 homeowner vacancy rate for the ROI was 2.2 percent, compared with the statewide rates of 2.5 percent for Georgia and 1.7 percent for South Carolina. The renter vacancy rate for the ROI counties was 10 percent compared with the statewide rates of 12.2 percent for Georgia and 11.5 percent for South Carolina (DOC 1990a). Population and housing trends are summarized in Figure 3–27.

3.5.3.3 Community Services

3.5.3.3.1 Education

Seven school districts provided public education services and facilities in the SRS ROI. As shown in Figure 3–28, these school districts operated at between 85 percent (Barnwell County, District 19) and 125 percent (Richmond County School District) capacity in 1997. In 1997, the average student-to-teacher ratio for the SRS ROI was 17:1 (Nemeth 1997a). In 1990, the average student-to-teacher ratios were 10.8:1 for Georgia and 11.5:1 for South Carolina (DOC 1990b; 1994).

3.5.3.3.2 Public Safety

In 1997, a total of 973 sworn police officers were serving the five-county ROI. The average ROI officer-to-population ratio was 2.1 officers per 1,000 persons (Nemeth 1997b). This compares with the 1990 State averages of 2.0 officers per 1,000 persons for Georgia and 1.8 officers per 1,000 persons for South Carolina (DOC 1990b). In 1997, 1,712 paid and volunteer firefighters provided fire protection services in the SRS ROI. The average firefighter-to-population ratio in the ROI was 3.8 firefighters per 1,000 persons (Nemeth 1997b). This compares with the 1990 State averages of 1.0 firefighters per 1,000 persons for Georgia and 0.8 firefighters per 1,000 persons for South Carolina (DOC 1990b). Figure 3–29 displays the ratio of sworn police officers and firefighters to the population for all the counties in the ROI.

3.5.3.3.3 Health Care

In 1996, a total of 1,722 physicians served the ROI. The average physician-to-population ratio in the ROI was 3.8 physicians per 1,000 persons. This compares with a 1996 State average of 2.3 physicians per 1,000 persons for Georgia and 2.2 physicians per 1,000 persons for South Carolina (Randolph 1997). In 1997, there were 10 hospitals serving the five-county ROI. The hospital bed-to-population ratio averaged 7.7 beds per 1,000 persons (Nemeth 1997c). This compares with a 1990 State average of 4.1 beds per 1,000 persons for Georgia and 3.3 beds per 1,000 persons for South Carolina (DOC 1996:128). Figure 3–29 displays the hospital bed-to-population and physician-to-population ratios for the SRS ROI counties.

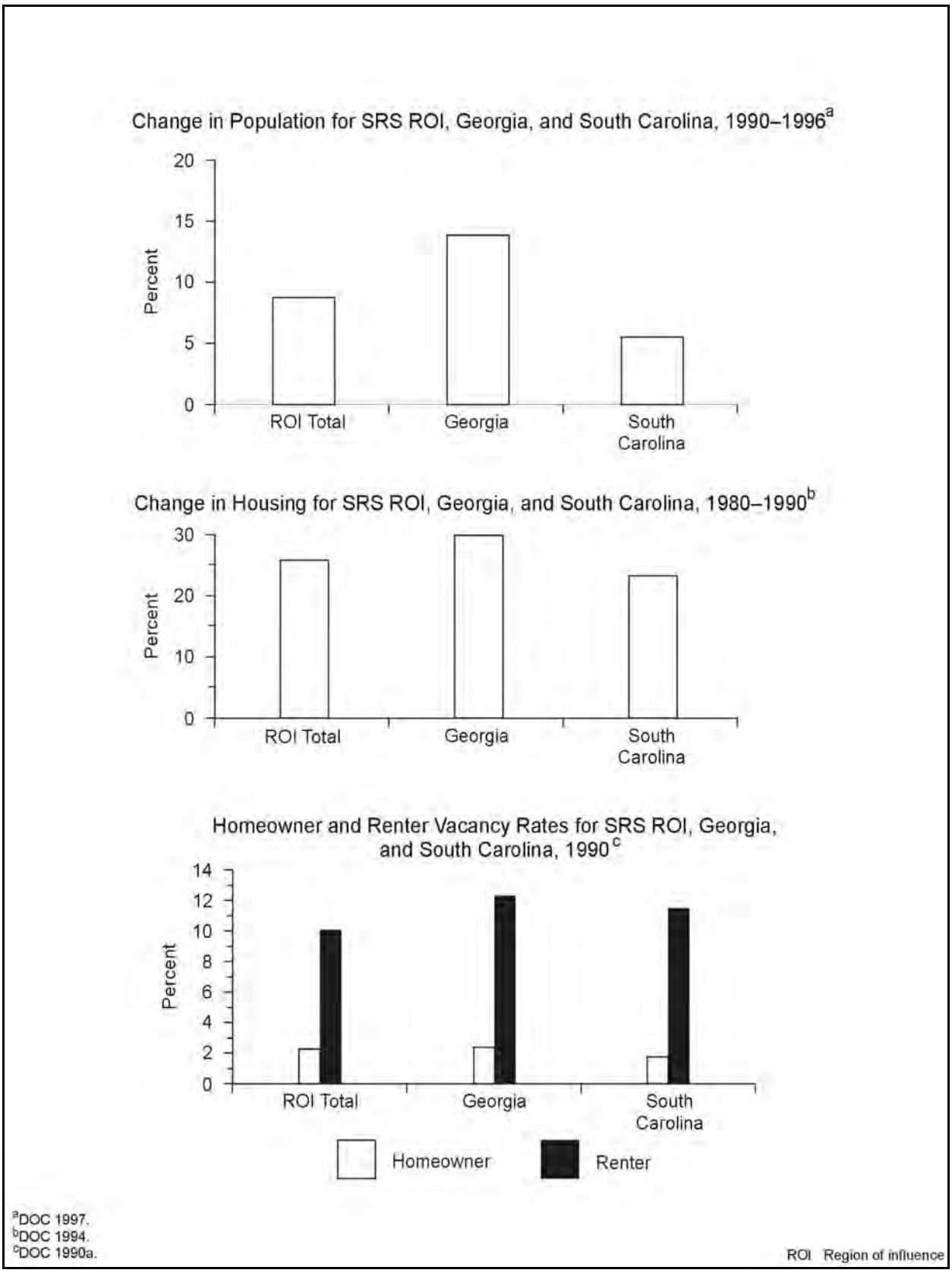
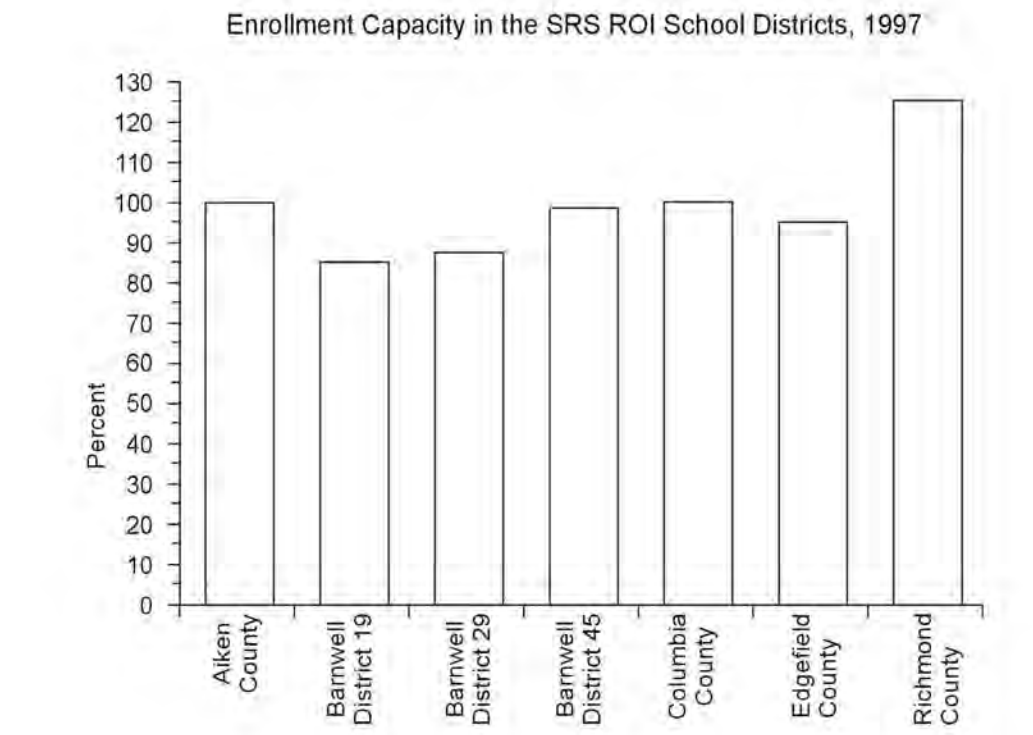
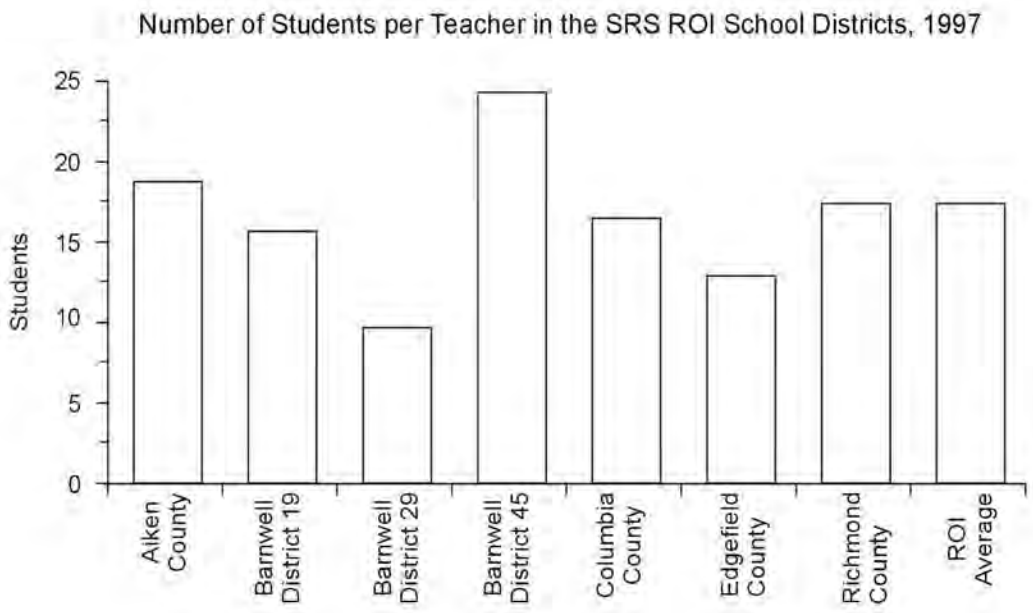


Figure 3–27. Population and Housing for the SRS Region of Influence and the States of Georgia and South Carolina





Source: Nemeth 1997a.

ROI Region of influence

Figure 3–28. School District Characteristics for the SRS Region of Influence

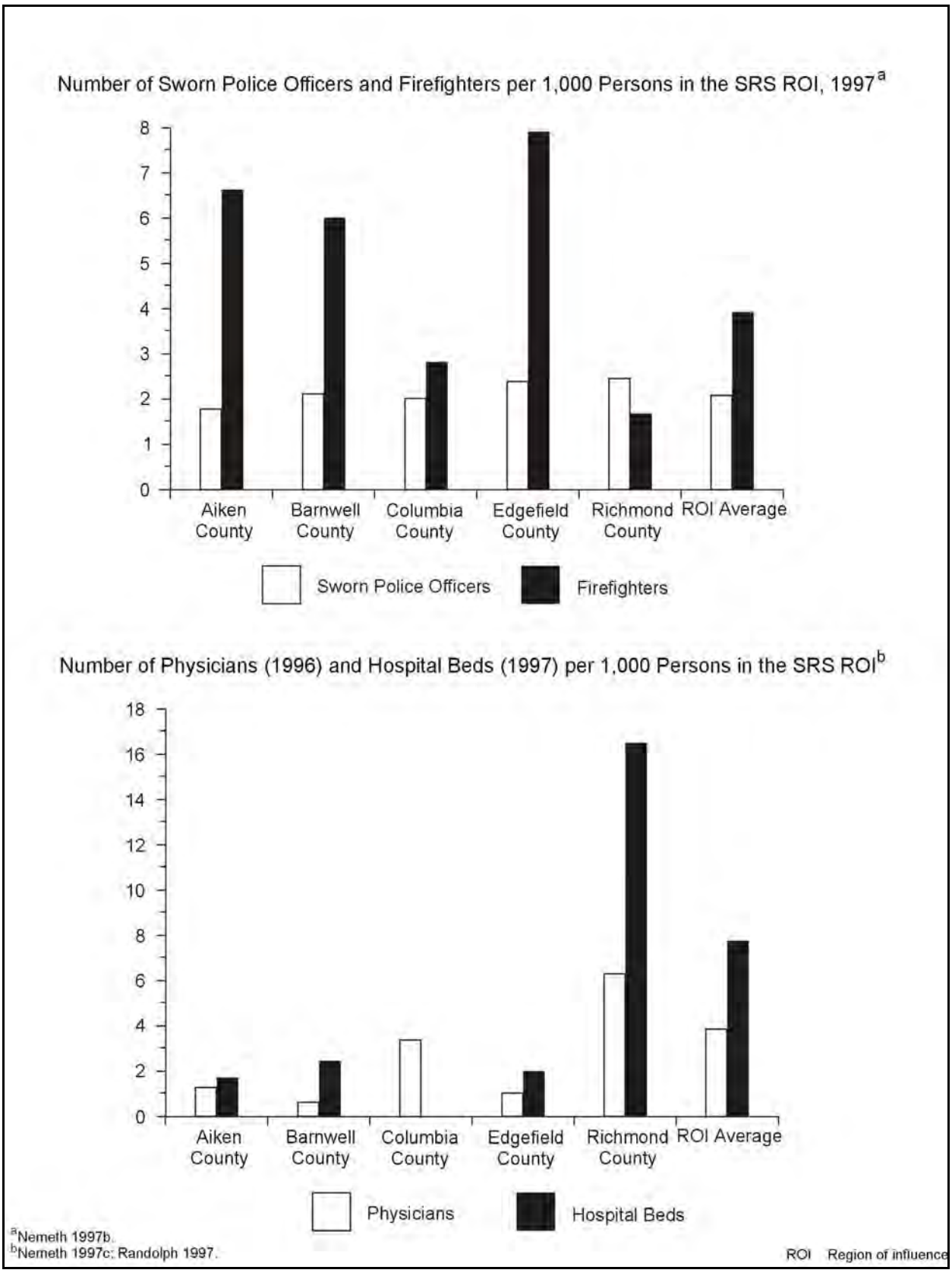


Figure 3–29. Public Safety and Health Care Characteristics for the SRS Region of Influence

3.5.3.4 Local Transportation

Vehicular access to SRS is provided by South Carolina State Routes 19, 64, and 125 (see Figure 2–5). Two road segments in the ROI could be affected by the disposition alternatives: South Carolina State Route 19 from U.S. I–78 at Aiken to U.S. 278 and South Carolina State Route 230 from U.S. 25 Business at North Augusta to U.S. I–25, I–78, and I–278. Three road improvement projects are planned that would alleviate traffic congestion leading into SRS.

The first improvement project is the widening of South Carolina State Route 302, Pine Log Road, from U.S. Route 78 and the construction of new segments to extend the route to South Carolina State Route 19. U.S. Route 25 is also being widened for one-half mile south of I–20. The widening project will be in conjunction with the second improvement project, the new construction of the Bobby Jones Expressway. The expressway will head in a southwest direction crossing South Carolina State Routes 126 and 125 and U.S. Route 1 and continue over the Savannah River to connect with the Georgia portion of the Bobby Jones Expressway, which is already constructed. The third improvement project is the completion of the South Carolina State Route 118 around Aiken. South Carolina State Route 118 will be widened with the construction of new segments to complete the by-pass (Sullivan 1997).

There is no public transportation to SRS. Rail service in the ROI is provided by the Norfolk Southern Corporation and CSX Transportation. SRS is provided rail access via Robbins Station on the CSX Transportation line.

Waterborne transportation is available via the Savannah River. Currently, the Savannah River is used primarily for recreation. SRS has no commercial docking facilities, but it has a boat ramp that has accepted large transport barge shipments.

Columbia Metropolitan Airport in the city of Columbia, South Carolina, and Bush Field in the city of Augusta, Georgia, receive jet air passenger and cargo service from both national and local carriers. Numerous smaller private airports are located in the ROI (DOE 1996a).

3.5.4 Existing Human Health Risk

Public and occupational health and safety issues include the determination of potentially adverse effects on human health that result from acute and chronic exposures to ionizing radiation and hazardous chemicals.

3.5.4.1 Radiation Exposure and Risk

3.5.4.1.1 General Site Description

Major sources and levels of background radiation exposure to individuals in the vicinity of SRS are shown in Table 3–44. Annual background radiation doses to individuals are expected to remain constant over time. The total dose to the population, in terms of person-rem, changes as the population size changes. Background radiation doses are unrelated to SRS operations.

Releases of radionuclides to the environment from SRS operations provide another source of radiation exposure to individuals in the vicinity of SRS. Types and quantities of radionuclides released from SRS operations in 1996 are listed in the *Savannah River Site Environmental Report for 1996* (Arnett and Mamatey 1997a:71–73). Doses to the public resulting from these releases are presented in Table 3–45. These doses fall within radiological limits per DOE Order 5400.5 (DOE 1993a:II-1–II-5) and are much lower than those of background radiation.

Table 3–44. Sources of Radiation Exposure to Individuals in the SRS Vicinity Unrelated to SRS Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation[a]	
Cosmic radiation	27
External radiation	28
Internal terrestrial radiation	40
Radon in homes (inhaled)	200[b]
Other background radiation[c]	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Air travel	1
Consumer and industrial products	10
Total	360

[a] Arnett and Mamatey 1997a:116.
[b] An average for the United States.
[c] NCRP 1987:11, 40, 53.

Table 3–45. Radiation Doses to the Public From Normal SRS Operations in 1996 (Total Effective Dose Equivalent)

	Atmospheric Releases		Liquid Releases		Total	
Members of the Public	**Standard**[a]	**Actual**	**Standard**[a]	**Actual**[b]	**Standard**[a]	**Actual**
Maximally exposed individual (mrem)	10	0.06	4	0.14	100	0.20
Population within 80 km (person-rem)[c]	None	6.4	None	2.2	100	8.6
Average individual within 80 km (mrem)[d]	None	1.0×10^{-2}	None	3.2×10^{-3}	None	1.4×10^{-2}

[a] The standards for individuals are given in DOE Order 5400.5 (DOE 1993a:II-1–II-5). As discussed in that order, the 10-mrem/yr limit from airborne emissions is required by the Clean Air Act, and the 4-mrem/yr limit is required by the Safe Drinking Water Act; for this SPD EIS the 4-mrem/yr value is conservatively assumed to be the limit for the sum of doses from all liquid pathways. The total dose of 100 mrem/yr is the limit from all pathways combined. The 100-person-rem value for the population is given in proposed 10 CFR 834, as published in 58 FR 16268 (DOE 1993b:para. 834.7). If the potential total dose exceeds the 100-person-rem value, it is required that the contractor operating the facility notify DOE.
[b] Conservatively includes all water pathways, not just the drinking water pathway. The population dose includes contributions to Savannah River users downstream of SRS to the Atlantic Ocean.
[c] About 620,100 in 1996. For liquid releases, an additional 70,000 water users in Port Wentworth, Georgia, and Beaufort, South Carolina (about 160 km [98 mi] downstream), are included in the assessment.
[d] Obtained by dividing the population dose by the number of people living within 80 km (50 mi) of the site for atmospheric releases; for liquid releases the number of people includes water users who live more than 80 km (50 mi) downstream of the site.

Source: Arnett and Mamatey 1997a:108, 111, 112, 115.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from SRS operations in 1996 is estimated to be 1.0×10^{-7}. That is, the estimated probability of this person dying of cancer at some point in the future from radiation exposure associated with 1 year of SRS operations is 1 in 10 million. (It takes several to many years from the time of radiation exposure for a cancer to manifest itself.)

According to the same risk estimator, 0.0043 excess fatal cancer is projected in the population living within 80 km (50 mi) of SRS from normal operations in 1996. To place this number in perspective, it may be compared with the number of fatal cancers expected in the same population from all causes. The 1996 mortality rate

associated with cancer for the entire U.S. population was 0.2 percent per year (Famighetti 1998:964). Based on this national mortality rate, the number of fatal cancers from all causes expected during 1996 in the population living within 80 km (50 mi) of SRS was 1,240. This expected number of fatal cancers is much higher than the 0.0043 fatal cancers estimated from SRS operations in 1996.

SRS workers receive the same dose as the general public from background radiation, but also receive an additional dose from working in facilities with nuclear materials. Table 3–46 presents the average worker and cumulative worker dose to SRS workers from operations in 1996. These doses fall within the radiological regulatory limits of 10 CFR 835 (DOE 1995b:paragraph 835.202). According to a risk estimator of 400 fatal cancers per 1 million person-rem among workers[8] (Appendix F.10), the number of projected fatal cancers to SRS workers from normal operations in 1996 is 0.095.

Table 3–46. Radiation Doses to Workers From Normal SRS Operations in 1996 (Total Effective Dose Equivalent)

	Onsite Releases and Direct Radiation	
Occupational Personnel	**Standard[a]**	**Actual**
Average radiation worker (mrem)	None[b]	19.0
Total workers (person-rem)[c]	None	237

[a] The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995a:para. 835.202). However, DOE's goal is to maintain radiological exposure as low as reasonably achievable. It has therefore established an administrative control level of 2,000 mrem/yr (DOE 1994a:2-3); DOE must make reasonable attempts to maintain worker doses below this level.

[b] No standard is specified for an "average radiation worker"; however, the maximum dose that this worker may receive is limited to that given in footnote "a."

[c] About 12,500 (badged) in 1996.

Source: Sessions 1997c.

A more detailed presentation of the radiation environment, including background exposures and radiological releases and doses, is presented in the *Savannah River Site Environmental Report for 1996* (Arnett and Mamatey 1997a). The concentrations of radioactivity in various environmental media (including air, water, and soil) in the site region (on and off the site) are also presented in that report.

3.5.4.1.2 Proposed Facility Locations

External radiation doses and concentrations of gross alpha, plutonium, and americium in air have been measured in F- and S-Areas. In 1996, the annual doses in the F- and S-Areas were 106 and 111 mrem, respectively. Both are higher than the dose of 87 mrem measured at the offsite control location. In the same year, the concentrations of gross alpha were about 1.3×10^{-3} pCi/m^3 and 9.8×10^{-4} pCi/m^3 in the F- and S-Areas, respectively, compared with the approximately 9.4×10^{-4} pCi/m^3 measured at the offsite control location. The concentrations of plutonium 239 in the F- and S-Areas were about 8.4×10^{-7} and 0 pCi/m^3, respectively. Offsite controls did not detect any plutonium 239 in the air in 1996 (Arnett and Mamatey 1997a:80; 1997b:31, 33, 40, 42).

[8] The risk estimator for workers is lower than the estimator for the public because of the absence from the workforce of the more radiosensitive infant and child age groups.

3.5.4.2 Chemical Environment

The background chemical environment important to human health consists of the atmosphere, which may contain hazardous chemicals that can be inhaled; drinking water, which may contain hazardous chemicals that can be ingested; and other environmental media through which people may come in contact with hazardous chemicals (e.g., surface water during swimming, soil through direct contact, or food). Hazardous chemicals can cause cancer and noncancer health effects. The baseline data for assessing potential health impacts from the chemical environment are addressed in Section 3.5.1.

Effective administrative and design controls that decrease hazardous chemical releases to the environment and help achieve compliance with permit requirements (e.g., air emissions and NPDES permit requirements) contribute to minimizing health impacts on the public. The effectiveness of these controls is verified through the use of monitoring information and inspection of mitigation measures. Health impacts on the public may occur via inhalation of air containing hazardous chemicals released to the atmosphere during normal SRS operations. Risks to public health from other possible pathways, such as ingestion of contaminated drinking water or direct exposure, are lower than those via the inhalation pathway.

Baseline air emission concentrations and applicable standards for hazardous chemicals are addressed in Section 3.5.1. The baseline concentrations are estimates of the highest existing offsite concentrations and represent the highest concentrations to which members of the public could be exposed. These concentrations are in compliance with applicable guidelines and regulations. Information on estimating the health impacts of hazardous chemicals is presented in Appendix F.10.

Exposure pathways to SRS workers during normal operations may include inhaling contaminants in the workplace atmosphere and direct contact with hazardous materials. The potential for health impacts varies among facilities and workers, and available information is insufficient for a detailed estimate of impacts. Workers are protected from workplace hazards through appropriate training, protective equipment, monitoring, substitution, and engineering and management controls. They are also protected by adherence to OSHA and EPA standards that limit workplace atmospheric and drinking water concentrations of potentially hazardous chemicals. Appropriate monitoring that reflects the frequency and amounts of chemicals used in the operational processes ensures that these standards are not exceeded. Additionally, DOE requires that conditions in the workplace be as free as possible from recognized hazards that cause or are likely to cause illness or physical harm. Therefore, workplace conditions at SRS are substantially better than required by standards.

3.5.4.3 Health Effects Studies

One epidemiological study on the general population in communities surrounding SRS has been conducted and published. No evidence of excess cancer mortality, congenital anomalies, birth defects, early infancy deaths, strokes, or cardiovascular deaths was reported. The epidemiological literature on the facility reflects an excess of leukemia deaths among hourly workers; no other health effects for workers are reported. For a more detailed description of the studies reviewed and their findings, and for a discussion of the epidemiologic surveillance program implemented by DOE to monitor the health of current SRS workers, refer to Appendix M.4.7 of the *Storage and Disposition PEIS* (DOE 1996a:M-242, M-243).

3.5.4.4 Accident History

Between 1974 and 1988, there were 13 inadvertent tritium releases from the SRS tritium facilities. These releases were attributed to aging equipment in the tritium-processing facility and are one of the reasons for the construction of the Replacement Tritium Facility at SRS. A detailed description and study of these incidents and the consequences thereof for the offsite population have been documented by SRS. The most significant were

in 1981, 1984, and 1985, when, respectively, 32,934, 43,800, and 19,403 Ci of tritiated water vapor were released (DOE 1996a:3-259). From 1989 through 1992, there were 20 inadvertent releases, all with little or no offsite dose consequences. The largest of the recent releases occurred in 1992 when 12,000 Ci of tritium were released (Arnett, Karapatakis, and Mamatey 1993:260).

In 1993, an inadvertent release of 0.18 microcurie (mCi) of plutonium 238 and plutonium 239 took place. Westinghouse Savannah River Company emergency response models estimated an exposure of 0.0019 mrem to a hypothetical person at the site boundary (Arnett, Karapatakis, and Mamatey 1994:178).

3.5.4.5 Emergency Preparedness

Each DOE site has established an emergency management program that would be activated in the event of an accident. This program has been developed and maintained to ensure adequate response to most accident conditions and to provide response efforts for accidents not specifically considered. The emergency management program includes emergency planning, preparedness, and response.

The Emergency Preparedness Facility at SRS provides overall direction and control for onsite responses to emergencies and coordinates with Federal, State, and local agencies and officials on the technical aspects of the emergency. Emergency plans have been prepared for specific areas at SRS. Participating government agencies whose plans are interrelated with the SRS emergency plan for action include the States of South Carolina and Georgia, the City of Aiken, and the various counties in the general region of the site. Emergency response support, including firefighting and medical assistance, would be provided by these jurisdictions.

DOE has specified actions to be taken at all DOE sites to implement lessons learned from the emergency response to an accidental explosion at Hanford in May 1997. These actions and the timeframe in which they must be implemented are presented in Section 3.2.4.5.

3.5.5 Environmental Justice

Environmental justice concerns the environmental impacts that proposed actions may have on minority and low-income populations, and whether such impacts are disproportionate to those on the population as a whole in the potentially affected area. In the case of SRS, the potentially affected area includes parts of Georgia and South Carolina.

The potentially affected area around the location of the proposed surplus plutonium disposition facilities in F-Area is defined by a circle with an 80-km (50-mi) radius centered at the Actinide Packaging and Storage Facility (APSF), if built, (lat. 33E17'32" N, long. 81E40'26" W). The total population residing within that area in 1990 was 614,095. The proportion of the population there that was considered minority was 38.0 percent.

Figure 3–30 illustrates the racial and ethnic composition of the minority population in the potentially affected area surrounding APSF, if built. At the time of the 1990 census, Blacks were the largest minority group within that area, constituting 35.7 percent of the total population. Hispanics constituted about 1.1 percent, and Asians, about 1 percent. Native Americans comprised about 0.2 percent of the population (DOC 1992).

[Text deleted.]

The potentially affected area around S-Area is defined by a circle with an 80-km (50-mi) radius centered at DWPF (lat. 33E17'43" N, long. 81E38'25" W). The total population residing within that area in 1990 was 626,317. The proportion of the population around this facility that was considered minority was 38.5 percent.

Figure 3–30 illustrates the racial and ethnic composition of the minority population in the potentially affected area around the S-Area. At the time of the 1990 census, Blacks were the largest minority group within the potentially affected area, constituting 36.3 percent of the total population. Hispanics constituted about 1.0 percent, and Asians, about 1 percent. Native Americans constituted about 0.2 percent of the population (DOC 1992). The same census data show that the percentage of minorities for the contiguous United States was 24.1, and the percentages for the States of Georgia and South Carolina, 29.8 and 31.4, respectively (DOC 1992).

A breakdown of incomes in the potentially affected area is also available from the 1990 census data (DOC 1992). At that time, the poverty threshold was $9,981 for a family of three with one related child under 18 years of age. A total of 107,057 persons (18.0 percent of the total population) residing within the potentially affected area around F-Area at APSF, if built, reported incomes below the poverty threshold. [Text deleted.] The low-income population around S-Area at DWPF was 109,217 (18.0 percent of the total population).

Data obtained during the 1990 census also show that of the total population of the contiguous United States, 13.1 percent reported incomes below the poverty threshold, and that Georgia and South Carolina reported 14.7 and 15.4 percent, respectively.

3.5.6 Geology and Soils

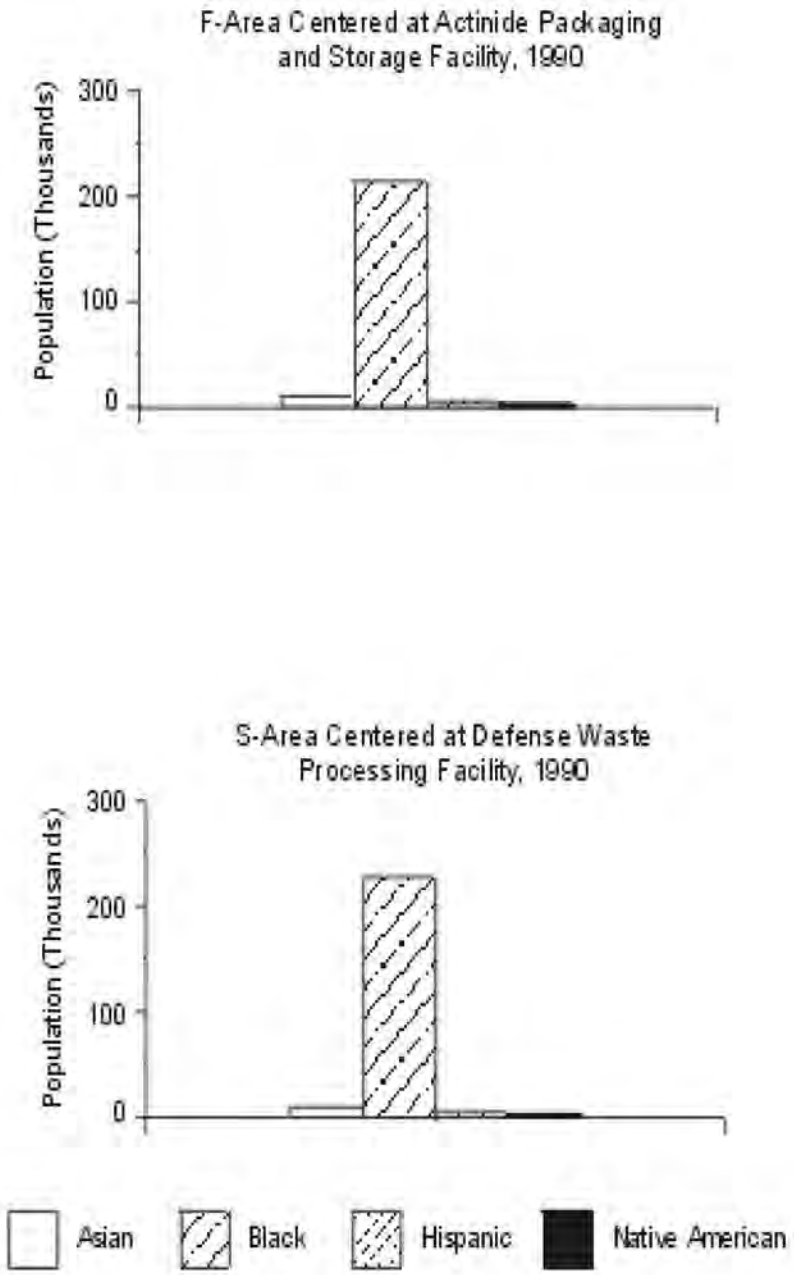
Geologic resources are consolidated or unconsolidated earth materials, including ore and aggregate materials, fossil fuels, and significant landforms. Soil resources are the loose surface materials of the earth in which plants grow, usually consisting of disintegrated rock, organic matter, and soluble salts.

3.5.6.1 General Site Description

Coastal Plain sediments beneath SRS overlie a basement complex composed of Paleocene crystalline and Triassic sedimentary formations of the Dunbarton Basin. Small and discontinuous zones of calcareous sand (i.e., sand containing calcium carbonate [calcite]), potentially subject to dissolution by water, are beneath some parts of SRS. If dissolution occurs in these zones, potential underground subsidence resulting in settling of the ground surface could occur. No settling as a result of dissolution of these zones has been identified. No economically viable geologic resources have been identified at SRS (DOE 1996a:3-241).

In the immediate region of SRS, there are no known capable faults. A capable fault is one that has had movement at or near the ground surface at least once within the past 35,000 years or recurrent movement within the past 500,000 years. Several faults have been identified from subsurface mapping and seismic surveys within the Paleozoic and Triassic basement beneath SRS. The largest of these is the Pen Branch Fault. There is no evidence of movement within the last 38 million years along this fault (DOE 1996a:3-241).

According to the Uniform Building Code, SRS is in Seismic Zone 2, meaning that moderate damage could occur as a result of an earthquake (DOE 1996a:3-241). Two earthquakes occurred during recent years inside the SRS boundary. On June 8, 1985, an earthquake with a local Richter scale magnitude of 2.6 and a focal depth of about 1 km (0.6 mi) occurred at SRS. Its epicenter was west of C- and K-Areas. The acceleration produced by the earthquake did not activate seismic monitoring instruments in the reactor areas. (These instruments have detection limits of 0.002g.) On August 5, 1988, another earthquake with a local Richter scale magnitude of 2.0 and a focal depth of about 2.7 km (1.7 mi) occurred at SRS. Its epicenter was northwest of K-Area. The seismic alarms in SRS facilities were not triggered. Existing information does not conclusively correlate the two earthquakes with any of the known faults on the site (DOE 1995c:3-7). Earthquakes capable of producing structural damage are not likely to occur in the vicinity of SRS (DOE 1996a:3-241).



Source: DOC 1992.

Figure 3–30. Racial and Ethnic Composition of Minorities Around SRS

Historically, two large earthquakes have occurred within 300 km (186 mi) of SRS. The largest of these, the Charleston earthquake of 1886, had an estimated Richter scale magnitude ranging from 6.5 to 7.5 (DOE 1996a:3-241). The SRS area experienced an estimated peak horizontal acceleration of 0.10g during this earthquake (DOE 1995c:3-6). An earthquake with a maximum horizontal acceleration of 0.19g is estimated to have an annual probability of occurrence of 1 in 5,000 at SRS (Barghusen and Feit 1995:2.13–16).

There are no volcanic hazards at SRS. The area has not experienced volcanic activity within the last 230 million years (DOE 1996a:3-241). Future volcanism is not expected because SRS is along the passive continental margin of North America (Barghusen and Feit 1995:2.13–16).

The soils at SRS are primarily sands and sandy loams. The somewhat excessively drained soils have a thick, sandy surface layer that extends to a depth of 2 m (6.6 ft) or more in some areas. Soil units that meet the soil requirements for prime farmland soils exist on SRS. However, the U.S. Department of Agriculture, Natural Resources Conservation Service, does not identify these lands as prime farmland due to the nature of site use; that is, the lands are not available for the production of food or fiber. The soils at SRS are considered acceptable for standard construction techniques (DOE 1996a:3-230, 3-241). Detailed descriptions of the geology and the soil conditions at SRS are included in the *Storage and Disposition PEIS* (DOE 1996a:3-241) and the *Savannah River Site Waste Management Final EIS* (DOE 1995c:3-4–3-6).

3.5.6.2 Proposed Facility Locations

Soils in F-Area are predominantly of the Fuquay-Blanton-Dothan association, consisting of nearly level to sloping, well-drained soils. Other soils include the Troup-Pickney-Lucy association, consisting of nearly level soils formed along, and parallel to, the floodplains of streams (Barghusen and Feit 1995:2.13–16).

Several subsurface investigations conducted on SRS waste management areas encountered soft sediments classified as calcareous sands. These sands were encountered in borings in S-Area between 33 and 35 m (108 to 115 ft) below ground surface. Preliminary information indicates that these calcareous zones are not continuous over large areas, nor are they very thick. No settling as a result of dissolution of these zones has been identified (DOE 1995c:3-6). Soils in S-Area are predominantly the same as those in F-Area (Barghusen and Feit 1995:2.13–16).

3.5.7 Water Resources

3.5.7.1 Surface Water

Surface water includes marine or freshwater bodies that occur above the ground surface, including rivers, streams, lakes, ponds, rainwater catchments, embayments, and oceans.

3.5.7.1.1 General Site Description

The largest river in the area of SRS is the Savannah River, which borders the site on the southwest. Six streams flow through SRS and discharge into the Savannah River: Upper Three Runs Creek, Beaver Dam Creek, Fourmile Branch, Pen Branch, Steel Creek, and Lower Three Runs Creek. Upper Three Runs Creek has two tributaries, Tims Branch and Tinker Creek; Pen Branch has one, Indian Grave Branch; and Steel Creek, one, Meyers Branch (DOE 1996a:3-236).

There are two manmade lakes at SRS: L-Lake, which discharges to Steel Creek, and Par Pond, which discharges to Lower Three Runs Creek. Also, about 299 Carolina bays—i.e., closed depressions capable of holding

water—occur throughout the site. While these bays receive no direct effluent discharges, they do receive storm-water runoff (DOE 1996a:3-236; WSRC 1997b:6-124).

Water has historically been withdrawn from the Savannah River for use mainly as cooling water; some, however, has been used for domestic purposes (DOE 1996a:3-236). SRS currently withdraws about 140 billion l/yr (37 billion gal/yr) from the river. Most of this water is returned to the river through discharges to various tributaries (DOE 1996a:3-236).

The average flow of the Savannah River is 283 m^3/s (10,000 ft^3/s). Three large upstream reservoirs, Hartwell, Richard B. Russell, and Strom Thurmond/Clarks Hill, regulate the flow in the Savannah River, thereby lessening the impacts of drought and flooding on users downstream (DOE 1995c:3-14).

Several communities in the area use the Savannah River as a source of domestic water. The nearest downstream water intake is the Beaufort-Jasper Water Authority in South Carolina, which withdraws about 0.23 m^3/s (8.1 ft^3/s) to service about 51,000 people. Treated effluent is discharged to the Savannah River from upstream communities and from treatment facilities at SRS. The average annual volume of flow discharged by the sewage treatment facilities at SRS is about 700 million l (185 million gal) (DOE 1996a:3-236; Barghusen and Feit 1995:2.13-18).

It is clear that the surplus plutonium disposition facilities would not be located within a 100-year floodplain, but there is no information concerning 500-year floodplains (DOE 1996a:3-236). No federally designated Wild and Scenic Rivers occur within the site (Barghusen and Feit 1995:2.13-2). A map showing the 100-year floodplain is presented as Figure 3–31 (Noah 1995:52).

The Savannah River is classified as a freshwater source that is suitable for primary and secondary contact recreation; drinking, after appropriate treatment; fishing; balanced indigenous aquatic community development and propagation; and industrial and agricultural uses. A comparison of Savannah River water quality upstream (river mile 160) and downstream (river mile 120) of SRS showed no significant differences for nonradiological parameters (Arnett and Mamatey 1996:73, 119, 120). A comparison of current and historical data shows that the coliform data are within normal fluctuations for river water in this area. For the different river locations, however, there has been an increase in the number of analyses in which standards were not met. The data for the river's monitoring locations generally met the freshwater standards set by the State; a comparison of the 1995 and earlier measurements for river samples showed no abnormal deviations. As for radiological constituents, tritium is the predominant radionuclide detected above background levels in the Savannah River (Arnett and Mamatey 1996:80, 120).

Surface water rights for SRS are determined by the Doctrine of Riparian Rights, which allows owners of land adjacent to or under the water to use the water beneficially (DOE 1996a:3-239). SRS has five NPDES permits, two (SC0000175 and SC0044903) for industrial wastewater discharges, two (SCR000000 and SCR100000) for general storm-water discharges, and one (ND0072125) for land application. Permit SC0000175 regulates 76 outfalls; permit SC0044903, another 7. The 1995 compliance rate for these outfalls was 99.8 percent. The 48 storm-water–only outfalls regulated by the storm-water permits are monitored as required. A pollution prevention plan has been developed to identify where best available technology and best management practices must be used. For storm-water runoff from construction activities extending over 2 ha (5 acres), a sediment reduction and erosion plan is required (Arnett and Mamatey 1996:24, 114, 115, 226).

3.5.7.1.2 Proposed Facility Locations

The land around F-Area drains to Upper Three Runs Creek and Fourmile Branch (DOE 1995c:3-17). Upper Three Runs Creek is a large, cool blackwater stream that flows into the Savannah River. It drains about

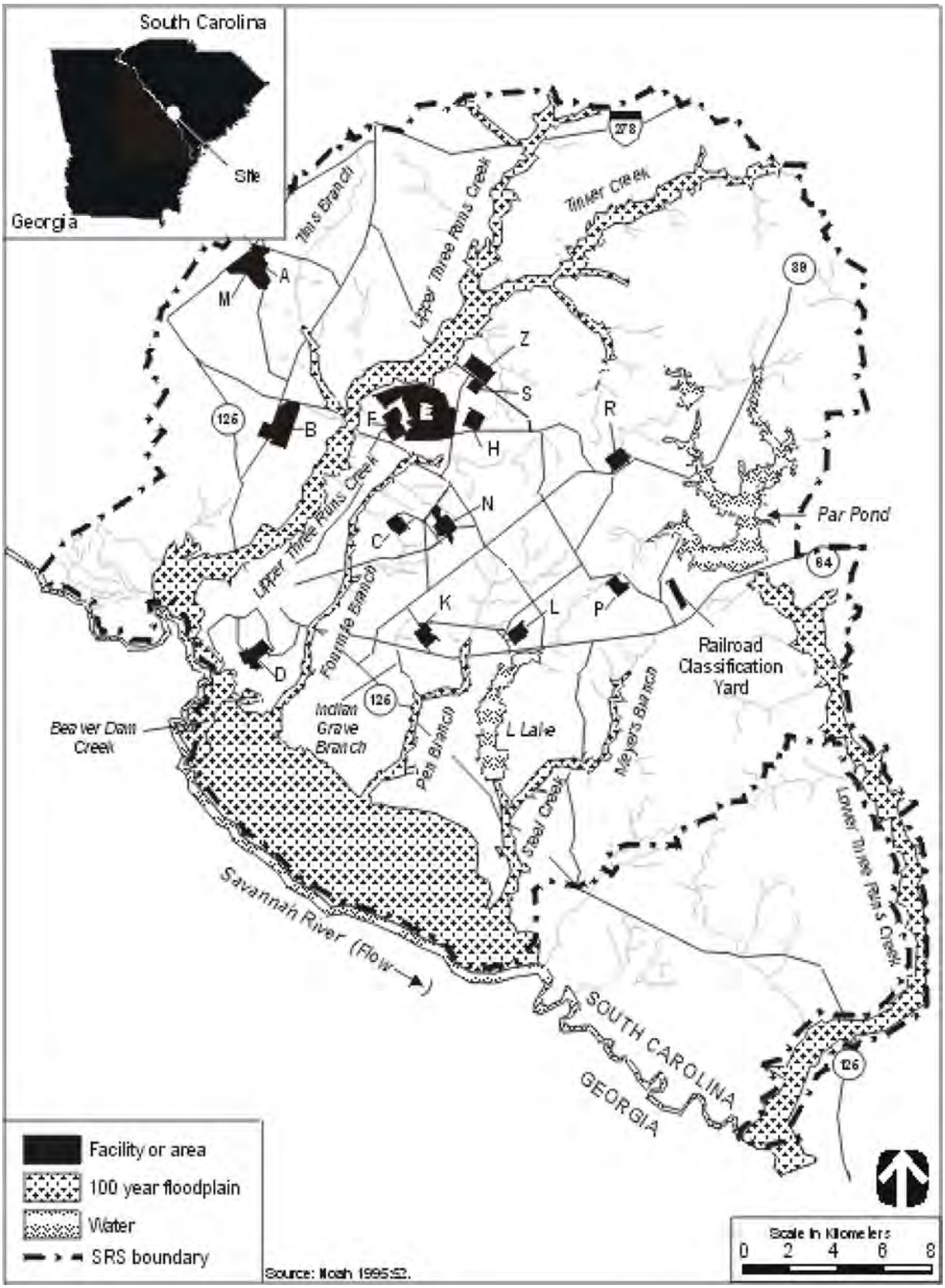


Figure 3–31. Locations of Floodplains at SRS

544 km^2 (210 mi^2), and during water year 1991, had a mean discharge of 6.8 m^3/s (240 ft^3/s) near its mouth. The 7-day, 10-year low flow, which is the lowest flow over any 7 days within any 10-year period, is about 2.8 m^3/s (100 ft^3/s). The stream is about 40 km (25 mi) long and only its lower reaches extend through SRS. It receives more water from underground sources than any other SRS stream, and therefore has lower dissolved solids, hardness, and pH values. It is the only major stream on the site that has not received thermal discharges. It receives permitted discharges from several areas at SRS, including F-Area, S-Area, S-Area sewage treatment plant, and treated industrial wastewater from the Chemical Waste Treatment Facility steam condensate. Flow from the sanitary wastewater discharge averages less than 0.001 m^3/s (0.035 ft^3/s or 16 gal/min). A comparison with the 7-day, 10-year low flow of 2.8 m^3/s (100 ft^3/s) in Upper Three Runs Creek shows that the present discharges are very small. The analytical results for the active outfalls show the constituents of concern are maintained within permit limitations (DOE 1994c:3-12–3-15; 1995c:3-15, 3-19).

Fourmile Branch is a blackwater stream affected by past operational practices at SRS. Its headwaters are near the center of the site, and it flows southwesterly before discharging into the Savannah River. The watershed is about 54 km^2 (21 mi^2) and receives permitted effluent discharges from F-Area and H-Area. This stream received cooling water discharges from C-Reactor while it was operating. Since those discharges ceased in 1985, the maximum recorded temperature in the stream has been 32 EC (90 EF), as opposed to ambient water temperatures that exceeded 60 EC (140 EF) when the reactor was operating. The average flow in the stream during C-Reactor operation was about 11.3 m^3/s (400 ft^3/s); since then flows have averaged about 1.8 m^3/s (64 ft^3/s) (DOE 1995c:3-19). In its lower reaches, this stream widens and flows via braided channels through a delta. Downstream of this delta area, it re-forms into one main channel, and most of the flow discharges into the Savannah River at river mile 152.1. When the Savannah River floods, water from Fourmile Branch flows along the northern boundary of the floodplain and joins with other site streams to exit the swamp via Steel Creek instead of flowing directly into the Savannah River (DOE 1995c:3-19).

The land surrounding S-Area also drains to Upper Three Runs Creek and Fourmile Branch. (Except for the differences noted in this section, stream information for F-Area is also relevant to S-Area.) Storm-water runoff from most of the area near DWPF is collected and discharged into a retention basin north of S-Area. Effluent from this basin is discharged at Outfall DW-005 to Crouch Branch, then to Upper Three Runs Creek (Arnett and Mamatey 1996:167; DOE 1994c:3-15). Analyses of samples from this outfall show a minimal impact of storm water on the water quality of Upper Three Runs Creek. Construction of DWPF adversely affected the water quality of Crouch Branch and McQueen Branch; however, enhanced erosion and sedimentation controls have been instituted at DWPF and in Z-Area. Also, startup of DWPF and the concurrent reduction in construction activities have assisted in reducing sediment loads to these streams (DOE 1994c:3-15).

3.5.7.2 Groundwater

Aquifers are classified by Federal and State authorities according to use and quality. The Federal classifications include Class I, II, and III groundwater. Class I groundwater is either the sole source of drinking water or is ecologically vital. Class IIA and IIB are current or potential sources of drinking water (or other beneficial use), respectively. Class III is not considered a potential source of drinking water and is of limited beneficial use.

3.5.7.2.1 General Site Description

Although many different systems have been used to describe groundwater systems at SRS, for this SPD EIS the same system used in the *Storage and Disposition PEIS* has been adopted. The uppermost aquifer is referred to as the water table aquifer. It is supported by the leaky “Green Clay” aquitard, which confines the Congaree aquifer. Below the Congaree aquifer is the leaky Ellenton aquitard, which confines the Cretaceous aquifer, also known as the Tuscaloosa aquifer. In general, groundwater in the water table aquifer flows downward to the Congaree aquifer or discharges to nearby streams. Flow in the Congaree aquifer is downward to the Cretaceous

aquifer or horizontal to stream discharge or the Savannah River, depending on the location within SRS (DOE 1996a:3-239).

Groundwater in the area is used extensively for domestic and industrial purposes. Most municipal and industrial water supplies are withdrawn from the Cretaceous or water table aquifer, while small domestic supplies are withdrawn from the Congaree or water table aquifer. It is estimated that about 13 billion l/yr (3.4 billion gal/yr) are withdrawn from the aquifers within a 16-km (10-mi) radius of the site, which is similar to the volume used by SRS (DOE 1996a:3-239). The Cretaceous aquifer is an important water resource for the SRS region. The water is generally soft, slightly acidic, and low in dissolved and suspended solids (DOE 1995c:3-11, 3-13). Aiken, South Carolina, for example, uses the Cretaceous aquifer for drinking water.
Groundwater is the only source of domestic water at SRS (DOE 1995c:3-13). All groundwater at SRS is classified by EPA as a Class II water source, and depth to groundwater ranges from near the surface to about 46 m (150 ft). In 1993, SRS withdrew about 13 billion l/yr (3.4 billion gal/yr) of groundwater to support site operations (DOE 1996a:3-239). There are no designated sole source aquifers in the area (Barghusen and Feit 1995:2.13-2).

Groundwater ranges in quality across the site: in some areas it meets drinking water quality standards, while in areas near some waste sites it does not. The Cretaceous aquifer is generally unaffected except for an area near A-Area, where TCE has been reported. TCE has also been reported in the A- and M-Areas in the Congaree aquifer. Tritium has been reported in the Congaree aquifer in the Separations Area. The water table aquifer is contaminated with solvents, metals, and low levels of radionuclides at several SRS sites and facilities. Groundwater eventually discharges into onsite streams or the Savannah River (DOE 1996a:3-239), but groundwater contamination has not been detected beyond SRS boundaries (DOE 1995c:3-13).

Groundwater rights in South Carolina are associated with the absolute ownership rule. Owners of land overlying a groundwater source are allowed to withdraw as much water as they desire; however, the State requires users who withdraw more than 379,000 l/day (100,000 gal/day) to report their withdrawals. SRS is required to report because its usage is above the reporting level (DOE 1996a:3-239).

3.5.7.2.2 Proposed Facility Locations

Groundwater in the shallow, intermediate, and deep aquifers flows in different directions, depending on the depths of the streams that cut the aquifers. The shallow aquifer discharges to Upper Three Runs Creek and Fourmile Branch. Shallow groundwater in the vicinity of S-Area flows toward Upper Three Runs Creek, McQueen Branch, or Fourmile Branch. Groundwater in the intermediate and deep aquifers flows horizontally toward the Savannah River and southeast toward the coast (DOE 1994c:3-4, 3-6).

Groundwater also moves vertically. In the shallow aquifer, it moves downward until its movement is obstructed by impermeable material. Operating under a different set of physical conditions, groundwater in the intermediate and deep aquifers flows mostly horizontally. Near F-Area it moves upward due to higher water pressure below the confining unit between the upper and lower aquifers. This upward movement helps to protect the lower aquifers from contaminants found in the shallow aquifer. The depth to groundwater in F-Area varies from about 1 to 20 m (3.3 to 66 ft) (DOE 1994c:3-6).

Groundwater quality in F-Area is not significantly different from that for the site as a whole. It is abundant, usually soft, slightly acidic, and low in dissolved solids. High dissolved iron concentrations occur in some aquifers. Where needed, groundwater is treated to raise the pH and remove iron. Results of sampling in the shallow aquifer have indicated excursions from drinking water standards for lead, tetrachloroethylene, and tritium in S-Area wells (DOE 1994c:3-6, 3-9).

F-Area groundwater quality can exceed drinking water standards for several contaminants. Near the F-Area seepage basins and inactive process sewer line, radionuclide contamination is widespread. Most of these wells contain tritium above drinking water standards. Other wells exhibit gross alpha, gross beta, strontium 90, and iodine 129 above their standards. Other radionuclides found above proposed standards in several wells include americium 241; curium 243 and 244; radium 226 and 228; strontium 90; total alpha–emitting radium; and uranium 233, 234, 235, and 238. Cesium 137, curium 245 and 246, and plutonium 238 were also found (Arnett and Mamatey 1996:143, 144).

Near the F-Area Tank Farm, tritium, mercury, nitrate-nitrite as nitrogen, cadmium, gross alpha, and lead were detected above drinking water standards in one or more wells. The pH exceeded the basic standard, and trichlorofluoromethane (Freon 11), which has no drinking water standard, was present in elevated levels (Arnett and Mamatey 1996:153).

At the F-Area Sanitary Sludge Land Application Site, tritium, specific conductance, lead, and copper were found to exceed their drinking water standards in one or more wells (Arnett and Mamatey 1996:154). Groundwater near the F-Area Acid/Caustic Basin consistently exceeded drinking water standards for gross alpha. Total alpha-emitting radium, alkalinity, gross beta, nitrate as nitrogen, and pH were above their respective standards in one or more wells (Arnett and Mamatey 1996:138). The groundwater near the F-Area Coal Pile Runoff Containment Basin did not exceed any chemical or radiological standard during 1995 (Arnett and Mamatey 1996:141).

Groundwater flow and conditions in S-Area are not significantly different from those in F-Area. Tritium, tetrachloroethylene, and TCE exceeded the drinking water standards near the S-Area facilities. The groundwater in one well near the S-Area Low-Point Pump Pit also contained tritium in excess of drinking water standards. No other radiological or chemical constituents have been detected above standards since 1989 (Arnett and Mamatey 1996:149). Near the S-Area vitrification building, also known as the S-Area Canyon, tritium exceeded drinking water standards, and specific conductance and alkalinity were elevated (Arnett and Mamatey 1996:149).

3.5.8 Ecological Resources

Ecological resources are defined as terrestrial (predominantly land) and aquatic (predominantly water) ecosystems characterized by the presence of native and naturalized plants and animals. For the purposes of this SPD EIS, those ecosystems are differentiated in terms of habitat support of threatened, endangered, and other special-status species—that is, “nonsensitive” versus “sensitive” habitat.

3.5.8.1 Nonsensitive Habitat

Nonsensitive habitat comprises those terrestrial and aquatic areas of the site that typically support the region’s major plant and animal species.

3.5.8.1.1 General Site Description

At least 90 percent of the SRS land cover is composed of upland pine and bottomland hardwood forests (DOE 1997a:4-97). Five major plant communities have been identified at SRS: bottomland hardwood (most commonly sweetgum and yellow poplar); upland hardwood-scrub oak (predominantly oaks and hickories); pine/hardwood; loblolly, longleaf, and slash pine; and swamp. The loblolly, longleaf, and slash pine community covers about 65 percent of the upland areas of the site. Swamp forests and bottomland hardwood forests occur along the Savannah River and the numerous streams found on the site (Figure 3–32) (DOE 1995a:vol. 1, app. C, 4-47; 1996a:3-242).

The biodiversity of the region is extensive due to the variety of plant communities and the mild climate. Animal species known to inhabit SRS include 44 species of amphibians, 255 species of birds, 54 species of mammals, and 59 species of reptiles. Common species include the eastern box turtle, Carolina chickadee, common crow, eastern cottontail, and gray fox (DOE 1996a:3-242; WSRC 1997b:3-3). Game animals include a number of species, two of which, the white-tailed deer and feral hogs, are hunted on the site (DOE 1996d:3-56). Raptors, such as the Cooper's hawk and black vulture, and carnivores, such as the gray fox are ecologically important groups at SRS (DOE 1996a:3-242).

Aquatic habitat includes manmade ponds, Carolina bays, reservoirs, and the Savannah River and its tributaries. There are more than 50 manmade impoundments throughout the site that support populations of bass and sunfish. Carolina bays, a type of wetland unique to the southeastern United States, are natural shallow depressions that occur in interstream areas. These bays can range from lakes to shallow marshes, herbaceous bogs, shrub bogs, or swamp forests. Among the 299 Carolina bays found throughout SRS, fewer than 20 have permanent fish populations. Redfin pickerel, mud sunfish, lake chubsucker, and mosquito fish are present in these bays. Although sport and commercial fishing is not permitted at SRS, the Savannah River is used extensively for both. Important commercial species are the American shad, hickory shad, and striped bass, all of which are anadromous. The most important warm-water game fish are bass, pickerel, crappie, bream, and catfish (DOE 1996a:3-244; WSRC 1997b:6-124).

3.5.8.1.2 Proposed Facility Locations

F-Area and S-Area are situated on an upland plateau between the drainage areas of Upper Three Runs Creek and Fourmile Branch. These heavily industrialized areas are dominated by buildings, paved parking lots, graveled construction areas, and laydown yards; little natural vegetation remains inside the fenced areas. Grassed areas occur around the administration buildings, and some vegetation is present along drainage ditches, but most of the developed areas have no vegetation (DOE 1994c:3-24; 1995b:vol. 1, app. C, 4-47). The most common plant communities in the vicinities of F-Area and S-Area include loblolly, longleaf, and slash pine; upland hardwood-scrub oak; pine/hardwood; and bottomland hardwood (DOE 1995c:3-34, 3-35; DOE 1996a:3-242). Cleared fields are also common in F-Area, and a roughly 6-ha (15-acre) oak-hickory forest area designated as a National Environmental Research Park set aside is northwest of F-Area (DOE 1996a:3-242).

A recent (1994–1997) study was conducted to document the composition and diversity of urban wildlife, those species of amphibians, birds, mammals and reptiles that inhabit or temporarily use the developed areas on SRS. Results indicate that the use of the developed areas by wildlife species is more common than has been previously reported (Mayer and Wike 1997:8, 52). A total of 41 wildlife species were observed in and around F-Area, including 18 species of birds, 11 species of mammals, and 12 species of reptiles. Similarly, S-Area produced sightings of 36 wildlife species, including 19 species of birds, 9 species of mammals, and 8 species of reptiles. Bird species commonly seen include the bufflehead (F-Area only), turkey vulture, black vulture, killdeer, rock dove, mourning dove, chimney swift (F-Area only), great crested flycatcher (F-Area only), barn swallow, common crow, fish crow, northern mockingbird, American robin, loggerhead shrike (S-Area only), European starling, house sparrow (S-Area only), red-winged blackbird (S-Area only), and common grackle. Frequently sighted mammals include the Virginia opossum, eastern cottontail (F-Area only), house mouse, feral cat, striped skunk, and raccoon. The only reptile commonly observed is the banded water snake (Mayer and Wike 1997:9–14).

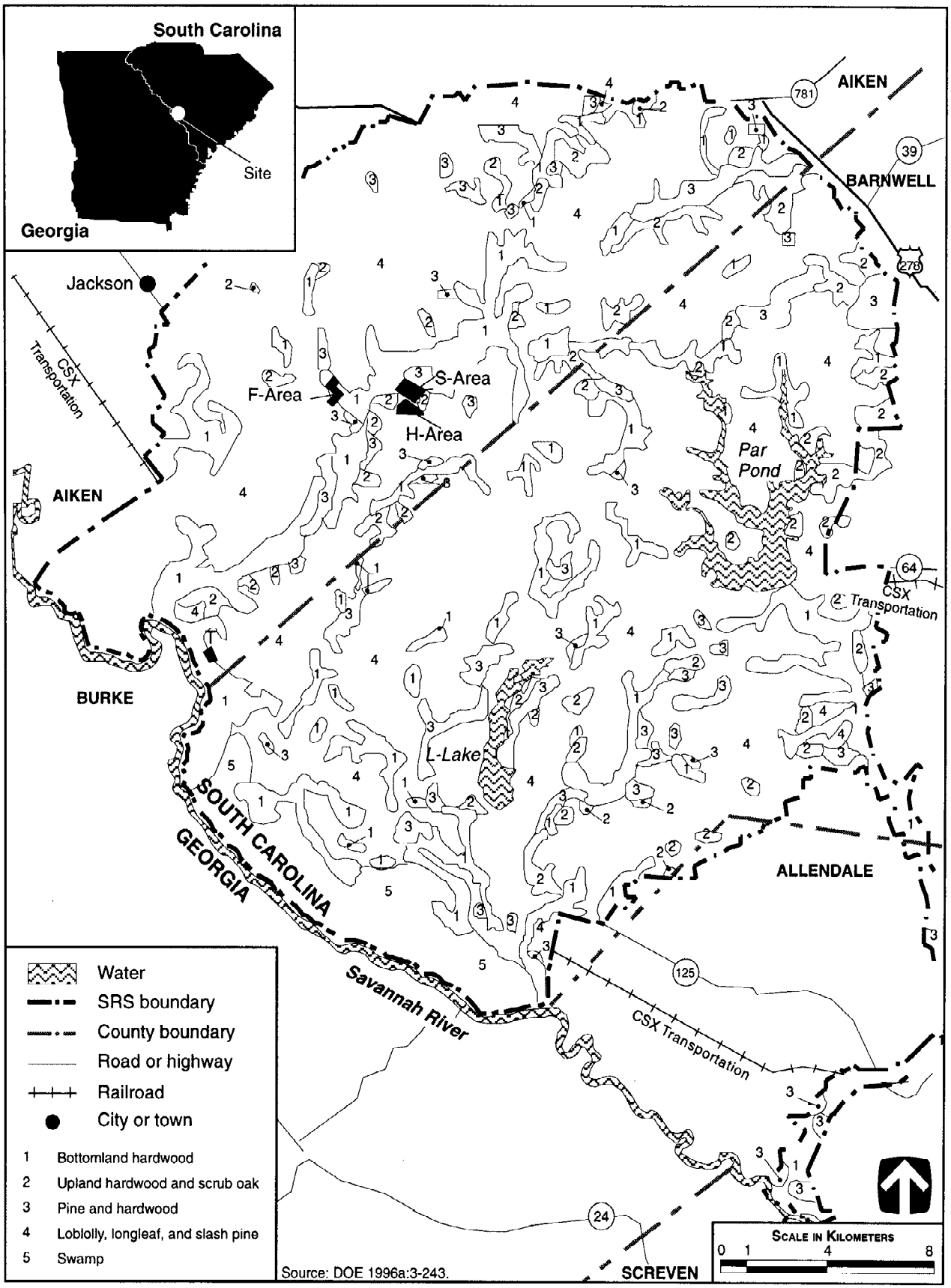


Figure 3–32. Major Plant Communities at SRS

Upper Three Runs Creek and its tributaries and three Carolina bays constitute the aquatic habitat in the vicinity of F-Area and S-Area. Streams support largemouth bass, black crappie, and various species of pan fish. Upper Three Runs Creek has a rich fauna; more than 551 species of aquatic insects have been collected (DOE 1996a:3-244; WSRC 1997b:5-32). It is important as a spawning area for blueback herring, and as a seasonal nursery habitat for American shad, striped bass, and other Savannah River species. Aquatic resources information on the three Carolina bays is unavailable (DOE 1996a:3-244).

3.5.8.2 Sensitive Habitat

Sensitive habitat comprises those terrestrial and aquatic (including wetlands) areas of the site that support threatened and endangered, State-protected, and other special-status plant and animal species.[9]

3.5.8.2.1 General Site Description

SRS wetlands, most of which are associated with floodplains, streams, and impoundments, include bottomland hardwood, cypress-tupelo, scrub-shrub, and emergent vegetation, as well as open water. Swamp forest along the Savannah River is the most extensive wetlands vegetation type (DOE 1996a:3-242).

Sixty-one threatened, endangered, and other special-status species listed by the Federal Government or the State of South Carolina may be found in the vicinity of SRS, as shown in Table 3.7.6–1 in the *Storage and Disposition PEIS*. No critical habitat for threatened or endangered species exists on SRS (DOE 1996a:3-245).

3.5.8.2.2 Proposed Facility Locations

No federally listed threatened or endangered species are known to occur in F-Area or S-Area, but several species that may exist in the general vicinity of these areas are listed in Table 3–47. The American alligator, although listed as threatened (by virtue of similarity in appearance to the endangered crocodile) is fairly abundant on SRS. It was recently observed near F-Area, but its occurrence there is seen as uncommon. Furthermore, no State-listed protected species have been found in any developed area on SRS, and of the State-listed organisms known to occur, none would be expected to use any of the disturbed areas for extended periods (Mayer and Wike 1997:42).

The Pen Branch area, about 14 km (8.7 mi) southwest of the proposed sites, and an area south of Par Pond, about 12 km (7.5 mi) to the southeast, support active bald eagle nests. Wood storks have been observed about 21 km (13 mi) from the proposed site, near the Fourmile Branch delta. The closest colony of red-cockaded woodpeckers is about 5 km (3.1 mi) away, but suitable forage habitat exists on the proposed sites. The smooth purple coneflower, the only endangered plant species found on SRS, could be found on the proposed sites (DOE 1996a:3-245). Botanical surveys conducted by the Savannah River Forest Station in 1992 and 1994 identified three populations of Oconee azalea in the area northwest of F-Area. This State-listed rare plant species, was found on the steep slopes adjacent to the Upper Three Runs Creek floodplain (DOE 1995c:3-37).

3.5.9 Cultural and Paleontological Resources

Cultural resources are human imprints on the landscape and are defined and protected by a series of Federal laws, regulations, and guidelines. Field studies conducted over the past two decades by the South Carolina Institute of Archaeology and Anthropology of the University of South Carolina have provided considerable information about the distribution and content of cultural resources at SRS. About 60 percent of SRS has been surveyed, and 858 archaeological (historic and prehistoric) sites have been identified (DOE 1995c). There are 67 sites considered potentially eligible for listing on the National Register; most of the sites have not yet been

[9] The Federal Government defines threatened and endangered species in the Endangered Species Act, and wetlands in 33 CFR 328.3.

Table 3–47. Threatened and Endangered Species, Species of Concern, and Sensitive Species Occurring or Potentially Occurring in the Vicinity of F-Area and S-Area

Common Name	Scientific Name	Federal Status	State Status
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Endangered
Red-cockaded woodpecker	*Picoides borealis*	Endangered	Endangered
Wood stork	*Mycteria americana*	Endangered	Endangered
Plants			
Oconee azalea	*Rhododendron flammeum*	Not listed	Species of Concern
Smooth purple coneflower	*Echinacea laevigata*	Endangered	Endangered
Reptiles			
American alligator	*Alligator mississippiensis*	Threatened (S/A)[a]	Not listed

[a] Protected under the Similarity of Appearance Provision of the Endangered Species Act.

Source: DOE 1996a:3-245–3-248; EuDaly 1998; Mayer and Wike 1997:9–14, 42.

evaluated (DOE 1996a:3-249). No SRS nuclear production facilities have been nominated for the National Register, and there are no plans for nominations. Existing SRS facilities lack architectural integrity and do not contribute to the broad historic theme of the Manhattan Project and the production of World War II era nuclear materials (DOE 1995c:vol. I, 3-53, 3-54).

Cultural sites are often occupied continuously or intermittently over substantial time spans. For this reason, a single location (sites) may contain evidence of use during both historic and prehistoric periods. In the discussions that follow, the numbers of prehistoric and historic resources are presented; the sum of these resources may be greater than the total number of sites reported due to this dual-use history at sites. Therefore, where the total number of sites reported is less than the sum of prehistoric and historic sites certain locations were used during both periods.

Cultural resources at SRS are managed under the terms of a programmatic memorandum of agreement among the DOE Savannah River Operations Office, the South Carolina State Historic Preservation Officer, and the Advisory Council on Historic Preservation, dated August 24, 1990 (WSRC 1997b:sec. 2.6). Guidance on the management of cultural resources at SRS is included in the *Archaeological Resources Management Plan of the Savannah River Archaeological Research Program* (SRARP 1989).

3.5.9.1 Prehistoric Resources

Prehistoric resources are physical properties that remain from human activities that predate written records.

3.5.9.1.1 General Site Description

Prehistoric resources at SRS consist of villages, base camps, limited-activity sites, quarries, and workshops. An extensive archaeological survey program begun at SRS in 1974 includes numerous field studies such as reconnaissance surveys, shovel test transects, and intensive site testing and excavation. There is prehistoric evidence of more than 800 sites, some of which may fall in the vicinity of the proposed facilities. Fewer than 8 percent of these sites have been evaluated for National Register eligibility (DOE 1996a:3-249).

3.5.9.1.2 Proposed Facility Locations

Within F-Area, land areas have been disturbed over the past 46 years by activities associated with construction and operation of the extant facilities. Although no archaeological surveys have been conducted within the

boundary of F-Area, no prehistoric cultural materials have been, or are expected to be, identified within this industrial area.

The proposed construction area adjacent to F-Area has been surveyed for prehistoric and historic archaeological resources. A number of archaeological sites within this area contain prehistoric materials considered potentially eligible for nomination to the National Register (Cabak, Sassaman, and Gillam 1996:199–312; SRARP 1997; Stephenson and King 1999). Prior to any activity with potential impact on the sites in this area, a consultation process would be initiated with the South Carolina State Historic Preservation Officer to formally determine the eligibility of specific sites and to determine necessary and appropriate mitigation measures.

A survey of S-Area prior to construction of DWPF revealed no archaeological resources potentially eligible for nomination to the National Register.

3.5.9.2 Historic Resources

Historic resources consist of physical properties that postdate the existence of written records. In the United States, historic resources are generally considered to be those that date no earlier than 1492.

3.5.9.2.1 General Site Description

Types of historic sites include farmsteads, tenant dwellings, mills, plantations and slave quarters, rice farm dikes, dams, cattle pens, ferry locations, towns, churches, schools, cemeteries, commercial building locations, and roads. About 400 historic sites or sites with historic components have been identified within SRS, and some of these may fall within the locations of the proposed facilities. To date, about 10 percent of the historic sites have been evaluated for National Register eligibility. Most pre-SRS era historic structures were demolished during the initial establishment of SRS in 1950. Two SRS era buildings built in 1951 remain in use. From a Cold War perspective, SRS has been involved in tritium operations and other nuclear material production for more than 40 years; therefore, some existing facilities and engineering records may have significant historical and scientific content (DOE 1996a:3-249).

3.5.9.2.2 Proposed Facility Locations

Within F-Area, land areas have been disturbed over the past 46 years by activities associated with the construction and operation of the extant facilities. Although no surveys have been conducted within the boundary of F-Area, no historic resources are expected to be identified with the possible exception of surviving facilities and engineering records from the Cold War era (DOE 1996a:3-249).

The proposed construction area adjacent to and northeast of F-Area has been surveyed for prehistoric and historic archaeological resources. Four known archaeological resources containing historic materials are considered potentially eligible for nomination to the National Register (Cabak, Sassaman, and Gillam 1996:199–312). Prior to any activity with potential impact on the sites in this area, a consultation process would be initiated with the South Carolina State Historic Preservation Officer to formally determine the eligibility of specific sites and to determine necessary and appropriate mitigation measures.

A survey of S-Area in conjunction with the 1982 DWPF EIS revealed no archaeological resources potentially eligible for nomination to the National Register (DOE 1994c:3–37).

3.5.9.3 Native American Resources

Native American resources are sites, areas, and materials important to Native Americans for religious or heritage reasons. In addition, cultural values are placed on natural resources such as plants, which have multiple purposes within various Native American groups. Of primary concern are concepts of sacred space that create the potential for land-use conflicts.

3.5.9.3.1 General Site Description

Native American groups with traditional ties to the area include the Apalachee, Cherokee, Chickasaw, Creek, Shawnee, Westo, and Yuchi. At different times, each of these groups was encouraged by the English to settle in the area to provide protection from the French, Spanish, or other Native American groups. Main villages of both the Cherokee and Creek were located southwest and northwest of SRS, respectively, but both groups may have used the area for hunting and gathering activities. During the early 1800s, most of the remaining Native Americans residing in the region were relocated to the Oklahoma Territory (DOE 1996a:3-249).

Native American resources in the region include remains of villages or townsites, ceremonial lodges, burials, cemeteries, and natural areas containing traditional plants used in religious ceremonies. Literature reviews and consultations with Native American representatives have revealed concerns related to the American Indian Religious Freedom Act within the central Savannah River valley, including some sensitive Native American resources and several plants traditionally used in ceremonies (DOE 1996a:3-249).

3.5.9.3.2 Proposed Facility Locations

In 1991, DOE conducted a survey of Native American concerns about religious rights in the central Savannah River valley. During this study, three Native American groups, the Yuchi Tribal Organization, the National Council of Muskogee Creek, and the Indian People's Muskogee Tribal Town Confederacy, expressed continuing interest in the SRS region with regard to the practice of their traditional religious beliefs. The Yuchi Tribal Organization and the National Council of Muskogee Creek have expressed concerns that several plant species—for example, redroot (*Lachnanthese carolinianum*), button snakeroot (*Erynglum yuccifolium*), and American ginseng (*Panax quinquefolium*)—traditionally used in tribal ceremonies could exist on SRS. Redroot and button snakeroot are known to occur on SRS, but are typically found in wet, sandy areas such as evergreen shrub bogs and savannas. Neither species is likely to be found in F-Area or S-Area due to clearing prior to the establishment of SRS in the 1950s (DOE 1994c:3-37). Consultations (see Chapter 5 and Appendix O) were initiated with appropriate Native American groups to determine any concerns associated with the actions evaluated in this SPD EIS.

3.5.9.4 Paleontological Resources

Paleontological resources are the physical remains, impressions, or traces of plants or animals from a former geological age.

3.5.9.4.1 General Site Description

Paleontological materials from the SRS area date largely from the Eocene Age (54 to 39 million years ago) and include fossil plants, numerous invertebrate fossils, giant oysters (*Crassostrea gigantissima*), other mollusks, and bryozoa. With the exception of the giant oysters, all other fossils are fairly widespread and common; therefore, the assemblages have low research potential or scientific value (DOE 1996a:3-249).

3.5.9.4.2 Proposed Facility Locations

No paleontological resources have been recorded for either F-Area or S-Area.

3.5.10 Land Use and Visual Resources

3.5.10.1 Land Use

Land may be characterized by its potential for the location of human activities (land use). Natural resource attributes and other environmental characteristics could make a site more suitable for some land uses than for others. Changes in land use may have both beneficial and adverse effects on other resources (biological, cultural, geological, aquatic, and atmospheric).

Located in southwestern South Carolina, SRS occupies an area of about 800 km^2 (310 mi^2) in a generally rural area about 40 km (25 mi) southeast of Augusta, Georgia, and 19 km (12 mi) south of Aiken, South Carolina, the nearest population centers (DOE 1996a:3-228). The site is owned by the Federal Government and is administered, managed, and controlled by DOE (DOE 1996a:3-230). It is bordered by the Savannah River to the southwest and includes portions of three South Carolina counties: Aiken, Allendale, and Barnwell (DOE 1996a:3-230).

3.5.10.1.1 General Site Description

Forest and agricultural land predominate in the areas bordering SRS. There are also significant open water and nonforested wetlands along the Savannah River Valley. Incorporated and industrial areas are the only other significant land uses. There is limited urban and residential development bordering SRS. The three counties in which SRS is located have not zoned any of the site land. The only adjacent area with any zoning is the town of New Ellenton, which has lands in two zoning categories bordering SRS: urban development and residential development. The closest residences are to the west, north, and northeast, within 60 m (200 ft) of the site boundary (DOE 1996a:3-230).

Various industrial, manufacturing, medical, and farming operations are conducted in areas around the site. Major industrial and manufacturing facilities in the area include textile mills, plants producing polystyrene foam and paper products, chemical processing plants, and a commercial nuclear power plant. Farming is diversified in the region; it includes crops such as peaches, watermelon, cotton, soybeans, corn, and small grains (DOE 1995b:vol. 1, app. C, 4-2).

Outdoor public recreation facilities are plentiful and varied in the SRS region. Included are the Sumter National Forest, 75 km (47 mi) to the northwest; Santee National Wildlife Refuge, 80 km (50 mi) to the east; and Clarks Hill/Strom Thurmond Reservoir, 70 km (43 mi) to the northwest. There are also a number of State, county, and local parks in the region, most notably Redcliffe Plantation, Rivers Bridge, Barnwell and Aiken County State Parks in South Carolina, and Mistletoe State Park in Georgia (DOE 1995b:vol. I, app. C, 4-2). The Crackerneck Wildlife Management Area, which extends over 1,930 ha (4,770 acres) of SRS adjacent to the Savannah River, is open to the public for hunting and fishing. Public hunts are allowed under DOE Order 4300.1C, which states that “all installations having suitable land and water areas will have programs for the harvesting of fish and wildlife by the public” (Noah 1995:48). SRS is a controlled area, public access being limited to through traffic on South Carolina Highway 125 (SRS Road A), U.S. Highway 278 (SRS Road 1), and the CSX railway line (DOE 1995b:vol. 1, app. C, 4-2).

Land use at SRS can be classified into three major categories: forest/undeveloped, water/wetlands, and developed facilities. Generalized land uses at SRS and vicinity are shown on Figure 3–33. Approximately

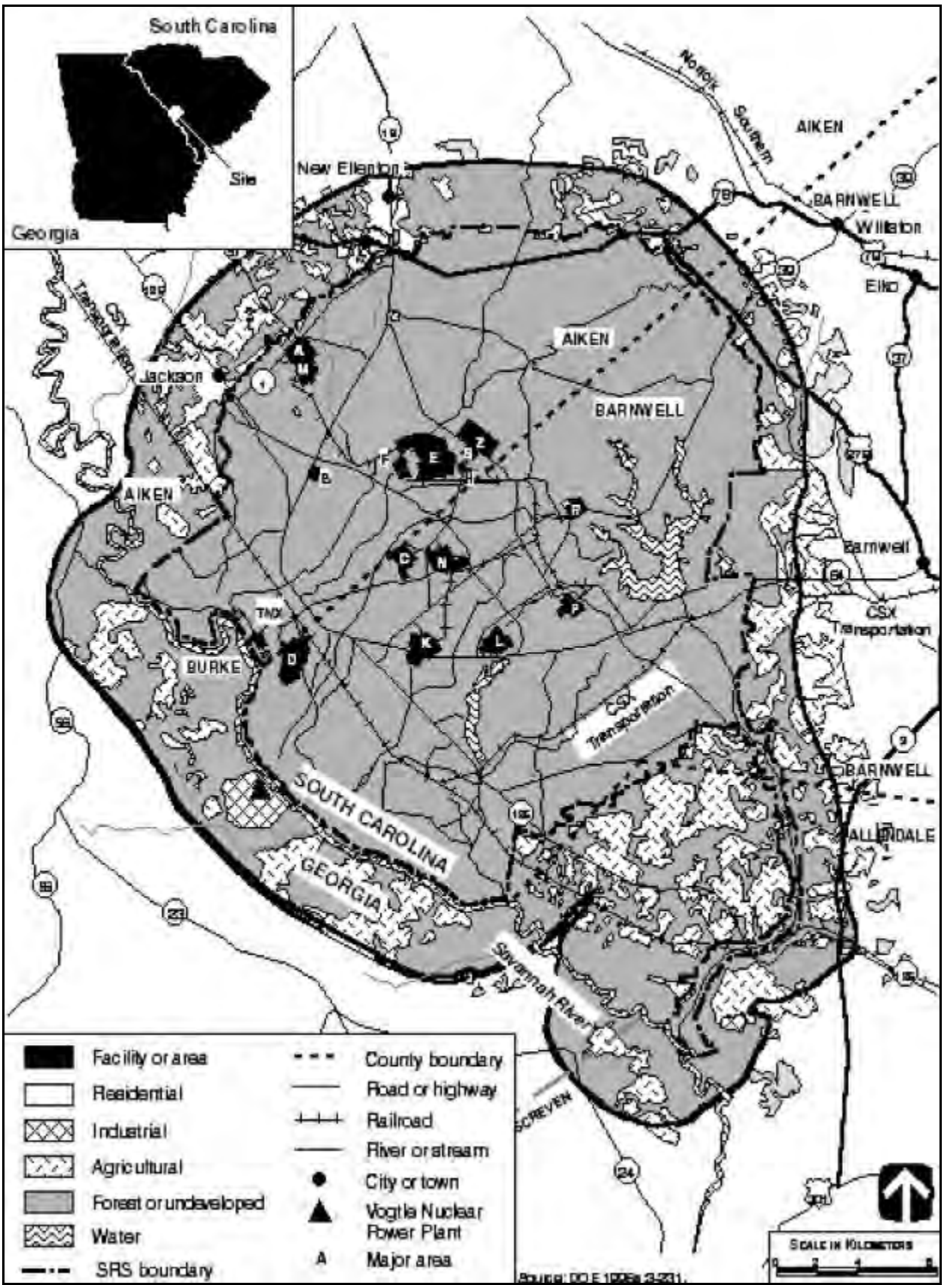


Figure 3–33. Generalized Land Use at SRS and Vicinity

585 km^2 (226 mi^2) of SRS—i.e., 73 percent of the area—is undeveloped (DOE 1996a:3-230). Wetlands, streams, and lakes account for 180 km^2 (70 mi^2) or 22 percent of the site, while developed facilities including production and support areas, roads, and utility corridors only make up approximately 5 percent or 40 km^2 (15 mi^2) of SRS (DOE 1996a:3-230). The woodlands area is primarily in revenue-producing, managed timber production. The U.S. Forest Service, under an interagency agreement with DOE, harvests about 7.3 km^2 (2.8 mi^2) of timber from SRS each year (DOE 1997e:4-57). Soil map units that meet the requirements for prime farmland soils exist on the site. However, the U.S. Department of Agriculture, Natural Resources Conservation Service, does not identify these as prime farmlands because the land is not available for agricultural production (DOE 1996a:3-230).

In 1972, DOE designated all of SRS as a National Environmental Research Park. The National Environmental Research Park is used by the national scientific community to study the impacts of human activities on the cypress swamp and hardwood forest ecosystems (DOE 1996a:3-230). DOE has set aside approximately 57 km^2 (22 mi^2) of SRS exclusively for nondestructive environmental research (DOE 1997e:4-57). A portion of SRS is open to the public for hunting and fishing.

Decisions on future land uses at SRS are made by DOE through the site development, land use, and future planning processes. SRS has established a Land Use Technical Committee composed of representatives from DOE, Westinghouse Savannah River Company, and other SRS organizations. DOE prepared the *FY 1994 Draft Site Development Plan*, which describes the current SRS mission and facilities, evaluates possible future missions and requirements, and outlines a master development plan that is now being prepared. In January 1996a, DOE published the *SRS Future Use Project Report*, which summarizes stakeholder-preferred future use recommendations that DOE considers throughout future planning and decisionmaking activities (DOE 1997e:4-57).

The State of South Carolina, through Act 489, as amended in 1994, requires local jurisdictions to undertake comprehensive planning. Regional-level planning also occurs within the State, with the State divided into 10 planning districts guided by regional advisory councils (DOE 1996a:3-230). The counties of Aiken, Allendale, and Barnwell together constitute part of the Lower Savannah River Council of Governments. Private lands bordering SRS are subject to the planning regulations of these three counties.

No onsite areas are subject to Native American Treaty Rights. However, five Native American groups, the Yuchi Tribal Organization, the National Council of Muskogee Creek, the Indian Peoples Muskogee Tribal Town Confederacy, the Pee Dee Indian Association, and the Ma Chis Lower Alabama Creek Indian Tribe, have expressed concern over sites and items of religious significance on SRS. DOE routinely notifies these organizations about major planned actions at SRS and asks them to comment on SRS documents prepared in accordance with NEPA.

3.5.10.1.2 Proposed Facility Locations

Many buildings are situated within F-Area. Included is Building 221–F, one of the canyons where plutonium was recovered from targets during DOE's plutonium production phase. Land use at Building 221–F in F-Area is classified as heavy industrial. This 30-m (100-ft) concrete structure is designed for plutonium immobilization. F-Area occupies approximately 160 ha (395 acres) of the site; S-Area, 110 ha (272 acres). These areas are about 14 km (8.7 mi) and 10 km (6.2 mi), respectively, from the site boundary.

Also within F-Area will be the Actinide Packaging and Storage Facility (if built), a planned below-grade facility for receiving and storing Category I quantities of special nuclear material (UC 1999). For those alternatives that involve installing the plutonium conversion and immobilization facilities at SRS, DWPF in S-Area would provide the second-stage immobilization services (DOE 1994c:3-29).

3.5.10.2 Visual Resources

Visual resources are natural and human-created features that give a particular landscape its character and aesthetic quality. Landscape character is determined by the visual elements of form, line, color, and texture. All four elements are present in every landscape; however, they exert varying degrees of influence. The stronger the influence exerted by these elements in a landscape, the more interesting the landscape. The more visual variety that exists with harmony, the more aesthetically pleasing the landscape.

3.5.10.2.1 General Site Description

The dominant viewshed in the vicinity of SRS consists mainly of agricultural land and forest, with some limited residential and industrial areas. The SRS landscape is characterized by wetlands and upland hills. Vegetation is composed of bottomland hardwood forests, scrub oak and pine woodlands, and wetland forests. DOE facilities are scattered throughout SRS and are brightly lit at night. These facilities are generally not visible offsite, as views are limited by rolling terrain, normally hazy atmospheric conditions, and heavy vegetation. The only areas visually impacted by the DOE facilities are those within the view corridors of State Highway 125 and SRS Road 1.

The developed areas and utility corridors (transmission lines and aboveground pipelines) of SRS are consistent with a VRM Class IV designation. The remainder of SRS is consistent with VRM Class III or IV (DOE 1996a:3-230; DOI 1986a, 1986b).

3.5.10.2.2 Proposed Facility Locations

Industrial facilities within F-Area consist of large concrete structures, smaller administrative and support buildings, and parking lots (DOE 1994c:3-38). The structures range in height from 3 to 30 m (10 to 100 ft), with a few stacks and towers that reach 60 m (200 ft). The facilities in this area are brightly lit at night and visible when approached via SRS access roads. Visual resource conditions in F-Area are consistent with VRM Class IV (DOI 1986a, 1986b; Sessions 1997c:sec. 2.1, table 2-1). F-Area is about 7 km (4.3 mi) from State Highway 125 and 8.5 km (5.3 mi) from SRS Road 1. Public view of F-Area facilities is restricted by heavily wooded areas bordering segments of the SRS Road 1 system and site-crossing State Highway 125. Moreover, those facilities are not visible from the Savannah River, which is about 10 km (6.2 mi) to the west.

Industrial facilities within S-Area consist of large concrete buildings, smaller administrative and support buildings, and parking lots (DOE 1994c:3-38). The facilities in this area are brightly lit at night and visible when approached via SRS access roads. Visual resource conditions in S-Area are consistent with a VRM Class IV designation (DOI 1986a, 1986b; Sessions 1997c:sec. 2.1, table 2-1). S-Area is about 10 km (6.2 mi) from State Highway 125 and 11 km (6.8 mi) from SRS Road 1. Public view of S-Area facilities is restricted by heavily wooded areas bordering segments of the SRS Road 1 system and site-crossing State Highway 125. Moreover, those facilities are not visible from the Savannah River, which is about 15 km (9.3 mi) to the west.

3.5.11 Infrastructure

Site infrastructure includes those utilities and other resources required to support construction and continued operation of mission-related facilities identified under the various alternative actions.

3.5.11.1 General Site Description

SRS comprises numerous research, processing, and administrative facilities. An extensive infrastructure system supports these facilities, as shown in Table 3–48.

Table 3–48. SRS Sitewide Infrastructure Characteristics

Resource	Current Usage	Site Capacity
Transportation		
Roads (km)	230	230
Railroads (km)	103	103
Electricity		
Energy consumption (MWh/yr)	420,000	5,200,000
Peak load (MW)	70	330
Fuel		
Natural gas (m^3/yr)	NA	NA
Oil (l/yr)	28,400,000	NA[a]
Coal (t/yr)	210,000	NA[a]
Water (l/yr)	1,780,000,000	3,870,000,000

[a] As supplies get low, more can be supplied by truck or rail.

Key: NA, not applicable.

Source: Sessions 1997a:2.

3.5.11.1.1 Transportation

SRS has an extensive network—230 km (143 mi)—of roads to meet its onsite intrasite transportation requirements. The railroad infrastructure, which consists of 103 km (64 mi) of track, provides for deliveries of large volumes of coal and oversized structural components (Table 3–48).

3.5.11.1.2 Electricity

The SRS electrical grid is a 115-kV system in a ring arrangement that supplies power to operating areas, administrative areas, and independent and support function areas. That system includes about 160 km (100 mi) of transmission lines. Power is supplied to the grid by three South Carolina Electric & Gas Company (SCE&G) transmission lines. SRS is situated in, and draws its power from, the Virginia-Carolina Sub-Region, an electric power pool area that is a part of the Southeastern Electrical Reliability Council. Most of that power comes from offsite coal-fired and nuclear-powered generating plants (Sessions 1997c:sec. 2.8).

Current site electricity consumption is about 420,000 MWh/yr. Site capacity is about 5.2 million MWh/yr. The peak load capacity is 330 MW; the peak load usage, 70 MW (Sessions 1997c:sec. 2.8).

3.5.11.1.3 Fuel

Coal and oil are used at SRS primarily to power the steam plants. Steam generation facilities at SRS include coal-fired powerhouses at A-, D-, and H-Areas and two package steam boilers, which use number 2 fuel oil, in K-Area. Coal is delivered by rail and is stored in coal piles in A-, D- and H-Areas. Oil is delivered by truck to K-Area. Coal is used to fuel A-Area powerhouse that provides process and heating steam for the main administrative area at SRS. D-Area powerhouse provides most of the steam for the SRS process area (Sessions 1998a). Natural gas is not used at SRS.

3.5.11.1.4 Water

A new central domestic water system serves the majority of the site. The system includes three wells and a 17-million-l/day (4.5-million-gal/day) water treatment plant in A-Area; two wells and an 8.3-million-l/day (2.2-million-gal/day) backup water treatment plant in B-Area; three elevated storage tanks; and a 43-km (27-mi)

piping loop (Sessions 1997c:sec. 2.8). The system's available flow capacity is approximately 13,060 1/min (3,450 gal/min) (DOE 1997f:3-35). Process water is provided to individual site areas. See Section 3.5.11.2.3 for more information.

3.5.11.1.5 Site Safety Services

The SRS fire department operates under a 12-hr rotational shift schedule, with three fire stations. Among the firefighters and officers are members of the SRS Hazardous Materials Response Team and the Rescue Team, responsible for rescues of all types. The fire department is supported by a fleet of 20 vehicles, including six pumpers, one pumper-tanker, one tanker, one aerial platform ladder truck, one light duty rescue vehicle, one mini-pumper for grass fires, one specially prepared emergency response step van and trailer for hazardous materials response, and two boats for waterway spill response and control. Inspections are performed periodically according to National Fire Protection Codes and Standards (WSRC 1994).

3.5.11.2 Proposed Facility Locations

A summary of the infrastructure characteristics for F-Area and S-Area is provided in Table 3–49.

Table 3–49. SRS Infrastructure Characteristics for F-Area and S-Area

	F-Area		S-Area	
Resource	**Current Usage**	**Capacity**	**Current Usage**	**Capacity**
Electricity				
Energy consumption (MWh/yr)	78,300	561,000	37,400	385,000
Peak load (MW)	14.5	64.0	6.0	14.5
Fuel				
Natural gas (m^3/yr)	NA	NA	NA	NA
Oil (l/yr)	NA	NA	NA	NA
Coal (t/yr)	NA	NA	NA	NA
Water (l/yr)	374,000,000	1,590,000,000	49,800,000	797,000,000

Key: NA, not applicable.
Source: Sessions 1997a.

3.5.11.2.1 Electricity

Electric power for F-Area is provided by the 200–F Power Loop, which is supplied by the 251–F electrical substation. This substation consists of two 115/13.8-kV, 24/32-MVA transformers and associated switchgear. The 13.8-kV power is distributed through a 2,000-A–rated bus (Sessions 1997c:sec. 2.8). F-Area electrical energy consumption is about 78,300 MWh/yr; F-Area electrical capacity, about 561,000 MWh/yr (Sessions 1997a).

Electric power for S-Area is provided by two 13.8-kV feeders supplied by the 251–H electrical substation. This substation consists of two 115/13.8-kV, 24/32-MVA transformers and associated switchgear. The 13.8-kV power is distributed through two 2,000-A–rated buses. The 13.8-kV bus tie breaker is normally closed. S-Area electrical energy consumption is about 37,400 MWh/yr; electrical capacity in S-Area, about 385,000 MWh/yr (Sessions 1997a; 1997c:sec. 2.8).

3.5.11.2.2 Fuel

Coal and oil are not required in F- or S-Area because steam is supplied from the central facility, and electricity is supplied from the site electrical grid system (Sessions 1998b).

3.5.11.2.3 Water

F-Area water usage of domestic water is about 374 million l/yr (100 million gal/yr) from the new central domestic water system. Currently available capacity for F-Area is about 1.6 billion l/yr (420 million gal/yr) (Sessions 1997a; 1997c:sec. 2.8).

S-Area has managed its supply of water until recently and has used an average of 50 million l/yr (13 million gal/yr). Now that it is connected to the new central domestic water system, the area has access to the system's excess capacity of 797 million l/yr (211 million gal/yr) (Sessions 1997a; 1997c:sec. 2.8).

Process and service water are supplied through deep-well systems within site areas. Wells 905-100F and 905-102F supply process and service water to F-Area; wells 905-1S and 905-2S to S-Area's DWPF. These wells are screened in the McQueen Branch (Lower Tuscaloosa) aquifer (Sessions 1997c:sec. 2.8). Each of these process water systems is capable of delivering 1,987 million 1/yr (525 million gal/yr) of water (Sessions 1997a; 1997c:sec 2.8). Current usage of process and service water in F-Area is 481 million 1/yr (127 million gal/yr) and about 3.79 million 1/yr (1 million gal/yr) in S-Area (Sessions 1997a).

3.6 LEAD ASSEMBLY FABRICATION AND POSTIRRADIATION EXAMINATION SITES

3.6.1 Hanford Overview

Hanford is located in the southeast portion of Washington State, occupying about 1,450 km^2 (560 mi^2). The 400 Area occupies 0.6 km^2 (0.2 km^2). Additional information on Hanford and the 400 Area is provided in Section 3.2.

[Text deleted.]

The options proposed for lead assembly fabrication at Hanford would use existing employees and buildings; therefore, major facility modifications would not be required. For this reason, detailed descriptions of environmental resources such as geology and soils, water, ecological, cultural and paleontological, land use and visual, socioeconomics, and environmental justice are not required for the 400 Area. For additional information on the resource areas that could be impacted by lead assembly fabrication activities in the 400 Area, refer to Sections 3.2.1, 3.2.2, 3.2.4, and 3.2.11.

3.6.2 ANL–W Overview

Located in the southeast portion of INEEL is ANL–W. ANL–W is about 328 ha (820 acres). Atomic City, 29 km (18 mi) southwest, is the closest populated area to ANL–W; it has a population of 25. Idaho Falls, population of about 45,000, is 63 km (39 mi) east of ANL–W (see Figure 2–3). In 1997, about 700 employees worked at ANL–W (O'Connor et al. 1998b).

Established in the mid-1950s, the primary mission of the ANL–W was to support advanced liquid metal reactor research (DOE 1996h:Idaho 4). In 1995, ANL–W began a Redirected Nuclear Research and Development Program to conduct research in the treatment of DOE spent nuclear fuel and reactor decontamination and decommissioning technologies (O'Connor et al. 1998b).

[Text deleted.]

The options proposed for lead assembly fabrication and postirradiation examination at ANL–W would occur in existing facilities that would not require major modifications and would use existing employees. For this reason, detailed descriptions of environmental resources such as geology and soils, water, ecological, cultural and paleontological, land use and visual, socioeconomics, and environmental justice are not provided. For more information on these resource areas, refer to Section 3.3. The resource areas that could be impacted by lead assembly fabrication activities are air quality, waste management, existing human health risk, and infrastructure. These resource areas are described below.

3.6.2.1 Air Quality

The meteorological conditions at INEEL are considered to be representative for ANL–W. Emissions of criteria pollutants at ANL–W result from the ongoing operation of onsite boilers used to produce steam for heating. Existing ambient air pollutant concentrations at INEEL are in compliance with applicable guidelines and regulations. See Section 3.3.1 for additional information on air quality for areas surrounding INEEL.

3.6.2.2 Waste Management

ANL–W analyzes, stores, and ships TRU waste, hazardous waste, mixed waste, LLW, and nonhazardous waste generated by the numerous research and support facilities at INEEL (O'Connor et al. 1998b).

The Waste Characterization Area, in the ANL–W Hot Fuels Examination Facility, is a glovebox facility used for characterization of TRU. The Radioactive Scrap and Waste Facility, in the northeast corner of ANL–W, provides underground vault storage for remote-handled LLW, mixed LLW, and TRU waste. The Radioactive Scrap and Waste Facility is a State of Idaho RCRA-permitted facility (O'Connor et al. 1998b).

The Radioactive Sodium Storage Facility is in an ANL–W controlled access area. The Radioactive Sodium Storage Facility is a RCRA-permitted storage facility used to store radioactive and heavy metal contaminated debris along with sodium and sodium-potassium alloy mixed waste (O'Connor et al. 1998b).

The sanitary wastewater treatment facility, 6,057-m^3/yr (21,390-ft^3/yr) capacity, is the only waste treatment facility at ANL–W. Other forms of waste generated at ANL–W are treated and disposed of at INEEL waste facilities or shipped off the site (O'Connor et al. 1998b). More information on waste management activities at INEEL can be found in Section 3.3.2.

3.6.2.3 Existing Human Health Risk

See Section 3.3.4 for major sources and levels of background radiation, mean concentrations of radiological releases, and offsite estimated dose rates to individuals within the vicinity of INEEL. Site worker radiological exposure data at ANL–W for 1994–1996 is provided in Table 3–50. Worker exposure limits at ANL–W remain within applicable limits.

Table 3–50. Worker Exposure Data for ANL–W, 1994–1996

	Radiation Worker Dose		All Workers	
Year	(mrem)	(person-rem)	(mrem)	(person-rem)
1994	34	28	19	34
1995	50	41	27	43
1996	56	45	31	45

Key: ANL–W, Argonne National Laboratory–West.
Source: O'Connor et al. 1998b.

3.6.2.4 Infrastructure

The site infrastructure at ANL–W includes those utilities and other resources required to support construction and continued operation of mission-related facilities. Table 3–51 shows facility infrastructure information for the proposed facility location. An adequate infrastructure exists at ANL–W to support current activities. See Section 3.3.11 for more detailed information on INEEL's infrastructure.

3.6.3 LLNL Overview

LLNL is composed of two sites: Livermore Site and Site 300 (see Figure 2–31). The Livermore Site is about 80 km (50 mi) east of San Francisco and 6.4 km (4 mi) from downtown Livermore. It occupies about 332 ha (821 acres) of flat terrain in the Livermore Valley. Site 300 is about 24 km (15 mi) southeast of the Livermore Site (DOE 1996h:California 67; 1996i:4-328).

Table 3–51. ANL–W Infrastructure Characteristics

Resource	Current Usage
Electricity	
Energy consumption (MWh/yr)	4,200
Peak load (MWe)	5,088
Fuel	
Natural gas (m^3/yr)	0
Liquid (m^3)	0
Coal (t/yr)	0
Steam (kg/h)	690
Water	
Annual (l/yr)	1,500,000
Peak (l/yr)	2,000,000

Key: ANL–W, Argonne National Laboratory–West.
Source: O'Connor et al. 1998b:S-10.

Originally used as a naval air training station, the Livermore Site was established in 1952 to conduct nuclear weapons research. Site 300 is a remote high-explosives testing facility. The current mission of LLNL is research, testing, and development that focuses on national defense and security, energy, the environment, and biomedicine (DOE 1996h:California 69). Within recent years, LLNL's mission has broadened to include global security, ecology, and mathematics and science education. In early 1998, LLNL had about 7,700 employees (O'Connor et al. 1998c).

[Text deleted.]

The options proposed for lead assembly fabrication at LLNL would occur in existing facilities that would not require major modifications and would use existing employees. For this reason, detailed descriptions of environmental resources such as geology and soils, water, ecological, cultural and paleontological, land use and visual, socioeconomics, and environmental justice are not provided. For a detailed discussion of these resource areas, refer to the *Stockpile Stewardship and Management Final PEIS* (DOE 1996i). The resource areas that could be impacted by lead assembly fabrication activities are air quality, waste management, existing human health risk, and infrastructure. These resource areas are described below.

3.6.3.1 Air Quality

The Livermore Site is in the San Francisco Bay Area Air Quality Management District. This area is designated as attainment for all criteria pollutants with respect to attainment of the NAAQS (EPA 1998b); however, EPA has recently redesignated the area as nonattainment for ozone (EPA 1998c). The emissions of criteria air pollutants at the Livermore Site result from the ongoing operation of numerous boilers for heating; solvent cleaning operations; emergency generators; and various experimental, testing, and process sources. The Bay Area Air Quality Management District and the San Joaquin Valley Unified Air Pollution Control District requested that the Livermore Site assess the impact of toxic air emissions on the surrounding area. The risks at the Livermore Site were found to be below the threshold values used to determine the need for additional evaluation (DOE 1996i:4-334). For a detailed discussion of this resource area, refer to Section 4.7.2.3 of the *Stockpile Stewardship and Management Final PEIS* (DOE 1996i:4-333).

3.6.3.2 Waste Management

LLNL was added to EPA's National Priorities List in July 1987 based on the presence of volatile organic compounds in the groundwater. In November 1988, DOE, EPA, the California Department of Health Services, and the Bay Area Regional Water Quality Control Board signed an FFCA to facilitate compliance with CERCLA, the Superfund Amendments and Reauthorization Act, and applicable State laws. In a remedial investigation/feasibility study prepared pursuant to CERCLA, DOE outlined its cleanup strategy for the LLNL Livermore Site. A ROD issued on July 15, 1992, included an announcement of DOE's decision to pump and treat contaminated groundwater and construct approximately seven small treatment facilities. The selected remedies address the principal concerns at LLNL by removing the contaminants from soil and groundwater and treating the effluents to the extent necessary for protection of human health and the environment (O'Connor et al. 1998c:3).

Through its research and operation activities, LLNL treats, stores, packages, and prepares TRU, low-level, mixed low-level, hazardous, and nonhazardous wastes for transport. Waste is treated and stored on the site and then shipped off the site for additional treatment and disposal. No disposal of waste occurs at the Livermore Site (DOE 1996h:California 78). LLNL waste generation rates and inventories are shown in Table 3–52. Table 3–53 provides information on waste management facilities at LLNL.

Table 3–52. Waste Generation Rates and Inventories at LLNL

Waste Type	Generation Rate (m^3/yr)	Inventory (m^3)
TRU[a]	27	257
Contact-handled		
LLW	124	644
Mixed LLW [b]	353	454
Hazardous	579	NA[c]
Nonhazardous		
Liquid	456,000	NA[c]
Solid	4,280	NA[c]

[a] Includes mixed TRU waste.
[b] Includes TSCA mixed LLW.
[c] Generally, hazardous and nonhazardous wastes are not held in long-term storage.
Key: LLNL, Lawrence Livermore National Laboratory; LLW, low-level waste; NA, not applicable; TRU, transuranic; TSCA, Toxic Substances Control Act.
Source: DOE 1996i:4-400 for hazardous and nonhazardous waste; DOE 1996d:15, 16 for all other wastes.

For a more detailed discussion of waste management activities at the Livermore Site, refer to Section 4.7.2.10 of the *Stockpile Stewardship and Management Final PEIS* (DOE 1996i:4-358) or Section 4.15.2 of the *Final EIS and Environmental Impact Report for Continued Operation of LLNL and Sandia National Laboratories, Livermore* (DOE 1992:4-239).

Table 3–53. Waste Management Facilities at LLNL

Facility Name/Description	Capacity	Status	Applicable Waste Types				
			TRU	LLW	Mixed LLW	Haz	Non-Haz
Treatment facilities (m^3/yr)							
LLW size reduction	771	Online		X			
Building 513 and 514 Waste Treatment Facility[a]	2,012	Online		X	X	X	X
Decontamination and waste treatment facility	Not determined	Planned	X	X	X	X	X
Storage facilities (m^3)							
Building 233, 625	217	Online	X	X	X	X	X
Building 280	513	Online	X	X			X
Building 513, 514, area 612–2	222	Online		X	X	X	X
Area 612–1	1,086	Online	X	X	X	X	X
Area 612–4	169	Online	X	X	X	X	X
Area 612–5	760	Online	X	X	X	X	X
Area 612 tanks	57	Online		X	X	X	X
Building 612 lab packaging unit	16	Online		X	X	X	X
Building 614, 693	298	Online	X	X	X	X	X
612 yard, area 612–3	1,327	Online		X			X
Building 696	590	Online	X	X			X
Disposal facilities (m^3/yr)							
LLNL sanitary sewer	2,327,800	Online					X

[a] Treatment methods employed in Building 513 are solidification and shredding. Methods used in Building 514 are evaporation, blending, separation, gas adsorption, silver recovery, and wastewater treatment (Kielusiak 1998a).

Key: Haz, hazardous; LLNL, Lawrence Livermore National Laboratory; LLW, low-level waste; TRU, transuranic.

Source: Kielusiak 1998b.

3.6.3.3 Existing Human Health Risk

Major sources and levels of background radiation exposure to individuals in the vicinity of LLNL are shown in Table 3–54. Annual background radiation doses to individuals are expected to remain constant over time. Total dose to the population changes as population size changes. Background radiation doses are unrelated to LLNL operations.

Release of radionuclides to the environment from LLNL operations provides another source of radiation exposure to the population in the vicinity. Doses to the public resulting from these releases are shown in Table 3–55. These doses fall within regulatory limits (DOE 1993a) and are small when compared with background radiation exposure.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from LLNL operations in 1996 is estimated to be 4.7×10^{-8}. That is, the estimated probability of this person dying from cancer from radiation exposure from 1 year of LLNL operations is slightly less than 5 chances in 100 million.

Table 3–54. Sources of Radiation Exposure to Individuals in the LLNL Vicinity Unrelated to LLNL Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation	
Internal terrestrial radiation	40
Cosmic radiation	30
External terrestrial radiation	30
Radon in homes (inhaled)	200
Other background radiation	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Nuclear fuel cycle	<1
Total	354

Key: LLNL, Lawrence Livermore National Laboratory.
Note: Values for radon and weapons test fallout are averages for the United States.
Source: Harrach et al.:12-18.

Table 3–55. Radiation Doses to the Public From Normal LLNL Operations in 1996 (Total Effective Dose Equivalent)

	Atmospheric Releases		Liquid Releases		Total	
Members of the Public	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**
Maximally exposed individual (mrem)[a]	10	0.093	4	0	100	0.093
Population within 80 km (person-rem)[b]	None	1.1	None	0	100	1.1
Average exposed individual within 80 km (mrem)[c]	None	0.000175	None	0	None	0.000175

[a] The standards for individuals are given in DOE Order 5400.5. As discussed in that order, the 10-mrem/yr limit for airborne emissions is required by the Clean Air Act. The 4-mrem/yr limit is required by the Safe Drinking Water Act; for this SPD EIS, the 4-mrem/yr value is conservatively assumed to be the limit for the sum of doses from all liquid pathways. The total dose of 100 mrem/yr is the limit from all combined pathways. The 100-person-rem value for the population is given in proposed 10 CFR 834 (DOE 1993b).
[b] In 1996, this population was about 6.3 million.
[c] Obtained by dividing the population dose by the number of people living within 80 km (50 mi) of the site.
Key: LLNL, Lawrence Livermore National Laboratory.
Source: Harrach et al.:12-18.

According to the same risk estimator, 5.5×10^{-4} excess fatal cancer per year is projected in the population living within 80 km (50 mi) of LLNL. For perspective, this number can be compared with the number of fatal cancers expected in this population from all causes. The 1996 mortality rate associated with cancer for the entire population was 0.2 percent per year. Based on this national rate, the number of fatal cancers from all causes expected during 1996 in the population living within 80 km (50 mi) of LLNL was 13,000. This number of expected fatal cancers is much higher than the estimated 5.5×10^{-4} fatal cancer that could result from LLNL operations in 1996.

Workers at LLNL receive the same dose as the general public from background radiation; however, they receive an additional dose from normal operations. Table 3–56 includes average, maximally exposed, and total

occupational doses to LLNL workers from operations in 1997. These doses fall within radiological limits. Based on a dose-to-risk conversion factor of 400 fatal cancers per 1 million person-rem (4×10^{-4} fatal cancer

Table 3–56. Radiation Doses to Onsite Workers From Normal LLNL Operations in 1997 (Total Effective Dose Equivalent)

	Onsite Releases and Direct Radiation	
Occupational Personnel	**Standard[a]**	**Actual**
Average radiation worker (mrem)	None[b]	2.5
Maximally exposed worker (mrem)	5,000	1,144
Total workers (person-rem)[c]	None	18.2

[a] The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995a:para. 835.202); however, DOE's goal is to maintain radiological exposures as low as is reasonably achievable. Therefore, DOE has established an administrative control level of 2,000 mrem/yr (DOE 1994a:2-3); DOE must make reasonable attempts to maintain worker doses below this level.

[b] No standard is specified for an "average radiation worker"; however, the maximum dose that this worker may receive is limited to that given in footnote "a."

[c] The total number of badged workers at the site in 1997 was 7,300.

Key: LLNL, Lawrence Livermore National Laboratory.

Source: Zahn 1998.

per person-rem) among workers (see Appendix F), the number of excess fatal cancers to LLNL workers from normal operations in 1997 is estimated to be 0.0073.

More detailed information of the radiation environment, including background exposures and radiological releases and doses, is presented in the *LLNL Environmental Report for 1996* (Harrach et al. 1997). Concentrations of radioactivity in various environmental media (e.g., air and water) and animal tissues in the site region are also presented in the same reference.

3.6.3.4 Infrastructure

A summary of the infrastructure characteristics of LLNL is presented in Table 3–57. An adequate infrastructure exists at LLNL to support current activities.

Table 3–57. LLNL Infrastructure Characteristics

Resource	Current Usage[a]	Site Capacity
Electricity		
Energy consumption (MWh/yr)	295,919	100 MW peak
Fuel		
Natural gas (m^3/yr)	13,017,173	4,400 m^3/hr peak
Liquid (1/yr)	1,257,699	NA[b]
Coal (t/yr)	0	0
Water		
Annual (l/yr)	874,138,983	10,977,660 1/day peak

[a] Five-year average for FY93–97.
[b] As supplies get low, more can be supplied by truck.
Key: LLNL, Lawrence Livermore National Laboratory; NA, not applicable.
Source: O'Connor et al. 1998c.

3.6.4 LANL Overview

LANL occupies 11,300 ha (28,000 acres) of land in northern New Mexico (see Figure 2–29). Situated on the Pajarito plateau in the Jemez mountains, the closest population centers are the city of Los Alamos (population 12,000) and White Rock (population 8,000). The closest metropolitan area is Santa Fe (population 50,000), about 40 km (25 mi) southeast of LANL. In 1997, LANL had about 9,200 workers (DOE 1996a:3-304).

The laboratory was established in 1943 to design, develop, and test nuclear weapons. LANL's mission has expanded from the primary task of designing nuclear weapons to include nonnuclear defense programs and a broad array of nondefense programs. Current programs include R&D of nuclear safeguards and security, space nuclear systems, biomedicine, computational science, and lasers (DOE 1996a:3-304). LANL consists primarily of Technical Areas (TAs), of which 49 are actively in use (DOE 1997g:1).

[Text deleted.]

The options proposed for lead assembly fabrication at LANL would occur in existing facilities that would not require major modifications and would use existing employees. For this reason, detailed descriptions of environmental resources such as geology and soils, water, ecological, cultural and paleontological, land use and visual, socioeconomics, and environmental justice are not provided. For more information on these resource areas, refer to the *Storage and Disposition PEIS* (DOE 1996a). The resource areas that could be impacted by lead assembly fabrication activities are air quality, waste management, existing human health risk, and infrastructure. These resource areas are described below.

3.6.4.1 Air Quality

LANL is within the New Mexico Intrastate AQCR 157. None of the areas within LANL and its surrounding communities are designated as nonattainment areas with respect to any of the NAAQS (EPA 1997h). The criteria pollutants, nitrogen dioxide, carbon monoxide, volatile organic hydrocarbons, particulate matter, and sulphur dioxide make up about 79 percent of the stationary source emissions at LANL. The sources of these criteria pollutants are power plants, steam plants, asphalt plants, and space heaters. Toxic and other hazardous pollutants comprise the remaining 21 percent of emissions from stationary sources at LANL. These emissions are generated by equipment cleaning, coating processes, and acid baths. Concentrations of criteria and hazardous and toxic air pollutants are in compliance with applicable guidelines and regulations (DOE 1996a:3-310). For a detailed discussion of this resource area, refer to Section 3.9.3 of the *Storage and Disposition PEIS* (DOE 1996a:3–310).

3.6.4.2 Waste Management

Although not listed on the National Priorities List, LANL adheres to the CERCLA guidelines for environmental restoration projects that involve certain hazardous substances not covered by RCRA. LANL's environmental restoration program originally consisted of approximately 2,100 potential release sites. At the end of FY97, there remained only about 756 sites requiring investigation or remediation and 118 buildings awaiting decontamination and decommissioning. LANL's environmental restoration program is scheduled for completion in 2006 (LANL 1998:21).

Through its research and operation activities, LANL manages the following waste categories generated at 33 technical areas: TRU, low-level, mixed low-level, hazardous, and nonhazardous wastes (DOE 1996h:New Mexico 38; 1996i:4-272). LANL waste generation rates and inventories are presented in Table 3–58.

Table 3–58. Waste Generation Rates and Inventories at LANL

Waste Type	Generation Rate (m^3/yr)	Inventory (m^3)
TRU[a]		
Contact-handled	262	11,262
LLW	1,585	NA[c]
Mixed LLW [b]	90	6,801
Hazardous	942	NA[c]
Nonhazardous		
Liquid	692,857	
Solid	5,453	NA[c]

[a] Includes mixed TRU waste.
[b] Includes TSCA mixed LLW.
[c] Generally, LLW, hazardous, and nonhazardous wastes are not held in long-term storage.
Key: LANL, Los Alamos National Laboratory; LLW, low-level waste; NA, not applicable; TRU, transuranic; TSCA, Toxic Substances Control Act.
Source: DOE 1996a:3-339 for hazardous and nonhazardous waste; DOE 1996d:15, 16 for all other wastes.

LANL currently stores TRU waste on the site pending shipment to WIPP for disposal. The site also treats and disposes of LLW on the site. Mixed LLW is stored on the site pending treatment at a combination of onsite and offsite facilities. Hazardous waste is treated and stored on the site for offsite disposal. Nonhazardous solid wastes are shipped off the site for treatment and disposal. Nonhazardous liquid wastes are treated and disposed of on the site (DOE 1996a:3-337, 3-340, 3-341). See Table 3–59 for information on selected treatment, storage, and disposal facilities at LANL.

Table 3–59. Selected Waste Management Facilities at LANL

Facility Name/Description	Capacity	Status	Applicable Waste Types					
			TRU	Mixed TRU	LLW	Mixed LLW	Haz	Non-Haz
Treatment facilities (m^3/yr)								
TRU waste volume reduction	1,080	Online	X	X				
RAMROD & RANT facilities	1,050	Online	X	X				
LLW compaction	76	Online			X			
Sanitary Wastewater Treatment Plant	1,060,063	Online						X
Storage facilities (m^3)								
TA–54 TRU waste storage	24,355	Online	X	X				
LLW storage	663	Online			X			
Mixed LLW storage	583	Online				X		
Hazardous waste storage	1,864	Online					X	
Disposal facilities (m^3)								
TA–54 Area G LLW Disposal	252,500 [a]	Online			X			
Sanitary tile fields (m^3/yr)	567,750	Online						X

[a] Current inventory of 250,000 m^3 (8.8 million ft^3), therefore, capacity will be exhausted in the next 2 to 5 years (O'Connor et al. 1998d). The *LANL Site-Wide Final EIS* (DOE 1999b) evaluates alternatives for LLW disposal.

Key: Haz, hazardous; LANL, Los Alamos National Laboratory; LLW, low-level waste; RAMROD, Radioactive Materials Research, Operations, and Demonstration; RANT, Radioactive Assay and Nondestructive Test; TRU, transuranic.

Source: DOE 1996a:3-337–3-341; Triay 1999.

For a more detailed description of this resource area, see Section 3.9.10 of the *Storage and Disposition PEIS* (DOE 1996a), or Sections 2.2.2.14 and 2.2.2.15 of the *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory* (DOE 1999b).

3.6.4.3 Existing Human Health Risk

Major sources and levels of background radiation exposure to individuals within the vicinity of LANL are shown in Table 3–60. Annual background radiation doses to individuals are expected to remain constant over time. Total dose to the population changes as population size changes. Background radiation doses are unrelated to LANL operations (DOE 1996a:3-334).

Table 3–60. Sources of Radiation Exposure to Individuals in the LANL Vicinity Unrelated to LANL Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation	
Cosmic radiation	48
External terrestrial radiation	44
Neutron cosmic radiation	10
Internal terrestrial	40
Radon in homes (inhaled)	200
Other background radiation	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Air travel	1
Consumer and industrial products	10
Total	407

Key: LANL, Los Alamos National Laboratory.
Note: Value for radon is an average for the United States.
Source: DOE 1996a:3-333.

Release of radionuclides to the environment from LANL operations provides another source of radiation exposure to the population in the vicinity. The doses to the public resulting from these releases are shown in Table 3–61. These doses fall within regulatory limits (DOE 1993a) and are small when compared with background radiation exposure.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from LANL operations in 1995 is estimated to be 2.9×10^{-6}. That is, the estimated probability of this person dying from cancer from radiation exposure from 1 year of LANL operations is about three chances in one million (DOE 1998g:3-77).

According to the same risk estimator, 1.6×10^{-3} excess fatal cancer per year is projected in the population living within 80 km (50 mi) of LANL in 1995. For perspective, this number can be compared with the number of fatal cancers expected in this population from all causes. The 1996 mortality rate associated with cancer for the entire population was 0.2 percent per year. Based on this national rate, the number of fatal cancers from all causes expected during 1995 in the population living within 80 km (50 mi) of LANL was 482. This number of expected fatal cancers is much higher than the estimated 1.6×10^{-3} fatal cancers that could result from LANL operations in 1995 (DOE 1998g:3-77).

Table 3–61. Radiation Doses to the Public From Normal LANL Operations in 1995 (Total Effective Dose Equivalent)

	Atmospheric Releases		Liquid Releases		Total	
Members of the Public	**Standard[a]**	**Actual**	**Standard[a]**	**Actual[b]**	**Standard[a]**	**Actual[b]**
Maximally exposed individual (mrem)	10	5.1	4	0.58	100	5.7
Population within 80 km (person-rem)[c]	None	3.2	None	Negligible	100	3.2
Average individual within 80 km (mrem)[d]	None	0.013	None	Negligible	None	0.013

[a] The standards for individuals are given in DOE Order 5400.5. As discussed in that order, the 10-mrem/yr limit from airborne emissions is required by the Clean Air Act. The 4-mrem/yr limit is required by the Safe Drinking Water Act; for this SPD EIS, the 4-mrem/yr value is conservatively assumed to be the limit for the sum of doses from all liquid pathways. The total dose of 100 mrem/yr is the limit from all combined pathways. The 100-person-rem value for the population is given in proposed 10 CFR 834 (DOE 1993b).

[b] Actual dose values given in this column conservatively include all water pathways, not just drinking water.

[c] In 1995, this population was about 241,000.

[d] Obtained by dividing the population dose by the number of people living within 80 km (50 mi) of the site.

Key: LANL, Los Alamos National Laboratory.

Source: DOE 1998g:3-77.

Workers at LANL receive the same dose as the general public from background radiation; however, they receive an additional dose from normal operations. Table 3–62 includes average, maximally exposed, and total occupational doses to LANL workers from operations in 1991–1995. Based on a risk estimator of 400 fatal cancers per 1 million person-rem (4×10^{-4} fatal cancer per person-rem) among workers (see Appendix F), the average annual number of fatal cancers to LANL workers from normal operations during the 1991–1995 timeframe is estimated to be 0.066 (DOE 1998g:3-77).

Table 3–62. Radiation Doses to Onsite Workers From Normal Operations at LANL, 1991–1995 (Total Effective Dose Equivalent)

	Onsite Releases and Direct Radiation	
Occupational Personnel	**Standard[a]**	**Actual[b]**
Average radiation worker (mrem)	None[c]	16
Maximally exposed worker (mrem)	5,000	2,000
Total workers (person-rem)	None	165

[a] The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995a:para. 835.202); however, DOE's goal is to maintain radiological exposures as low as is reasonably achievable. Therefore, DOE has established an administrative control level of 2,000 mrem/yr (DOE 1994a:2-3); DOE must make reasonable attempts to maintain worker doses below this level.

[b] Annual doses are averaged over the 5-year period.

[c] No standard is specified for an "average radiation worker"; however, the maximum dose that this worker may receive is limited to that given in footnote "a."

Key: LANL, Los Alamos National Laboratory.

Source: DOE 1998g:3-77.

More detailed information of the radiation environment at LANL is presented in *Environmental Surveillance at Los Alamos During 1995* (UC 1996). Concentrations of radioactivity in various environmental media (e.g., air and water) and animal tissues in the site region are also presented in the same reference.

3.6.4.4 Infrastructure

A summary of the infrastructure characteristics of LANL is presented in Table 3–63. An adequate infrastructure exists at LANL to support current activities.

Table 3–63. LANL Infrastructure Characteristics

Resource	Current Usage
Electricity	
Energy consumption (MWh/yr)	372,145
Fuel	
Natural gas (m^3/yr)	43,414,560
Fuel oil (l/yr)	0
Steam (kg/h)	33,554
Water	
Annual (l/yr)[a]	5,490,000,000

[a] In 1994, LANL's water system had an annual demand of 80 percent of its current allotment of 6,830 million l/yr (1,804 million gal/yr) (DOE 1999b:4-182). Demand includes use by Los Alamos County and National Park Service. LANL alone used 1,843 million l (approximately 487 million gal).

Key: LANL, Los Alamos National Laboratory.

Source: DOE 1996a:3-308, 1999b:4-181, 4-182.

3.6.5 SRS Overview

SRS occupies about 806 km^2 (310 mi^2) in the southern portion of South Carolina, about 19 km (12 mi) south of Aiken, South Carolina (see Figure 2–5) (DOE 1996a:3-228). Additional information on SRS is presented in Section 3.5.

[Text deleted.]

The options proposed for lead assembly fabrication at SRS would use existing employees and buildings; therefore, major facility modifications would not be required. For this reason, detailed descriptions of environmental resources such as geology and soils, water, ecological, cultural and paleontological, land use and visual, socioeconomics, and environmental justice are not provided. The resource areas that could be impacted by lead assembly fabrication activities are air quality, waste management, existing human health risk, and infrastructure. These resource areas are described below.

3.6.5.1 Air Quality

The meteorological conditions at H-Area are considered to be representative for SRS. Existing ambient air pollutant concentrations at SRS are in compliance with applicable guidelines and regulations. See Section 3.5.1 for additional information on air quality for areas surrounding SRS.

3.6.5.2 Waste Management

TRU, low-level, mixed low-level, hazardous, and nonhazardous wastes are generated by R&D, production, and decontamination activities in H-Area. These wastes are managed at SRS facilities and at offsite locations, as

appropriate. The total quantities of waste generated and the inventories in storage at SRS are presented in Section 3.5.2. Three of the major waste management facilities located in H-Area are described below. Additional SRS waste management facilities are described in Section 3.5.2.

The Consolidated Incineration Facility is designed to incinerate solid and liquid LLW, mixed LLW, and hazardous waste. This H-Area facility has a capacity of 4,630 m^3/yr (6,056 yd^3/yr) of liquid waste and 17,830 m^3/yr (23,322 yd^3/yr) of solid waste (DOE 1996a:E-109).

Liquid LLW and mixed LLW generated in H-Area are conveyed to the F- and H-Area Effluent Treatment Facility for treatment. This facility has a capacity of 1,930,000 m^3/yr (2,524,000 yd^3/yr). Treated effluents are discharged to Upper Three Runs Creek in compliance with permit limits. Treatment residuals are concentrated by evaporation and stored in the H-Area tank farm for eventual treatment in the Z-Area Saltstone Facility. In that facility, wastes are immobilized with grout for onsite disposal (DOE 1996a:E-98, E-109).

Sanitary wastewater from H-Area is conveyed to the Central Sanitary Wastewater Treatment Facility for treatment and disposal. The H-Area sanitary sewer has a capacity of 136,274 m^3/yr (178,246 yd^3/yr) (O'Connor et al. 1998e), and the Central Sanitary Wastewater Treatment Facility has a capacity of 1,030,000 m^3/yr (1,347,000 yd^3/yr) (Sessions 1997a). More information on waste management activities at SRS is presented in Section 3.5.2.

3.6.5.3 Existing Human Health Risk

See Section 3.5.4 for major sources and levels of background radiation, mean concentrations of radiological releases, and offsite estimated dose rates to individuals within the vicinity of SRS.

3.6.5.4 Infrastructure

The site infrastructure at Building 221–H includes those utilities and other resources required to conduct mission-related activities. A summary of the infrastructure characteristics at Building 221–H is presented in Table 3–64. An adequate infrastructure exists at this facility to support current activities. See Section 3.5.11 for more detailed information on the infrastructure at SRS.

Table 3–64. Infrastructure Characteristics of Building 221–H at SRS

Resource	Current Usage
Electricity	
Energy consumption (MWh/yr)	120,000
Fuel	
Natural gas (m^3/yr)	NA
Fuel oil (l/yr)	NA
Coal (t/yr)	0
Water (l/yr)	380,000,0000

Key: NA, not applicable.
Source: O'Connor et al. 1998e.

3.6.6 ORR Overview

ORR, established in 1943 as one of the three original Manhattan Project sites, occupies about 13,974 ha (34,516 acres) west of Knoxville, Tennessee, in and around the city of Oak Ridge, Tennessee (DOE 1999g:S-9). ORR is composed of three separate operations areas: East Tennessee Technology Park

(ETTP), ORNL, and Y–12. ETTP serves as an operations center for ORR's environmental restoration and waste management programs. Y–12 engages in national security activities and manufacturing outreach to U.S. industries.

ORNL is one of the country's largest multidisciplinary laboratories and research facilities. Its primary mission is to perform leading-edge nonweapons R&D in energy, health, and the environment. Other missions include production of radioactive and stable isotopes not available from other production sources; fundamental research in a variety of sciences; research involving hazardous and radioactive materials; and radioactive waste disposal. The facilities that would be used for postirradiation examination are located at ORNL.

The options proposed for postirradiation examination at ORNL would occur in existing facilities that would not require major modifications and would use existing employees. For this reason, detailed descriptions of environmental resources such as geology and soils, water, ecological, cultural and paleontological, land use and visual, socioeconomics, and environmental justice are not provided. For a detailed discussion of these resource areas, refer to the *Storage and Disposition PEIS* (DOE 1996a) and the *Final EIS, Construction and Operation of the Spallation Neutron Source* (DOE 1999g). The resource areas that are discussed include air quality, waste management, existing human health risk, and infrastructure.

3.6.6.1 Air Quality

ORR is in the Eastern Tennessee and Southwestern Virginia Interstate AQCR (DOE 1996a:3-192). This area is designated as attainment for all criteria pollutants with respect to the NAAQS (DOE 1999g:4-17). The primary sources of criteria air pollutants at ORR are the steam plants at ETTP, ORNL, and Y–12. Other emissions sources include the Toxic Substances Control Act incinerator, various process sources, vehicles, temporary emissions from construction activities, and fugitive particulate emissions from coal piles (DOE 1996a:3-192). For a detailed discussion of this resource area, refer to Section 4.1.3 of the *Final EIS, Construction and Operation of the Spallation Neutron Source* (DOE 1999g:4-14).

3.6.6.2 Waste Management

ORR was added to EPA's National Priorities List on November 21, 1989. In January 1, 1992, DOE, EPA, and the Tennessee Department of Environmental Conservation signed an FFCA to facilitate compliance with RCRA and applicable State laws. This agreement coordinates ORR inactive site assessment and remedial actions. In addition, portions of the FFCA are applicable to operating waste management systems (DOE 1996a:3-219).

Through its research and operation activities, ORR treats, stores, packages, and prepares for transport TRU, low-level, mixed low-level, hazardous, and nonhazardous wastes and spent nuclear fuel. Most waste is treated and stored on the site and then shipped off the site for additional treatment and disposal (DOE 1996a:3-219–3-227). ORR waste generation rates and inventories are shown in Table 3–65. Table 3–66 provides information on waste management facilities at ORR. For a more detailed discussion of waste management activities at ORR, refer to Sections 3.6.10 and E.2.5 of the *Storage and Disposition PEIS* (DOE 1996a:3-219, E-63).

Table 3–65. Waste Generation Rates and Inventories at ORR[a]

Waste Type	Generation Rate (m^3/yr)	Inventory (m^3)
TRU[b]		
Contact-handled	9	1,339
LLW	5,181	18,414
Mixed LLW [c]	1,122	48,763
Hazardous	34,048	NA [d]
Nonhazardous		
Liquid	2,406,300	NA [d]
Solid	49,470	NA [d]

[a] Includes ETTP, ORNL, and Y–12.
[b] Includes mixed TRU waste.
[c] Includes TSCA mixed LLW.
[d] Generally, hazardous and nonhazardous wastes are not held in long-term storage.

Key: ETTP, East Tennessee Technology Park; ORNL, Oak Ridge National Laboratory; ORR, Oak Ridge Reservation; LLW, low-level waste; NA, not applicable; TRU, transuranic; TSCA, Toxic Substances Control Act.

Source: DOE 1996a:3-220–3-225 for hazardous and nonhazardous waste; DOE 1996d:15, 16 for all other wastes.

Table 3–66. Selected Waste Management Facilities at ORR

Facility Name/Description	Capacity	Status	Applicable Waste Types: TRU	LLW	Mixed LLW	Haz	Non-Haz
Treatment facilities (m^3/yr)							
TRU Waste Treatment Plant (ORNL)	620	Planned for 2001	X				
Waste Compactor Facility (ORNL)	11,300	Online		X			
TSCA Incinerator (ETTP)	15,700	Online			X	X	
Bldg K–1203 Sewage Treatment Plant	829,000	Online					X
Oak Ridge Sewage Treatment Plant	1,934,500	Online					X
Sanitary Wastewater Treatment Facility (ORNL)	414,000	Online					X
Storage facilities (m^3)							
TRU Waste Storage (ORNL)	1,760	Online	X				
LLW Storage (ETTP and ORNL)	51,850	Online		X			
Mixed Waste Storage (ETTP, ORNL, and Y–12)	231,753	Online			X		
Hazardous Waste Storage (ORNL and Y–12)	1,051	Online				X	
Disposal facilities (m^3)							
Industrial & sanitary landfill (Y–12)	1,100,000	Online					X

Key: ETTP, East Tennessee Technology Park; Haz, hazardous; ORNL, Oak Ridge National Laboratory; ORR, Oak Ridge Reservation; LLW, low-level waste; TRU, transuranic; TSCA, Toxic Substances Control Act.
Source: DOE 1996a:3-219–3-225, E-78–E-95.

3.6.6.3 Existing Human Health Risk

Major sources and levels of background radiation exposure to individuals in the vicinity of ORR are shown in Table 3–67. Annual background radiation doses to individuals are expected to remain constant over time. Total dose to the population changes as population size changes. Background radiation doses are unrelated to ORR operations.

Table 3–67. Sources of Radiation Exposure to Individuals in the ORR Vicinity Unrelated to ORR Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation [a]	
Internal terrestrial radiation	40
Cosmic radiation	27
External terrestrial radiation	28
Radon in homes (inhaled)	200
Other background radiation [b]	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Air travel	1
Consumer and industrial products	10
Total	360

Source	Effective Dose Equivalent (mrem/yr)

[a] Hamilton et al. 1998.
[b] NCRP 1987.
Key: ORR, Oak Ridge Reservation.
Note: Value for radon is an average for the United States.

Release of radionuclides to the environment from ORR operations provides another source of radiation exposure to the population in the vicinity. Doses to the public resulting from these releases are shown in Table 3–68. These doses fall within regulatory limits (DOE 1993a) and are small when compared with background radiation exposure.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from ORR operations in 1997 is estimated to be $1.4\text{x}10^{-6}$. That is, the estimated probability of this person dying from cancer from radiation exposure from 1 year of ORR operations is slightly more than one chance in one million.

According to the same risk estimator, 0.0079 excess fatal cancer per year is projected in the population living within 80 km (50 mi) of ORR. For perspective, this number can be compared with the number of fatal cancers expected in this population from all causes. The 1996 mortality rate associated with cancer for the entire population was 0.2 percent per year. Based on this national rate, the number of fatal cancers from all causes expected during 1996 in the population living within 80 km (50 mi) of ORR was 1,760. This number of expected fatal cancers is much higher than the estimated 0.0079 fatal cancers that could result from ORR operations in 1997.

Table 3–68. Radiation Doses to the Public From Normal ORR Operations in 1997 (Total Effective Dose Equivalent)

	Atmospheric Releases		Liquid Releases		Total	
Members of the Public	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**
Maximally exposed individual (mrem)	10	0.41	4	1.4[b]	100	2.8[c]
Population within 80 km (person-rem)[d]	None	10.0	None	5.7	100	15.7
Average exposed individual within 80 km (mrem)[e]	None	0.011	None	0.0065	None	0.018

[a] The standards for individuals are given in DOE Order 5400.5. As discussed in that order, the 10-mrem/yr limit for airborne emissions is required by the Clean Air Act. The 4-mrem/yr limit is required by the Safe Drinking Water Act; for this SPD EIS, the 4-mrem/yr value is conservatively assumed to be the limit for the sum of doses from all liquid pathways. The total dose of 100 mrem/yr is the limit from all combined pathways. The 100-person-rem value for the population is given in proposed 10 CFR 834 (DOE 1993b).
[b] These doses are mainly from drinking water and eating fish from the Clinch River section of Poplar Creek.
[c] This total dose includes a conservative value of 1 mrem/yr from direct radiation exposure to a cesium field near the Clinch River.
[d] In 1997, this population was about 880,000.
[e] Obtained by dividing the population dose by the number of people living within 80 km (50 mi) of the site.
Key: ORR, Oak Ridge Reservation.
Source: Hamilton et al. 1998.

Workers at ORR receive the same dose as the general public from background radiation; however, they receive an additional dose from normal operations. Table 3–69 includes average, maximally exposed, and total

occupational doses to ORR workers from operations in 1997. These doses fall within radiological limits. Based on a dose-to-risk conversion factor of 400 fatal cancers per 1 million person-rem (4×10^{-4} fatal cancer per person-rem) among workers (see Appendix F), the number of excess fatal cancers to ORR workers from normal operations in 1997 is estimated to be 0.031.

Table 3–69. Radiation Doses to Onsite Workers From Normal ORR Operations in 1997 (Total Effective Dose Equivalent)

	Onsite Releases and Direct Radiation	
Occupational Personnel	**Standard[a]**	**Actual**
Average radiation worker (mrem)	None[b]	48
Total workers (person-rem)[c]	None	78

[a] The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995a:para. 835.202); however, DOE's goal is to maintain radiological exposures as low as is reasonably achievable. Therefore, DOE has established an administrative control level of 2,000 mrem/yr (DOE 1994a:2-3); DOE must make reasonable attempts to maintain worker doses below this level.

[b] No standard is specified for an "average radiation worker"; however, the maximum dose that this worker may receive is limited to that given in footnote "a."

[c] The total number of badged workers at the site in 1997 was 1,614.

Key: ORR, Oak Ridge Reservation.

Source: DOE 1999h.

More detailed information of the radiation environment, including background exposures and radiological releases and doses, is presented in the *ORR Annual Site Environmental Report for 1997* (Hamilton et al. 1998), and Section 4.1.9.1 of the *Final EIS, Construction and Operation of the Spallation Neutron Source* (DOE 1999g:4-60). Concentrations of radioactivity in various environmental media (e.g., air and water) and animal tissues in the site region are also presented in the *ORR Annual Site Environmental Report for 1997*.

3.6.6.4 Infrastructure

A summary of the infrastructure characteristics of ORR is presented in Table 3–70. An adequate infrastructure exists at ORR to support current activities. For a more detailed discussion of the site infrastructure, refer to Section 4.2.10.2 of the *Final EIS, Construction and Operation of the Spallation Neutron Source* (DOE 1999g:4-144), and Sections 3.6.2 and 3.6.4 of the *Storage and Disposition PEIS* (DOE 1996a:3-190,3-194).

Table 3–70. ORR Infrastructure Characteristics

Resource	Current Usage[a]	Site Capacity
Electricity		
Energy consumption (MWh/yr)	726,000	13,880,000
Fuel		
Natural gas (m^3/yr)	95,000,000	250,760,000
Liquid (1/yr)	416,000	416,000 [a]
Coal (t/yr)	16,300	16,300 [a]
Water		
Annual (l/yr)	14,210,000,000	44,347,500,000

[a] As supplies get low, more can be supplied by truck.

Key: ORR, Oak Ridge Reservation.

Source: DOE 1996a:3-190, 3-194.

3.7 REACTOR SITES FOR MOX FUEL IRRADIATION

3.7.1 Catawba Units 1 and 2 Site Overview

The Catawba nuclear power plant occupies 158 ha (391 acres) in York County, South Carolina, 9.3 km (5.8 mi) north-northwest of Rock Hill, South Carolina, and 16.9 km (10.5 mi) west-southwest of Charlotte, North Carolina (see Figure 3–34). The site is on a peninsula bounded by Beaver Dam Creek to the north, Big Allison Creek to the south, Lake Wylie to the east, and private property to the west (Duke Power 1997:2-3). Lake Wylie has a surface area of 5,040 ha (12,455 acres), a shoreline of approximately 523 km (325 mi), and a volume of 3.46×10^8 m^3 (281,900 acre-ft). The towns of Mount Holly and Belmont, North Carolina, take their raw water supplies from Lake Wylie. The communities of Chester, Fort Lawn, Fort Mill, Great Falls, Lancaster, Mitford, Riverview, and Rock Hill, South Carolina, obtain at least a portion of their municipal water supplies from the Catawba River within 80 km (50 mi) downstream from the site (Duke Power 1997:2-41, table 2-52).

In 1997, the plant employed 1,232 persons (DOE 1999f). The Catawba reactors are operated by Duke Power Company. The operating licenses (Nos. NPF–35 and NPF–52) for Units 1 and 2 were granted in 1985 and 1986 and expire in 2024 and 2026, respectively (NRC 1997). The population within an 80-km (50-mi) radius of these reactors is estimated to be 1,656,093 (Duke Power 1997:table 2-13).

Reactor cooling is accomplished using mechanical draft cooling towers, with water obtained from Lake Wylie (Duke Power 1997). During normal operations of Catawba, cooling water is pumped from the Beaver Dam Creek arm of Lake Wylie at a rate of 266,680 million l/yr (70,450 million gal/yr) and returned to Big Allison Creek at a rate of 172,902 million l/yr (45,676 million gal/yr). The net difference in water (93,779 million l/yr [24,774 million gal/yr]) is due to evaporation in the cooling towers (DOE 1999f).

New (unirradiated) fuel assemblies are dry stored in racks located in the two New Fuel Storage Buildings. Each New Fuel Storage Building is designed to accommodate 98 fuel assemblies (a total of 196 assemblies). Spent (irradiated) fuel assemblies are stored in two spent fuel pools in the two fuel buildings. The spent fuel storage pools have a total capacity of 2,836 assemblies (Duke Power 1997:9-3–9-6). Security at the site is provided in accordance with U.S. Nuclear Regulatory Commission (NRC) regulations and includes security checkpoints, barbed wire fencing, surveillance cameras, and intruder detection. More information about these reactors can be found at the NRC Web site at http://www.nrc.gov/OPA/finder.htm (NRC 1999) and in NRC Docket Nos. 50–413 and 50–414.

3.7.1.1 Air Quality

Catawba is within the Metropolitan Charlotte, North Carolina, AQCR #167. None of the areas within the site or York County are designated as nonattainment areas with respect to the NAAQS for criteria air pollutants (EPA 1998d).

Sources of criteria air pollutants from Catawba include five emergency diesel generators, a safe shutdown facility generator, and miscellaneous equipment such as trucks and forklifts. Table 3–71 provides a summary of criteria pollutant concentrations from operations of Catawba. The concentrations resulting from operations are well below the applicable ambient air quality standards even when background concentrations from other offsite sources are considered.

3.7.1.2 Waste Management

Table 3–72 presents the 5-year average annual waste generation rates for Catawba.

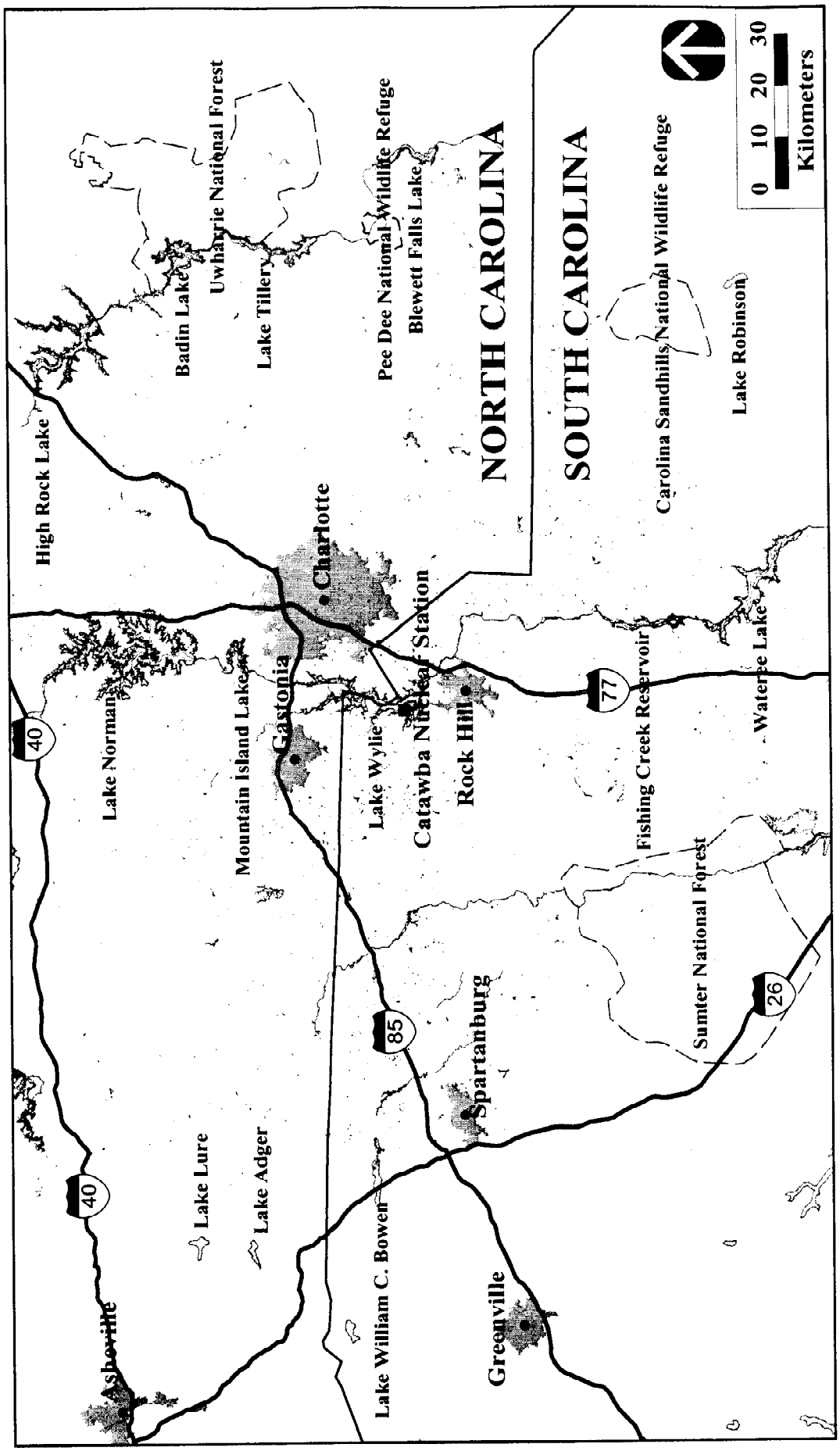


Figure 3–34. Catawba Nuclear Power Plant, South Carolina

Table 3–71. Comparison of Contribution to Nonradiological Ambient Air Pollutant Concentrations From Catawba Sources With National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS (Fg/m^3)	Catawba (Fg/m^3)
Carbon monoxide	8 hours	10,000	978
	1 hour	40,000	1,400
Nitrogen dioxide	Annual	100	3.26
PM_{10}	Annual	50	0.102
	24 hours	150	65.9
$PM_{2.5}$	3-year annual	15	(a)
	24 hours (98th percentile over 3 years)	65	(a)
Sulfur dioxide	Annual	80	0.0418
	24 hours	365	26.9
	3 hours	1,300	60.4

[a] No data is available with which to assess $PM_{2.5}$ concentrations.
Key: NAAQS, National Ambient Air Quality Standards.
Note: Based on 1994–1995 emissions data for diesel generators.
Source: Modeled concentrations based on DOE 1999f; EPA 1997a.

Table 3–72. Annual Waste Generation for Catawba (m^3)

Waste Type	Generation Rate
LLW	50
Mixed LLW	0.6[a]
Hazardous waste	29[a]
Nonhazardous waste	
Liquid	60,794[b]
Solid	455[a]

[a] Values converted from kilograms assuming a waste density such that 1 m^3 = 1,000 kg.
[b] Assuming sanitary wastewater is generated at the same rate 365 days per year.
Key: LLW, low-level waste.
Source: DOE 1999f.

The waste disposal systems provide all equipment necessary to collect, process, store, and prepare for disposal of all radioactive liquid and solid wastes produced as a result of reactor operations. Potentially radioactive liquids may originate from a variety of sources, including the steam generator blowdown system, ventilation unit condensate system, drainage system sumps, laboratory drains, personnel decontamination area drains, decontamination system, sampling system, and laundry drains. Potentially radioactive liquid wastes are collected and characterized as to the level of contamination present. If contamination is below regulated levels, liquids may be discharged to the circulating water discharge outfall in accordance with the National Pollutant Discharge Elimination System (NPDES) permit. If liquids are determined to be radioactively contaminated, they are treated by filtration, evaporation, or mixing and settling, or are sent to the demineralizers, before being discharged. Continuous radiation monitoring is provided for treated liquid waste before its release to the circulating water discharge outfall. Liquid waste is analyzed and monitored to ensure that radionuclide concentrations are maintained as low as practical and well within the limits of applicable regulations and permits (Duke Power 1997:11-9–11-27).

The radioactive solid waste disposal system provides facilities for holdup, packaging, and storage of wastes before shipment to offsite licensed treatment and disposal facilities. Radioactive solid waste may include evaporator concentrates, spent demineralizer resins, spent filters, laboratory wastes, rags, gloves, boots, brooms, and other miscellaneous tools and apparel that become contaminated during normal plant operations and maintenance. Treatment on the site may include dewatering and compaction, or solidification using a contractor-supplied mobile unit. Materials that are compressible are placed in 208-l (55-gal) drums for compaction. Spent radioactive filter cartridges are packaged in either 114-l (30-gal) or 208-l (55-gal) drums. Packaged wastes are stored in the filter cartridge storage bunker, low-activity-waste storage room, high-activity-waste storage room, solidification area, and waste shipping area before being shipped to an offsite treatment or disposal facility (Duke Power 1997:11-53–11-61).

The small quantities of mixed low-level and hazardous wastes generated are accumulated on the site before being shipped for commercial treatment and disposal in offsite permitted facilities. Nonhazardous solid wastes are generated by typical industrial processes and housekeeping activities and are collected on the site and managed off the site at the local permitted sanitary landfill. Nonhazardous sanitary wastewater is treated in the onsite sanitary wastewater treatment facility and then discharged to Lake Wylie (Sadler 1997:6).

3.7.1.3 Existing Human Health Risk

Major sources and levels of background radiation exposure to individuals within the vicinity of Catawba are shown in Table 3–73. Annual background radiation doses to individuals are expected to remain constant over time. Total dose to the population changes as population size changes. Background radiation doses are unrelated to reactor operations.

Table 3–73. Sources of Radiation Exposure to Individuals in the Catawba Vicinity Unrelated to Catawba Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation	
Cosmic and external and internal terrestrial radiation[a]	125
Radon in homes (inhaled)[b]	200[c]
Other background radiation[b]	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Air travel	1
Consumer and industrial products	10
Total	390

[a] Virginia Power 1998:11B-3.
[b] NCRP 1987:11, 40, 53.
[c] An average for the United States.

Releases of radionuclides to the environment from normal reactor operations provide another source of radiation exposure to populations within the vicinity of the site. The doses to the public resulting from these releases are shown in Table 3–74. These doses fall within regulatory limits and are small when compared with background exposure.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from normal reactor operations in 1997 is estimated to be 7.8×10^{-8}. That is, the estimated

Table 3–74. Radiological Impacts on the Public From Catawba Operations in 1997 (Total Effective Dose Equivalent)

	Atmospheric Releases		Liquid Releases		Total	
Members of the Public	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**
Maximally exposed individual (mrem)	5	0.045	3	0.11	25	0.16
Population within 80 km (person-rem)[b]	NA	4.0	NA	4.3	NA	8.3

[a] The standards for individuals are given in 10 CFR 50, Appendix I. The standard for the maximally exposed offsite individual (25 mrem/yr total body from all pathways) is given in 40 CFR 190.

[b] Population used: 1,656,093; this population dose was estimated for the year 2000 and is assumed to be representative for the year 1997.

Key: NA, not applicable.

Source: DOE 1999f; Duke Power 1997:tables 2-13, 11-12, and 11-15.

probability of this person dying from cancer from radiation exposure from 1 year of normal reactor operations is about 1 chance in 13 million.

According to the same risk estimator, 0.0042 excess fatal cancer is projected among the population living within 80 km (50 mi) of Catawba in 1997. For perspective, this number can be compared with the number of fatal cancers expected in this population from all causes. The 1996 mortality rate associated with cancer for the entire population was 0.2 percent per year (Famighetti 1998:964). Based on this national rate, the number of fatal cancers from all causes expected during 1997 in the population living within 80 km (50 mi) of Catawba was about 3,300. This number of expected fatal cancers is much higher than the estimated 0.0042 fatal cancer that could result from normal reactor operations in 1997.

Workers at the reactors receive the same background radiation dose as the general public; however, they receive an additional dose from normal operations of the reactors. Table 3–75 includes average, maximally exposed, and total occupational doses to reactor workers from operations in 1997. Based on a risk estimator of 400 cancer deaths per 1 million person-rem (4×10^{-4} fatal cancer per person-rem) among workers, the number of fatal cancers to reactor workers from 1997 normal operations is estimated to be 0.11.

Table 3–75. Radiological Impacts on Involved Workers From Catawba Operations in 1997

Number of badged workers[a]	3,420
Total dose (person-rem/yr)	265
Annual latent fatal cancers	0.11
Average worker dose (mrem/yr)	78
Annual risk of latent fatal cancer	3.1×10^{-5}

[a] A badged worker is equipped with an individual dosimeter.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (10 CFR 20). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999f.

3.7.1.4 Environmental Justice

Environmental justice concerns the environmental impacts that proposed actions may have on minority and low-income populations, and whether such impacts are disproportionately high and adverse (CEQ 1997). In the case of Catawba, the potentially affected area includes parts of North Carolina and South Carolina.

The potentially affected area around Catawba is defined by a circle with an 80-km (50-mi) radius centered at these reactors (lat. 35E03N050 N, long. 81E04N100 W). The total population residing within that area in 1990 was 1,519,392. The proportion of the population that was considered minority was 20.7 percent. The same census data show that the percentage of minorities for the contiguous United States was 24.1, and the percentages of the States of North Carolina and South Carolina were 25.0 and 31.5, respectively (DOC 1992).

At the time of the 1990 census, Blacks were the largest minority group within the potentially affected area, constituting 19.0 percent of the total population. Asians and Hispanics contributed about 0.7 percent, and Native Americans made up about 0.3 percent of the population (DOC 1992).

A breakdown of incomes in the potentially affected area is also available from the 1990 census data (DOC 1992). At that time, the poverty threshold was $9,981 for a family of three with one related child under 18 years of age. A total of 159,956 persons (10.5 percent of the total population) residing within the potentially affected area around Catawba reported incomes below that threshold. Data obtained during the 1990 census also show that of the total population of the contiguous United States, 13.1 percent reported incomes below the poverty threshold and that the figures for North Carolina and South Carolina were 13.0 and 15.4 percent, respectively (DOC 1992).

3.7.2 McGuire Units 1 and 2 Site Overview

The McGuire nuclear power plant occupies 280 ha (700 acres) in northwestern Mecklenburg County, North Carolina, 27.4 km (17 mi) northwest of Charlotte, North Carolina (see Figure 3–35). The site is bounded to the west by the Catawba River and to the north by Lake Norman. Surrounding land is generally rural nonfarmland. Lake Norman, with a surface area of 13,156 ha (32,510 acres), a volume of 1,349 million m^3 (1,093,600 acre-ft) and a shoreline of 837 km (520 mi), stretches 54.7 km (34 mi) from Cowans Ford Dam to the tailrace of Lookout Lake. The Charlotte municipal water intake is 18 km (11.2 mi) downstream from the site (Duke Power 1996:2-3, 2-27, 2-28; Nesbit 1999; Ritchey 1996). In addition, the communities of Belmont, Gastonia, and Mount Holly, North Carolina, and Chester, Fort Lawn, Fort Mill, Lancaster, Mitford, Riverview, and Rock Hill, South Carolina, obtain at least a portion of their municipal water supplies from the Catawba River within 80 km (50 mi) downstream from the site (Duke Power 1997:2-41, table 2-52).

In 1997, the plant employed 1,238 persons (DOE 1999f). The McGuire reactors are operated by Duke Power Company. The operating licenses (Nos. NPF–9 and NPF–17) for these reactors were granted in 1981 and 1983, and expire in 2021 and 2023, respectively (NRC 1997). The population within an 80-km (50-mi) radius of these reactors is estimated to be 2,140,720 (Duke Power 1996:table 2-1). Reactor cooling is accomplished using a once-through cooling system. Cooling water is withdrawn from Lake Norman at a rate of 7,025,937 million l/yr (1,856,062 million gal/yr) and discharged back into Lake Norman at a rate of 6,966,567 million l/yr (1,840,378 million gal/yr). The net difference in water (59,370 million l/yr [15,684 million gal/yr]) is due to evaporation (DOE 1999f).

New (unirradiated) fuel assemblies are dry stored in racks located in the two New Fuel Storage Vaults. Each New Fuel Storage Vault is designed to accommodate 96 fuel assemblies (a total of 192 assemblies). Spent (irradiated) fuel assemblies are stored in two spent fuel pools in the two Auxiliary Buildings. The two spent fuel storage pools have a total capacity of 2,926 assemblies. New fuel can also be stored in the spent fuel pools (Duke Power 1996:9-3–9-8). Security at the site is provided in accordance with NRC regulations and includes security checkpoints, barbed wire fencing, surveillance cameras, and intruder detection. More information about these reactors can be found at the NRC Web site at http://www.nrc.gov/OPA/finder.htm (NRC 1999) and in NRC Docket Nos. 50–369 and 50–370.

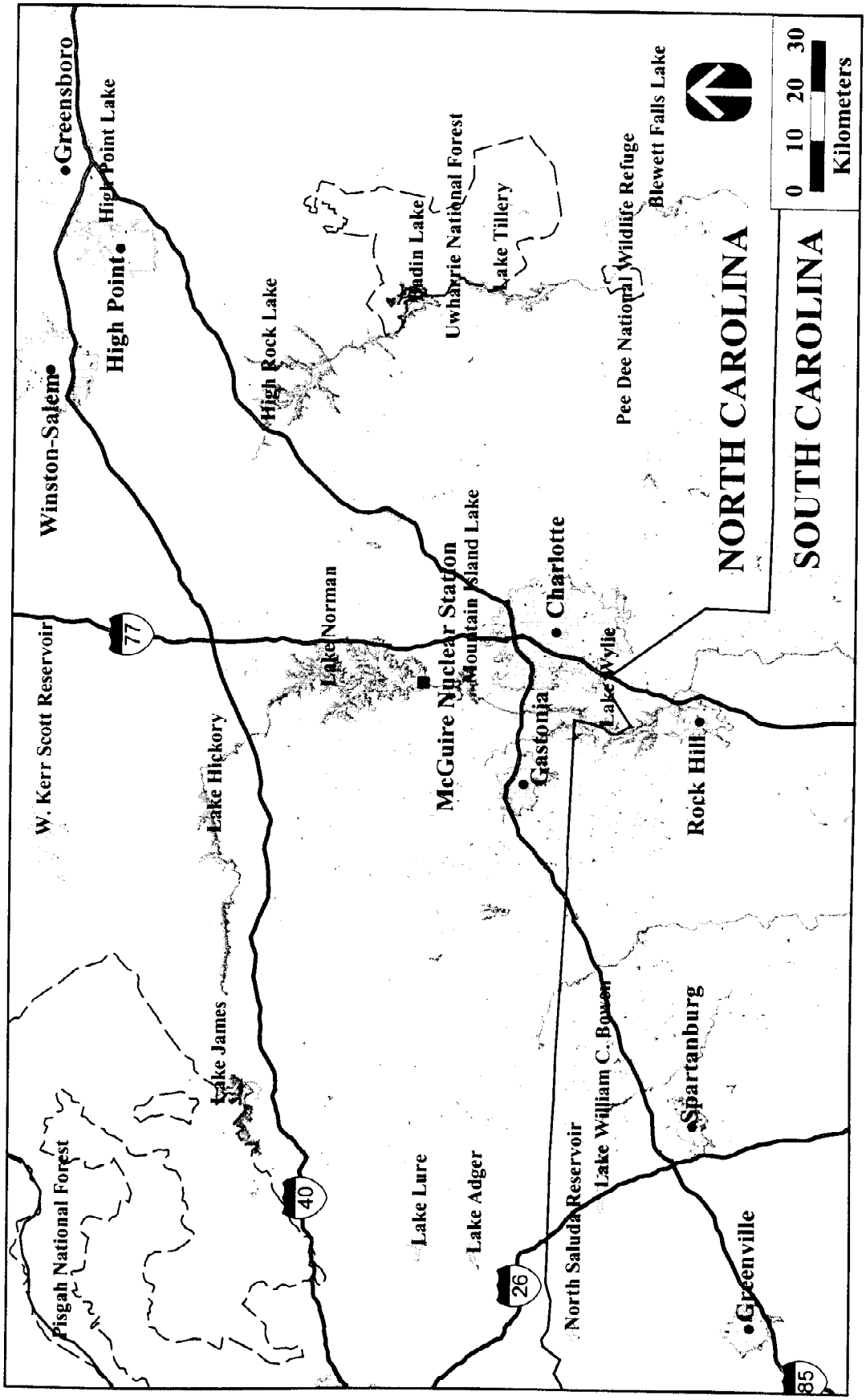


Figure 3–35. McGuire Nuclear Power Plant, North Carolina

3.7.2.1 Air Quality

McGuire is within the Metropolitan Charlotte AQCR #167. None of the areas within the site or Mecklenberg County are designated as nonattainment areas with respect to the NAAQS for criteria air pollutants (EPA 1998e).

Sources of criteria air pollutants from McGuire include five emergency diesel generators, a safe shutdown facility generator, and miscellaneous equipment such as trucks and forklifts. Table 3–76 provides a summary of criteria pollutant concentrations from operations of McGuire. The concentrations resulting from operations are well below the applicable ambient air quality standards even when background concentrations from other offsite sources are considered.

Table 3–76. Comparison of Contribution to Nonradiological Ambient Air Pollutant Concentrations From McGuire Sources With National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS (Fg/m^3)	McGuire (Fg/m^3)
Carbon monoxide	8 hours	10,000	1,060
	1 hour	40,000	1,510
Nitrogen dioxide	Annual	100	2.55
PM_{10}	Annual	50	0.0799
	24 hours	150	71.2
$PM_{2.5}$	3-year annual	15	(a)
	24 hours (98th percentile over 3 years)	65	(a)
Sulfur dioxide	Annual	80	0.0336
	24 hours	365	29.9
	3 hours	1,300	67.4

[a] No data is available with which to assess $PM_{2.5}$ concentrations.
Key: NAAQS, National Ambient Air Quality Standards.
Note: Based on 1994–1997 emissions data for diesel generators.
Source: Modeled concentrations based on DOE 1999f; EPA 1997a.

3.7.2.2 Waste Management

Table 3–77 presents the 5-year average annual waste generation rates for McGuire.

The waste disposal systems provide all equipment necessary to collect, process, store, and prepare for disposal of all radioactive liquid and solid wastes produced as a result of reactor operations. Potentially radioactive liquids may originate from a variety of sources, including the steam generator blowdown system, ventilation unit condensate system, drainage system sumps, laboratory drains, personnel decontamination area drains, decontamination system, sampling system, and laundry drains. Potentially radioactive liquid wastes are collected and characterized as to the level of contamination present. If contamination is below regulated levels, liquids may be discharged to the circulating water discharge outfall in accordance with the NPDES permit. If liquids are determined to be radioactively contaminated, they are treated by filtration, evaporation, or mixing and settling, or are sent to the demineralizers, before being discharged. Continuous radiation monitoring is provided for treated waste before its release to the circulating water discharge outfall. Liquid waste is analyzed and monitored to ensure that radionuclide concentrations are maintained as low as practical and well within the limits of applicable regulations and permits (Duke Power 1996:11-9–11-26).

Table 3–77. Annual Waste Generation for McGuire (m^3)

Waste Type	Generation Rate
LLW	42.2
Mixed LLW	0.19[a]
Hazardous waste	28.6[a]
Nonhazardous waste	
Liquid	49,740[b]
Solid	568[a]

[a] Values converted from kilograms assuming a waste density such that 1 m^3 = 1,000 kg.
[b] Assuming sanitary wastewater is generated at the same rate 365 days per year.
Key: LLW, low-level waste.
Source: DOE 1999f.

The radioactive solid waste disposal system provides facilities for holdup, packaging, and storage of wastes before shipment to offsite licensed treatment and disposal facilities. Radioactive solid waste may include evaporator concentrates, spent demineralizer resins, spent filters, laboratory wastes, contaminated oils, rags, gloves, boots, sweepings, brooms, and other miscellaneous tools and apparel that become contaminated during normal plant operations and maintenance. Treatment on the site may include dewatering, or solidification using a contractor-supplied mobile unit. Low-activity solid wastes, such as rags, clothing, and sweepings, are loaded directly into storage containers for shipment to an offsite treatment or disposal facility. Spent radioactive filter cartridges are packaged in drums or other waste containers, with spent resin solidified, if required. The disposal of slightly contaminated sludge from the wastewater treatment plant is carried out by landspreading the sludge on a site continguous to McGuire using a method approved by the State of North Carolina and NRC. Packaged wastes are stored in the filter storage bunker, solidified liner storage bunker, and the shielded storage bunker before being shipped to an offsite treatment or disposal facility (Duke Power 1996:11-49–11-56).

The small quantities of mixed LLW and hazardous waste generated are accumulated on the site before being shipped for commercial treatment and disposal in offsite permitted facilities. Nonhazardous solid wastes are generated by typical industrial processes and housekeeping activities and are collected on the site and managed off the site at the local permitted sanitary landfill. Nonhazardous sanitary wastewater is discharged to the Charlotte Mecklenburg Utility Department sanitary sewer system (Duke Power 1994).

3.7.2.3 Existing Human Health Risk

Major sources and levels of background radiation exposure to individuals within the vicinity of McGuire are shown in Table 3–78. Annual background radiation doses to individuals are expected to remain constant over time. Total dose to the population changes as population size changes. Background radiation doses are unrelated to reactor operations.

Releases of radionuclides to the environment from normal reactor operations provide another source of radiation exposure to populations within the vicinity of the site. The doses to the public resulting from these releases are shown in Table 3–79. These doses fall within regulatory limits and are small when compared with background exposure.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from normal reactor operations in 1997 is estimated to be 4.9×10^{-8}. That is, the estimated

Table 3–78. Sources of Radiation Exposure to Individuals in the McGuire Vicinity Unrelated to McGuire Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation	
Cosmic and external and internal terrestrial radiation[a]	125
Radon in homes (inhaled)[b]	200[c]
Other background radiation[b]	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Air travel	1
Consumer and industrial products	10
Total	390

[a] Virginia Power 1998:11B-3.
[b] NCRP 1987:11, 40, 53.
[c] An average for the United States.

Table 3–79. Radiological Impacts on the Public From McGuire Operations in 1997 (Total Effective Dose Equivalent)

	Atmospheric Releases		Liquid Releases		Total	
Members of the Public	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**	**Standard[a]**	**Actual**
Maximally exposed individual (mrem)	5	0.033	3	0.065	25	0.098
Population within 80 km (person-rem)[b]	NA	2.8	NA	93	NA	96

[a] The standards for individuals are given in 10 CFR 50, Appendix I. The standard for maximally exposed offsite individual (25 mrem/yr total body from all pathways) is given in 40 CFR 190.
[b] Population used: 2,140,720; this population dose was estimated for the year 2000 and is assumed to be representative for the year 1997.
Key: NA, not applicable.
Source: DOE 1999f; Duke Power 1974:5.3-7, table 5.3.5-1; 1996:table 2-1.

probability of this person dying from cancer from radiation exposure from 1 year of normal reactor operations is about 1 chance in 20 million.

According to the same risk estimator, 0.048 excess fatal cancer is projected among the population living within 80 km (50 mi) of McGuire in 1997. For perspective, this number can be compared with the number of fatal cancers expected in this population from all causes. The 1996 mortality rate associated with cancer for the entire population was 0.2 percent per year (Famighetti 1998:964). Based on this national rate, the number of fatal cancers from all causes expected during 1997 in the population living within 80 km (50 mi) of McGuire was about 4,300. This number of expected fatal cancers is much higher than the estimated 0.048 fatal cancer that could result from normal reactor operations in 1997.

Workers at the reactors receive the same background radiation dose as the general public; however, they receive an additional dose from normal operations of the reactors. Table 3–80 includes average, maximally exposed, and total occupational doses to reactor workers from operations in 1997. Based on a risk estimator of 400 cancer deaths per 1 million person-rem (4×10^{-4} fatal cancer per person-rem) among workers, the number of fatal cancers to reactor workers from 1997 normal operations is estimated to be 0.20.

Table 3–80. Radiological Impacts on Involved Workers From McGuire Operations in 1997

Number of badged workers[a]	3992
Total dose (person-rem/yr)	492
Annual latent fatal cancers	0.20
Average worker dose (mrem/yr)	123
Annual risk of latent fatal cancer	4.9×10^{-5}

[a] A badged worker is equipped with an individual dosimeter.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (10 CFR 20). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1999f.

3.7.2.4 Environmental Justice

Environmental justice concerns the environmental impacts that proposed actions may have on minority and low-income populations, and whether such impacts are disproportionately high and adverse (CEQ 1997). In the case of McGuire, the potentially affected area includes parts of North Carolina and South Carolina.

The potentially affected area around McGuire is defined by a circle with an 80-km (50-mi) radius centered at these reactors (lat. 35E25N590 N, long. 80E56N550 W). The total population residing within that area in 1990 was 1,738,966. The proportion of the population that was considered minority was 17.6 percent. The same census data show that the percentage of minorities for the contiguous United States was 24.1, and the percentages of the States of North and South Carolina were 25.0 and 31.5, respectively (DOC 1992).

At the time of the 1990 census, Blacks were the largest minority group within the potentially affected area, constituting 15.9 percent of the total population. Hispanics and Asians contributed about 0.7 percent, and Native Americans made up about 0.3 percent of the population (DOC 1992).

A breakdown of incomes in the potentially affected area is also available from the 1990 census data (DOC 1992). At that time, the poverty threshold was $9,981 for a family of three with one related child under 18 years of age. A total of 170,956 persons (9.8 percent of the total population) residing within the potentially affected area around McGuire reported incomes below that threshold. Data obtained during the 1990 census also show that of the total population of the contiguous United States, 13.1 percent reported incomes below the poverty threshold, and that the figures for North Carolina and South Carolina were 13.0 and 15.4 percent, respectively (DOC 1992).

3.7.3 North Anna Units 1 and 2 Site Overview

The North Anna nuclear power plant occupies 422 ha (1,043 acres) in Louisa County, Virginia, approximately 64.4 km (40 mi) north-northwest of Richmond, Virginia, and 113 km (70 mi) southwest of Washington, D.C. (see Figure 3–36). The largest community within 16 km (10 mi) of the site is the town of Mineral in Louisa County. The site is on a peninsula on the southern shore of Lake Anna. Lake Anna is approximately 27.4 km (17 mi) long, with a surface area of 5,260 ha (13,000 acres) and 322 km (200 mi) of shoreline. The reservoir contains approximately 380 billion l (100 billion gal) of water (Virginia Power 1998:2.1-1, 2.1-2).

In 1997, the plant employed 552 persons (DOE 1999f). The North Anna reactors are operated by the Virginia Power Company. The operating licenses (Nos. NPF–4 and NPF–7) for these reactors were granted in 1978 and 1980, and expire in 2018 and 2020, respectively (NRC 1997). It is estimated that the population within an 80-km (50-mi) radius of the reactor is 1,614,983 (Virginia Power 1998:2.1-21).

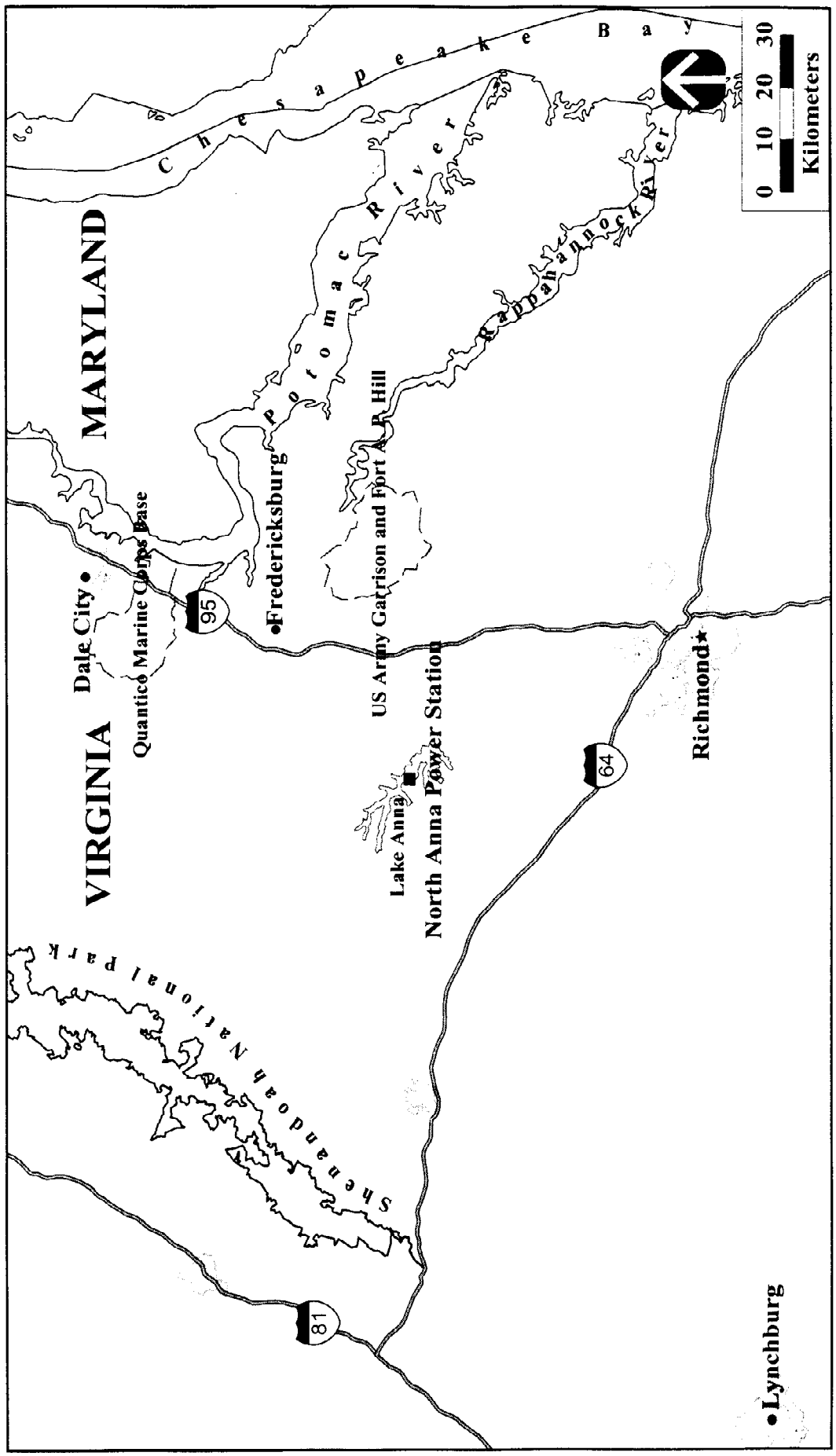


Figure 3–36. North Anna Nuclear Power Plant, Virginia

Reactor cooling is accomplished using a once-through cooling system with water obtained from Lake Anna (Virginia Power 1998:2.1-2). The rate of cooling water withdrawal is 5,564,000 million l/yr (1,470,000 million gal/yr), with all water returned to Lake Anna (DOE 1999f). There are no known industrial users downstream from the site until some 97 km (60 mi) downstream at West Point, where a large pulp and paper manufacturing plant is located. There are no known potable water withdrawals along the entire stretch of the river downstream to West Point, where the river becomes brackish (Virginia Power 1998:2.4-3).

New (unirradiated) fuel assemblies are dry stored in the new fuel storage area of the fuel building. The new fuel storage area has a capacity of 126 fuel assemblies. Spent (irradiated) fuel assemblies are stored under water in the spent fuel pit in the fuel building. The spent fuel storage pit has a capacity of 1,737 fuel assemblies (Virginia Power 1998:9.1-1, 9.1-2). Dry cask storage is being developed and is expected to have a capacity of an additional 1,824 assemblies (NRC 1998). Security at the site is provided in accordance with NRC regulations and includes security checkpoints, barbed wire fencing, surveillance cameras, and intruder detection. More information about these reactors can be found at the NRC Web site at http://www.nrc.gov/OPA/finder.htm (NRC 1999) and in NRC Docket Nos. 50–338 and 50–339.

3.7.3.1 Air Quality

North Anna is within the Northeastern Virginia AQCR #224. None of the areas within the site or Louisa County are designated as nonattainment areas with respect to the NAAQS for criteria air pollutants (EPA 1998f).

Sources of criteria air pollutants from North Anna include two auxiliary boilers, four emergency diesel generators, a station blackout generator, and miscellaneous equipment such as trucks and forklifts. Table 3–81 provides a summary of criteria pollutant concentrations from operations of North Anna. The concentrations resulting from operationsare well below the applicable ambient air quality standards even when background concentrations from other offsite sources are considered.

3.7.3.2 Waste Management

Table 3–82 presents the 5-year average annual waste generation rates for North Anna.

The waste disposal systems provide all equipment necessary to collect, process, store, and prepare for disposal of all radioactive liquid and solid wastes produced as a result of reactor operations. Potentially radioactive liquids may originate from a variety of sources, including the boron recovery system, steam generator blowdown system, drainage system sumps, laboratory drains, personnel decontamination area drains, decontamination system, sampling system, laundry drains, and spent resin flush system. Potentially radioactive liquid wastes are collected and characterized as to the level of contamination present. If contamination is below regulated levels, liquids may be discharged to the circulating water discharge outfall in accordance with the NPDES permit. If liquids are determined to be radioactively contaminated, they are treated by the ion exchange filtration system or demineralizers to reduce contamination before being discharged. Continuous radiation monitoring is provided for treated liquid waste before its release to the circulating water discharge outfall. Liquid waste is analyzed and monitored to ensure that radionuclide concentrations are maintained as low as practical and well within the limits of applicable regulations and permits (Virginia Power 1998:11.2-1, 11.2-2).

The radioactive solid waste disposal system provides facilities for holdup, packaging, and storage of wastes before shipment to offsite treatment and disposal facilities. Radioactive solid waste may include spent resin slurries, spent filter cartridges, rags, gloves, boots, brooms, and other miscellaneous tools and apparel that become contaminated during normal plant operations and maintenance. Contaminated solid materials resulting

Table 3–81. Comparison of Contribution to Nonradiological Ambient Air Pollutant Concentrations From North Anna Sources With National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS (Fg/m^3)	North Anna (Fg/m^3)
Carbon monoxide	8 hours	10,000	416
	1 hour	40,000	594
Nitrogen dioxide	Annual	100	0.00504
PM_{10}	Annual	50	0.00407
	24 hours	150	15.4
$PM_{2.5}$	3-year annual	15	(a)
	24 hours (98th percentile over 3 years)	65	(a)
Sulfur dioxide	Annual	80	0.0167
	24 hours	365	63
	3 hours	1,300	142

[a] No data is available with which to assess $PM_{2.5}$ concentrations.
Key: NAAQS, National Ambient Air Quality Standards.
Note: Based on 1997 emissions data for diesel generators.
Source: Modeled concentrations based on DOE 1999f; EPA 1997a.

Table 3–82. Annual Waste Generation for North Anna (m^3)

Waste Type	Generation Rate
LLW	236.6[a]
Mixed LLW	0
Hazardous waste	11.4
Nonhazardous waste	
Liquid	681
Solid	10,400

[a] Two-year average (1996–1997).
Key: LLW, low-level waste.
Source: DOE 1999f.

from station maintenance are stored in specified areas of the auxiliary building and the decontamination building. Materials that are compressible are placed in 208-l (55-gal) drums for compaction at the bailing facility. Compressible materials and other contaminated solid materials that are not placed in drums are placed in 6.1-m (20-ft) seavans for shipment to offsite licensed treatment and disposal facilities. Contaminated metallic materials and highly contaminated solid objects are placed inside disposable containers for shipment to a disposal facility (Virginia Power 1998:11.5-1–11.5-3).

The small quantities of mixed LLW and hazardous waste generated are accumulated on the site before being shipped for commercial treatment and disposal in offsite permitted facilities. Nonhazardous solid wastes are generated by typical industrial processes and housekeeping activities and are collected on the site and managed off the site at the local permitted sanitary landfill. Nonhazardous sanitary wastewater is treated in the onsite sanitary wastewater treatment facility and then discharged to Lake Anna (VADEQ 1997:9, 28).

3.7.3.3 Existing Human Health Risk

Major sources and levels of background radiation exposure to individuals within the vicinity of North Anna are shown in Table 3–83. Annual background radiation doses to individuals are expected to remain constant over time. Total dose to the population changes as population size changes. Background radiation doses are unrelated to reactor operations.

Table 3–83. Sources of Radiation Exposure to Individuals in the North Anna Vicinity Unrelated to North Anna Operations

Source	Effective Dose Equivalent (mrem/yr)
Natural background radiation	
Cosmic and external and internal terrestrial radiation[a]	125
Radon in homes (inhaled)[b]	200[c]
Other background radiation[b]	
Diagnostic x rays and nuclear medicine	53
Weapons test fallout	<1
Air travel	1
Consumer and industrial products	10
Total	390

[a] Virginia Power 1998:11B-3.
[b] NCRP 1987:11, 40, 53.
[c] An average for the United States.

Releases of radionuclides to the environment from normal reactor operations provide another source of radiation exposure to populations within the vicinity of the site. The doses to the public resulting from these releases are shown in Table 3–84. These doses fall within regulatory limits and are small when compared with background exposure.

Table 3–84. Radiological Impacts on the Public From North Anna Operations in 1997 (Total Effective Dose Equivalent)

	Atmospheric Releases		Liquid Releases		Total	
Members of the Public	Standard[a]	Actual	Standard[a]	Actual	Standard[a]	Actual
Maximally exposed individual (mrem)	5	6.1×10^{-4}	3	0.28	25	0.28
Population within 80 km (person-rem)[b]	NA	6.0	NA	9.0	NA	15.0

[a] The standards for individuals are given in 10 CFR 50, Appendix I. The standard for the maximally exposed offsite individual (25 mrem/yr total body from all pathways) is given in 40 CFR 190.
[b] Population used: 1,614,983; this population dose was estimated for the year 2000 and is assumed to be representative for the year 1997. Population doses were ratioed to reflect latest census data projections.
Key: NA, not applicable.
Source: DOE 1999f; Virginia Power 1998:2.1-21, 11B-3, 11.3-13.

Using a risk estimator of 500 cancer deaths per 1 million person-rem (5×10^{-4} fatal cancer per person-rem) to the public (see Appendix F.10), the fatal cancer risk to the maximally exposed member of the public due to radiological releases from normal reactor operations in 1997 is estimated to be 1.4×10^{-7}. That is, the estimated probability of this person dying from cancer from radiation exposure from 1 year of normal reactor operations is about one chance in seven million.

According to the same risk estimator, 0.0075 excess fatal cancer is projected among the population living within 80 km (50 mi) of North Anna in 1997. For perspective, this number can be compared with the number of fatal cancers expected in this population from all causes. The 1996 mortality rate associated with cancer for the entire population was 0.2 percent per year (Famighetti 1998:964). Based on this national rate, the number of fatal cancers from all causes expected during 1997 in the population living within 80 km (50 mi) of North Anna was about 3,200. This number of expected fatal cancers is much higher than the estimated 0.0075 fatal cancer that could result from normal reactor operations in 1997.

Workers at the reactors receive the same background radiation dose as the general public, however, they receive an additional dose from normal operations of the reactors. Table 3–85 includes average, maximally exposed, and total occupational doses to reactor workers from operations in 1997. Based on a risk estimator of 400 cancer deaths per 1 million person-rem (4×10^{-4} fatal cancer per person-rem) among workers, the number of fatal cancers to reactor workers from 1997 normal operations is estimated to be 0.041.

Table 3–85. Radiological Impacts on Involved Workers From North Anna Operations in 1997

Number of badged workers[a]	2,243
Total dose (person-rem/yr)	103
Annual latent fatal cancers	0.041
Average worker dose (mrem/yr)	46
Annual risk of latent fatal cancer	1.8×10^{-5}

[a] A badged worker is equipped with an individual dosimeter.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (10 CFR 20). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1999f.

3.7.3.4 Environmental Justice

Environmental justice concerns the environmental impacts that proposed actions may have on minority and low-income populations, and whether such impacts are disproportionately high and adverse (CEQ 1997). In the case of North Anna, the potentially affected area includes parts of Maryland and Virginia.

The potentially affected area around North Anna is defined by a circle with an 80-km (50-mi) radius centered around these reactors (lat. 38E03N370 N, long. 77E47N240 W). The total population residing within that area in 1990 was 1,286,156. The proportion of the population that was considered minority was 21.9 percent. The same census data show that the percentages of minorities for the contiguous United States was 24.1, and the percentage of the States of Maryland and Virginia were 30.4 and 24.0, respectively (DOC 1992).

At the time of the 1990 census, Blacks were the largest minority group within the potentially affected area, constituting 18.8 percent of the total population. Asians contributed about 1.5 percent, and Hispanics, about 1.4 percent. Native Americans made up about 0.3 percent of the population (DOC 1992).

A breakdown of incomes in the potentially affected area is also available from the 1990 census data (DOC 1992). At that time, the poverty threshold was $9,981 for a family of three with one related child under 18 years of age. A total of 88,162 persons (6.9 percent of the total population) residing within the potentially affected area around North Anna reported incomes below that threshold. Data obtained during the 1990 census also show that of the total population of the contiguous United States, 13.1 percent reported incomes below the poverty threshold, and that the figures for Maryland and Virginia were 8.3 and 10.3 percent, respectively (DOC 1992).

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Fissile Materials Disposition

United States Department of Energy

Surplus Plutonium Disposition Final Environmental Impact Statement

Volume I - Part B

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DOE/EIS-0283

Surplus Plutonium Disposition Final Environmental Impact Statement

Volume I - Part B

United States Department of Energy
Office of Fissile Materials Disposition

November 1999

Cover Sheet

Responsible Agency: United States Department of Energy (DOE)

Title: *Surplus Plutonium Disposition Final Environmental Impact Statement* (SPD EIS) (DOE/EIS-0283)

Locations of Candidate Sites: California, Idaho, New Mexico, North Carolina, South Carolina, Tennessee, Texas, Virginia, and Washington

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Abstract: On May 22, 1997, DOE published a Notice of Intent in the Federal Register (62 Federal Register 28009) announcing its decision to prepare an environmental impact statement (EIS) that would tier from the analysis and decisions reached in connection with the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS*. At that time, the U.S. Environmental Protection Agency decided to be a cooperating agency. The *Surplus Plutonium Disposition Draft Environmental Impact Statement* (SPD Draft EIS) (DOE/EIS-0283-D) was prepared in accordance with NEPA and issued in July 1998. It identified the potential environmental impacts of reasonable alternatives for the proposed siting, construction, and operation of three facilities for the disposition of up to 50 metric tons (55 tons) of surplus plutonium, as well as a No Action Alternative. These three facilities would accomplish pit disassembly and conversion, plutonium conversion and immobilization, and mixed oxide (MOX) fuel fabrication.

For the alternatives that included MOX fuel fabrication, the SPD Draft EIS described the potential environmental impacts of using from three to eight commercial nuclear reactors to irradiate MOX fuel. The potential impacts were based on a generic reactor analysis that used actual reactor data and a range of potential site conditions. In May 1998, DOE initiated a procurement process to obtain MOX fuel fabrication and reactor irradiation services. In March 1999, DOE awarded a contract to Duke Engineering & Services, COGEMA Inc., and Stone & Webster (known as DCS) to provide the requested services. A *Supplement to the SPD Draft EIS* was issued in April 1999, which analyzed the potential environmental impacts of using MOX fuel in six specific reactors named in the DCS proposal. Those reactors are Catawba Nuclear Station Units 1 and 2 in South Carolina, McGuire Nuclear Station Units 1 and 2 in North Carolina, and North Anna Power Station Units 1 and 2 in Virginia.

DOE has identified the hybrid approach as its Preferred Alternative for the disposition of surplus plutonium. This approach allows for the immobilization of 17 metric tons (19 tons) of surplus plutonium and the use of 33 metric tons (36 tons) as MOX fuel. DOE has identified the Savannah River Site near Aiken, South Carolina, as the preferred site for all three disposition facilities (Alternative 3). DOE has also identified Los Alamos National

Laboratory in New Mexico as the preferred site for lead assembly fabrication, and Oak Ridge National Laboratory in Tennessee as the preferred site for postirradiation examination of lead assemblies.

Public Involvement: In preparing the SPD Final EIS, DOE considered comments on the SPD Draft EIS and the *Supplement to the SPD Draft EIS* received via mail, fax, and email, and comments recorded by phone and transcribed from videotapes. In addition, comments were captured by notetakers during interactive public meetings held on the SPD Draft EIS in August 1998 in Amarillo, Texas; Idaho Falls, Idaho; North Augusta, South Carolina; Portland, Oregon; and Richland, Washington, as well as during a public meeting on the *Supplement to the SPD Draft EIS* held in June 1999 in Washington, D.C. Comments received and DOE's responses to these comments are found in Volume III, the Comment Response Document, of the SPD Final EIS. Information on the surplus plutonium disposition program can be obtained by visiting the Office of Fissile Materials Disposition Web site at http://www.doe-md.com.

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List of Acronyms

AEA	Atomic Energy Act of 1954
AECL	Atomic Energy of Canada Limited
AED	aerodynamic equivalent diameter
AIRFA	American Indian Religious Freedom Act
ALARA	as low as is reasonably achievable
AMWTP	Advanced Mixed Waste Treatment Project
ANL–W	Argonne National Laboratory–West
APSF	Actinide Packaging and Storage Facility
AQCR	Air Quality Control Region
ARF	airborne release fraction
ARIES	Advanced Recovery Integrated Extraction System
AVLIS	Atomic Vapor Laser Isotope Separation
BEA	Bureau of Economic Analysis
BEIR V	Report V of the Committee on the Biological Effects of Ionizing Radiations
BIO	Basis for Interim Operation
BLM	Bureau of Land Management
BNFL	British Nuclear Fuels
BWR	boiling water reactor
CAA	Clean Air Act
CAB	Citizens Advisory Board
CANDU	Canadian Deuterium Uranium (reactors)
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CPP	Chemical Processing Plant
CWA	Clean Water Act of 1972, 1987
D&D	decontamination and decommissioning
DBA	design basis accident
DCS	Duke Engineering & Services, COGEMA Inc., and Stone & Webster
DNFSB	Defense Nuclear Facilities Safety Board
DOC	U.S. Department of Commerce
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
DR	damage ratio
DU PEIS	*Final Programmatic Environmental Impact Statement for Alternative Strategies for Long-Term Management and Use of Depleted Uranium Hexafluoride*
DWPF	Defense Waste Processing Facility
EA	environmental assessment
EBR	Experimental Breeder Reactor (I or II)
EIS	environmental impact statement
EPA	Environmental Protection Agency

ES&H	environment, safety, and health
ESTEEM	Education in Science, Technology, Energy, Engineering, and Math
ETB	Engineering Test Bay
ETTP	East Tennessee Technology Park
FAA	Federal Aviation Administration
FDP	fluorinel dissolution process
FEMA	Federal Emergency Management Agency
FFCA	Federal Facility Compliance Agreement
FFF	Uranium Fuel Fabrication Facility
FFTF	Fast Flux Test Facility
FI	field investigation
FM	Farm-to-Market (road)
FMF	Fuel Manufacturing Facility
FMEA	failure modes and effects analysis
FMEF	Fuels and Materials Examination Facility
FONSI	finding of no significant impact
FPF	Fuel Processing Facility
FPPA	Farmland Protection Policy Act
FR	Federal Register
GAO	General Accounting Office
GDP	gaseous diffusion plant
GE	General Electric Company
GENII	Generation II, Hanford environmental radiation dosimetry software system
GPS	global positioning satellite
HE	high explosive
HEPA	high-efficiency particulate air (filter)
HEU	highly enriched uranium
HFEF	Hot Fuel Examination Facility
HHS	Department of Health and Human Services
HIGHWAY	(computer code for distances and populations along U.S. highways)
HLW	high-level waste
HLWVF	high-level-waste vitrification facility
HMIS	Hazardous Materials Information System
HWTPF	Hazardous Waste Treatment and Processing Facility
HYDOX	hydride oxidation
IAEA	International Atomic Energy Agency
ICPP	Idaho Chemical Processing Plant
ICRP	International Commission on Radiological Protection
ID DHW	Idaho Department of Health and Welfare
INEEL	Idaho National Engineering and Environmental Laboratory
INRAD	Intrinsic Radiation
INTEC	Idaho Nuclear Technology and Engineering Center
IPE	Individual Plant Examination
ISC	Industrial Source Complex Model
ISC3	Industrial Source Complex Model, Version 3
ISCST3	Industrial Source Complex Model, Short-Term, Version 3
ISLOCA	interfacing systems loss-of-coolant accident
ITP	In-Tank Precipitation Process

LANL	Los Alamos National Laboratory
LCF	latent cancer fatality
LDR	Land Disposal Restrictions
LEU	low-enriched uranium
LLNL	Lawrence Livermore National Laboratory
LLW	low-level waste
LOCA	loss-of-coolant accident
LPF	leak path factor
LWR	light water reactor
M&H	Mason & Hanger Corporation
MACCS2	Melcor Accident Consequence Code System (computer code)
MAR	material at risk
MD	Office of Fissile Materials Disposition
MEI	maximally exposed individual
MIMAS	Micronized Master
MMI	Modified Mercalli Intensity
MOX	mixed oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Science
NCRP	National Council on Radiation Protection and Measurements
NDA	nondestructive analysis
NEPA	National Environmental Policy Act of 1969
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPH	natural phenomena hazard
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRU	National Research Universal
NTS	Nevada Test Site
NWCF	New Waste Calcining Facility
NWPA	Nuclear Waste Policy Act
NWS	National Weather Service
ORIGEN	ORNL Isotope Generation and Depletion Code
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PBF	Power Burst Facility
PEIS	programmatic environmental impact statement
PFP	Plutonium Finishing Plant
PIE	postirradiation examination
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
PNNL	Pacific Northwest National Laboratory
PRA	probabilistic risk assessment
PSD	prevention of significant deterioration
PUREX	Plutonium-Uranium Extraction (Facility)
PWR	pressurized water reactor
R&D	research and development

RADTRAN 4	(computer code: risks and consequences of radiological materials transport)
RANT	Radioactive Assay and Nondestructive Test
RAMROD	Radioactive Materials Research, Operations and Demonstration
RCRA	Resource Conservation and Recovery Act, as amended
REA	regional economic area
RF	respirable fraction
RfC	reference concentration
RfD	reference dose
RFETS	Rocky Flats Environmental Technology Site
RFP	Request for Proposal
RIA	Reactivity Insertion Accidents
RIMS II	Regional Input-Output Modeling System II (computer code)
RISKIND	(computer code: risks and consequences of radiological materials transport)
ROD	Record of Decision
ROI	region of influence
RMF	Radiation Measurements Facility
RWMC	Radioactive Waste Management Complex
S/A	Similarity of Appearance (provision of Endangered Species Act)
SAR	safety analysis report
SARA	Superfund Amendments and Reauthorization Act of 1986
SCDHEC	South Carolina Department of Health and Environmental Control
SCE&G	South Carolina Electric & Gas Company
SCSHPO	South Carolina State Historic Preservation Officer
SDWA	Safe Drinking Water Act, as amended
SEIS	supplemental environmental impact statement
SHPO	State Historic Preservation Officer
SI	sealed insert
SMC	Specific Manufacturing Complex
SNF	spent nuclear fuel
SNM	special nuclear material
SPD	surplus plutonium disposition
SPD EIS	*Surplus Plutonium Disposition Environmental Impact Statement*
SPERT	Special Power Excursion Reactor Test
SRS	Savannah River Site
SSM PEIS	*Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management*
SST/SGT	safe, secure trailer/SafeGuards Transport
SWMU	solid waste management unit
SWP 1	Service Waste Percolation Pond 1
TA	Technical Area
TCE	trichloroethylene
TNRCC	Texas Natural Resource Conservation Commission
TPBAR-LTA	tritium-producing burnable absorber rod lead test assembly
TRA	technical risk assessment
TRANSCOM	transportation tracking and communications system
TRU	transuranic
TRUPACT	TRU waste package transporter
TSCA	Toxic Substances Control Act
TSP	total suspended particulates

TVA	Tennessee Valley Authority
TWRS	tank waste remediation system
TWRS EIS	*Tank Waste Remediation System Final Environmental Impact Statement*
UC	Regents of the University of California
UFSAR	updated final safety analysis report
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEC	United States Enrichment Corporation
USFWS	U.S. Fish and Wildlife Service
UV	ultraviolet
VOC	volatile organic compounds
VORTAC	very high frequency omnidirectional range/tactical air navigation (facility)
VRM	Visual Resource Management
WAG 3	Waste Area Grouping 3
WERF	Waste Experimental Reduction Facility
WIPP	Waste Isolation Pilot Plant
WM PEIS	*Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*
WNP–1	Washington Nuclear Plant–1
WNP–2	Washington Nuclear Plant–2
WPPSS	Washington Public Power Supply System
WROC	Waste Reduction Operations Complex
WSRC	Westinghouse Savannah River Company
ZPPR	Zero Power Physics Reactor

Chemicals and Units of Measure

°C	degrees Celsius (Centigrade)
°F	degrees Fahrenheit
μCi	microcurie
μg	microgram
μm	micrometer (micron)
46°26'07"	46 degrees, 26 minutes, 7 seconds
Ci	curie
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dBA	decibel, A-weighted
DUF_6	depleted uranium hexafluoride
eH	oxidation reduction potential
ft	foot
ft^2	square foot
ft^3	cubic foot
g	gram
g	gravitational acceleration
gal	gallon
GWD	gigawatt days (per ton)
ha	hectare
hr	hour (in compound units)
in	inch
kg	kilogram
km	kilometer
km^2	square kilometers
kV	kilovolt
l	liter
lb	pound
m	meter
m^2	square meter
m^3	cubic meter
mg	milligram
mi	mile
min	minute
mph	miles per hour
mrem	millirem
MTHM	metric tons of heavy metal
MVA	megavolt-ampere
MW	megawatt
MWe	megawatt electric
MWh	megawatt-hour
N_2	nitrogen
nCi	nanocurie
NO_2	nitrogen dioxide
pCi	picocurie
pcm/F	percent mille/Farenheit
pH	hydrogen ion concentration
$PM_{2.5}$	particulate matter less than or equal to 2.5 μm in diameter
PM_{10}	particulate matter less than or equal to 10 μm in diameter
ppm	parts per million
PuO_2	plutonium dioxide
rad	radiation absorbed dose
rem	roentgen equivalent man
s	second
SO_2	sulfur dioxide
t	metric ton
ton	short ton
UF_6	uranium hexafluoride
UO_2	uranium dioxide
yd	yard
yd^3	cubic yard
yr	year (in compound units)
wt %	weight percent

Metric Conversion Chart

To Convert Into Metric			To Convert Out of Metric		
If You Know	**Multiply By**	**To Get**	**If You Know**	**Multiply By**	**To Get**
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
sq. inches	6.4516	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.092903	sq. meters	sq. meters	10.7639	sq. feet
sq. yards	0.8361	sq. meters	sq. meters	1.196	sq. yards
acres	0.40469	hectares	hectares	2.471	acres
sq. miles	2.58999	sq. kilometers	sq. kilometers	0.3861	sq. miles
Volume					
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.45360	kilograms	kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

Metric Prefixes

Prefix	Symbol	Multiplication Factor
exa-	E	1 000 000 000 000 000 000 = 10^{18}
peta-	P	1 000 000 000 000 000 = 10^{15}
tera-	T	1 000 000 000 000 = 10^{12}
giga-	G	1 000 000 000 = 10^{9}
mega-	M	1 000 000 = 10^{6}
kilo-	k	1 000 = 10^{3}
hecto-	h	100 = 10^{2}
deka-	da	10 = 10^{1}
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	μ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001= 10^{-12}
femto-	f	0.000 000 000 000 001 = 10^{-15}
atto-	a	0.000 000 000 000 000 001= 10^{-18}

Chapter 4
Environmental Consequences

4.1 INTRODUCTION

In this U.S. Department of Energy (DOE) *Surplus Plutonium Disposition Final Environmental Impact Statement* (SPD EIS), each of the major disposition alternatives, including the No Action Alternative, is discussed separately in Sections 4.2 through 4.25. To focus the impact analyses on those areas where the greatest potential exists for effects on the environment, the following areas are discussed in detail: air quality and noise, waste management, socioeconomics, human health risk, facility accidents, transportation, and environmental justice. The remaining resource areas (i.e., geology and soils, water resources, ecological resources, cultural and paleontological resources, land use and visual resources, and infrastructure) are likely to have minimal or no impacts at the candidate sites regardless of the disposition action alternative being considered. Therefore, impacts on these resources were evaluated in terms of the alternative that would have the greatest impact on the resource.[1] The alternative analyzed is generally that which would locate the largest number of surplus plutonium disposition facilities at a given site. For example, the maximum impact on these resource areas at Pantex would be Alternative 9 or 10, all of which consider building both a pit conversion facility and a mixed oxide (MOX) facility on the site. In another example, at Savannah River Site (SRS), the alternative having the greatest impact would be Alternative 3. [Text deleted.]

This chapter also discusses the potential impacts related to implementation of lead assembly fabrication at five candidate sites and postirradiation examination at two candidate sites. To provide an overview of the impacts associated with full implementation of the MOX fuel approach to disposition, this chapter presents an integrated assessment of the potential impacts of the MOX facility, lead assembly fabrication, postirradiation examination, and use of the MOX fuel in domestic, commercial reactors. To facilitate the evaluation of proposed immobilization technologies, this chapter discusses the impacts associated with the can-in-canister immobilization technology with the homogenous technologies described in the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement (Storage and Disposition PEIS)* for the ceramic immobilization and vitrification alternatives.

Environmental justice and transportation impacts of constructing facilities for surplus plutonium disposition are not discussed. Construction would not involve the release of any appreciable quantities of radionuclides or other hazardous constituents, and therefore would not be expected to cause adverse impacts on the offsite areas that are the focus of the environmental justice analysis. Likewise, construction would not involve the offsite transport of radioactive materials, and therefore would not appreciably contribute to adverse transportation impacts.

The environmental consequences of alternatives for surplus plutonium disposition were generally estimated by comparing facility characteristics and requirements from Chapter 2 and Appendix E with affected environment information from Chapter 3. The two sets of information were analyzed following the impact assessment methods described in Appendix F. The results of the assessment of environmental consequences are presented in this chapter. For some of the resource areas, more detailed descriptions of the development of the impacts are presented in Appendixes G through M as follows:

- Appendix G, Air Quality
- Appendix H, Waste Management
- Appendix I, Socioeconomics

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[1] During the conduct of the cultural resources impacts analysis, it was determined that construction of surplus plutonium disposition facilities at SRS could produce impacts on archaeological resources requiring mitigation (see Section 4.26.4.4.1). DOE plans to avoid these sites, and it will not be necessary to disturb these areas.

- Appendix J, Human Health Risks
- Appendix K, Facility Accidents
- Appendix L, Transportation
- Appendix M, Environmental Justice

Portions of some alternatives are equivalent. For example, under Alternatives 4A and 4B, the pit conversion facility is located in Zone 4 West at Pantex. Therefore, the activities at Pantex are the same for these two alternatives. The organization of Chapter 4 takes advantage of these equivalencies. When the impacts at a site have already been described under a previous alternative, the later impacts discussion provides a reference to the previous location rather than repeating the information.

DOE revised the SPD Draft EIS and its *Supplement* in response to comments received from other Federal agencies; tribal, State, and local governments; nongovernmental organizations; the general public; and DOE reviews. The text was changed to provide additional environmental baseline information, reflect new technical data, make editorial corrections, respond to comments, and clarify text. Some of these changes involved recalculations of the impacts discussed. In addition, DOE updated information due to events or decisions made since the SPD Draft EIS and *Supplement* were provided for public comment. Sidebars are used throughout this SPD Final EIS to indicate where changes have been made.

4.2 ALTERNATIVE 1: NO ACTION

The No Action Alternative for this SPD EIS includes implementation of the storage decisions made in the Record of Decision (ROD) (DOE 1997a) and amended ROD (DOE 1998a) for the *Storage and Disposition PEIS* (DOE 1996a). Therefore, under the No Action Alternative in this SPD EIS, surplus weapons-usable plutonium materials in storage at various DOE sites would remain at those locations. The vast majority of pits would continue to be stored at Pantex, and the remaining plutonium in various forms would continue to be stored at the Hanford Site (Hanford), Idaho National Engineering and Environmental Laboratory (INEEL), Los Alamos National Laboratory (LANL), and SRS. At Hanford, nonpit plutonium materials would continue to be stored at the Plutonium Finishing Plant (PFP). At INEEL, nonpit plutonium materials would continue to be stored in the Zero Power Physics Reactor (ZPPR) and Fuel Manufacturing Facility (FMF) at Argonne National Laboratory–West (ANL–W). At LLNL, surplus plutonium materials would continue to be stored in Building 332 of the Superblock complex. At LANL, surplus plutonium materials would continue to be stored in the Nuclear Materials Storage Facility (NMSF) in Technical Area 55 (TA–55). At Pantex, surplus plutonium pits would be stored in Zone 12.[2] At the Rocky Flats Environmental Technology Site (RFETS), DOE would continue to reduce plutonium inventories in order to support the accelerated cleanup and closure of that site.[3] At SRS, surplus nonpit plutonium would continue to be stored at various locations until the Actinide Packaging and Storage Facility (APSF), if built, is completed.

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[2] DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

[3] The removal of all plutonium pits from RFETS was completed in June 1999. Should the No Action Alternative be chosen, the ROD pursuant to this SPD EIS would also address the movement of the remaining surplus nonpit plutonium from RFETS in support of its planned closure in 2006.

4.2.1 Air Quality and Noise

4.2.1.1 Hanford

Activities associated with the No Action Alternative at Hanford would generate criteria, hazardous, and toxic air pollutants. The sources of air pollutants associated with operations include natural gas–fired package boilers, diesel generators that are periodically tested and operated, tank farm emissions, various process emissions, and vehicle emissions. No Action activities would include the conversion to natural gas and electricity for heating and process steam (DOE 1996a:4-34). To evaluate the air quality impacts, criteria, hazardous, and toxic pollutant concentrations from the No Action Alternative were compared with the applicable Federal and State standards and guidelines. This comparison is presented as Table 4–1.

Table 4–1. Evaluation of Hanford Air Pollutant Concentrations Associated With Alternative 1: No Action; Continued Storage of Plutonium at the Site

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	No Action Concentration (Fg/m^3)[b]	Percent of Standard or Guideline
Criteria pollutants				
Carbon monoxide	8 hours	10,000	34.1	0.34
	1 hour	40,000	48.3	0.12
Nitrogen dioxide	Annual	100	0.25	0.25
PM_{10}	Annual	50	0.0179	0.036
	24 hours	150	0.77	0.51
Sulfur dioxide	Annual	50	1.63	3.1
	24 hours	260	8.91	3.4
	3 hours	1,300	29.6	2.3
	1 hour	660	32.9[c]	5.0
Other regulated pollutants				
Total suspended particulates	Annual	60	0.0179	0.03
	24 hours	150	0.77	0.51
Hazardous and other toxic compounds				
[Text deleted.]				
Benzene	Annual	0.12	0.000006	0.01

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Total site contribution, including plutonium storage operations and other approved facilities projected to be in operation in 2005.

[c] Estimated from 3-hr concentration.

Source: EPA 1997a; WDEC 1994.

Maximum air pollutant concentrations from operations at Hanford are well under the applicable standards and guidelines for pollutants of concern. Natural pollutant sources should continue to produce occasional exceedances of the standards for particulate matter with an aerodynamic diameter less than or equal to 10 microns (Fm) (PM_{10}) and total suspended particulates. Vehicle emissions associated with No Action activities at Hanford would likely decrease somewhat because of a decrease in overall site employment during this timeframe. Site employment at Hanford is expected to increase significantly over the period 2005–2010 to support construction of the tank waste remediation system. After this construction is completed, site employment is expected to drop again.

Impacts of operational noise would be similar to those described for existing conditions in Section 3.2.1.2. Noise from traffic associated with operation of facilities at Hanford is expected to decrease until 2005, when it could again increase owing to a projected increase in employment unrelated to surplus plutonium disposition activities. Given the distance to the site boundary (about 7.1 km [4.4 mi]), noise emissions from operational activities would not be expected to annoy the public. Nontraffic noise sources are far enough away from offsite areas that the contribution to offsite noise levels would continue to be small.

4.2.1.2 INEEL

Activities associated with the No Action Alternative at INEEL would generate criteria, hazardous, and toxic air pollutants. The sources of air pollutants associated with operations include calcination of high-level radioactive liquid waste, coal-fired boilers, diesel generators that are periodically tested and operated, various process emissions, waste burial activities, and vehicle emissions. To evaluate the air quality impacts, criteria, hazardous, and toxic pollutant concentrations under the No Action Alternative were compared with the applicable Federal and State standards and guidelines. This comparison is presented as Table 4–2.

Table 4–2. Evaluation of INEEL Air Pollutant Concentrations Associated With Alternative 1: No Action; Continued Storage of Plutonium at the Site

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	No Action Concentration (Fg/m^3)[b]	Percent of Standard or Guideline
Criteria pollutants				
Carbon monoxide	8 hours	10,000	302	3.0
	1 hour	40,000	1,220	3.1
Nitrogen dioxide	Annual	100	11	11
PM_{10}	Annual	50	3	6
	24 hours	150	39	26
Sulfur dioxide	Annual	80	6	7.5
	24 hours	365	137	38
	3 hours	1,300	591	45
Hazardous and other toxic compounds				
[Text deleted.]				
Benzene	Annual	0.12	0.029	24

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Total site contribution, including current plutonium storage operations and other approved facilities projected to be in operation in 2005.

[Text deleted.]

Source: EPA 1997a; ID DHW 1995.

Maximum air pollutant concentrations from operations at INEEL would be in compliance with the applicable standards and guidelines for these pollutants of concern. Vehicle emissions associated with No Action activities at INEEL would likely decrease somewhat because of a decrease in overall site employment during this timeframe.

Impacts of operational noise would be similar to those described for existing conditions in Section 3.3.1.2. Noise from traffic associated with the operation of facilities at INEEL would likely decrease as site employment decreases. Given the distance to the site boundary (about 12 km [7.5 mi]), noise emissions from operational activities would not be expected to annoy the public. Nontraffic noise sources are far enough away from offsite areas that the contribution to offsite noise levels would continue to be small.

4.2.1.3 Pantex

Activities associated with the No Action Alternative at Pantex would generate criteria, hazardous, and toxic air pollutants. The types of sources associated with operations include steam boilers, diesel generators that are periodically tested and operated, explosives burning, high-explosive synthesis, and vehicle emissions. To evaluate the air quality impacts, criteria, hazardous, and toxic pollutant concentrations from the No Action Alternative were compared with the applicable Federal and State standards and guidelines. This comparison is presented as Table 4–3.

Table 4–3. Evaluation of Pantex Air Pollutant Concentrations Associated With Alternative 1: No Action; Continued Storage of Plutonium at the Site

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	No Action Concentration (Fg/m^3)[b]	Percent of Standard or Guideline
Criteria pollutants				
Carbon monoxide	8 hours	10,000	620	6.2
	1 hour	40,000	2,990	7.5
Nitrogen dioxide	Annual	100	1.94	1.9
PM_{10}	Annual	50	8.79	18
	24 hours	150	89.4	60
Sulfur dioxide	Annual	80	0	0
	24 hours	365	0.00002	<0.001
	3 hours	1,300	0.00008	<0.001
	30 minutes	1,048	0.00016	<0.001
Other regulated pollutants				
Total suspended particulates	3 hours	200	(c)	0
	1 hour	400	(c)	0
Hazardous and other toxic compounds				
[Text deleted.]				
Benzene	Annual	3[d]	0.0547	1.8
	1 hour	75[d]	19.4	26

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Total site contribution, including current plutonium storage operations and other approved facilities projected to be in operation in 2005.

[c] Three- and 1-hr concentrations for total suspended particulates are not listed in the source documents (see Table G–43).

[d] Effects-screening level of the Texas Natural Resource Conservation Commission. Such levels are not ambient air standards, but merely "tools" used by the Toxicology and Risk Assessment staff to evaluate impacts of air pollutant emissions. Thus, exceedance of the screening levels by ambient air contaminants does not necessarily indicate a problem. That circumstance, however, would prompt a more thorough evaluation.

[Text deleted.]

Source: EPA 1997a; TNRCC 1997a, 1997b.

Maximum air pollutant concentrations from operations at Pantex would likely continue to be in compliance with the applicable standards of the pollutants of concern, but natural pollutant sources could continue to produce occasional exceedances of the PM_{10} standard. The maximum 1-hr air pollutant concentration and the annual concentration for benzene are below the Texas Natural Resource Conservation Commission's (TNRCC's) effects-screening levels. [Text deleted.] Vehicle emissions associated with No Action activities at Pantex would likely decrease somewhat because of a decrease in overall site employment during this timeframe.

Impacts of operational noise would be similar to those described for existing conditions in Section 3.4.1.2. Noise from traffic associated with the operation of facilities at Pantex would likely decrease as site employment decreases. Given the distance to the site boundary (about 1.6 km [1.0 mi]), noise emissions from operational activities would not be expected to annoy the public. Most nontraffic noise sources are far enough away from offsite areas that the contribution to offsite noise levels would continue to be small. Noise from explosives detonation and small arms firing would continue to be heard off the site.

4.2.1.4 SRS

Activities associated with the No Action Alternative at SRS would generate criteria, hazardous, and toxic air pollutants. The sources of air pollutants associated with operations include coal-fired boilers, diesel generators that are periodically tested and operated, various process emissions, groundwater air strippers, the consolidated incineration facility, and vehicle emissions. To evaluate the air quality impacts, criteria, hazardous, and toxic pollutant concentrations from the No Action Alternative were compared with the applicable Federal and State standards and guidelines. This comparison is presented as Table 4–4.

Table 4–4. Evaluation of SRS Air Pollutant Concentrations Associated With Alternative 1: No Action; Continued Storage of Plutonium at the Site

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	No Action Concentration (Fg/m³)[b]	Percent of Standard or Guideline
Criteria pollutants				
Carbon monoxide	8 hours	10,000	671	6.7
	1 hour	40,000	5,100	13
Nitrogen dioxide	Annual	100	11.4	11
PM_{10}	Annual	50	4.94	9.9
	24 hours	150	85.7	57
Sulfur dioxide	Annual	80	16.7	21
	24 hours	365	222	61
	3 hours	1,300	725	56
Other regulated pollutants				
Total suspended particulates	Annual	75	45.4	61
Hazardous and other toxic compounds				
[Text deleted.]				
Benzene	24 hours	150	20.7	14

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Total site contribution, including current plutonium storage operations and other approved facilities projected to be in operation in 2005.

Source: EPA 1997a; SCDHEC 1996a.

Maximum air pollutant concentrations from operations at SRS are in compliance with the applicable standards and guidelines for these pollutants of concern. Vehicle emissions associated with No Action activities at SRS would likely decrease somewhat from current emissions because of a decrease in overall site employment during this timeframe.

Impacts of operational noise would be similar to those described for existing conditions in Section 3.5.1.2. Noise from traffic associated with the operation of facilities at SRS is expected to decrease as site employment

decreases. Given the distance to the site boundary (about 8.7 km [5.4 mi]), noise emissions from operational activities would not be expected to annoy the public. Nontraffic noise sources are far enough away from offsite areas that the contribution to offsite noise levels would continue to be small.

4.2.1.5 LLNL

Activities associated with the No Action Alternative at LLNL would generate criteria, hazardous, and toxic air pollutants. The types of sources associated with operations include boilers, diesel generators that are periodically tested and operated, various processes, and vehicle emissions. No Action activities would include the continuation of plutonium storage within administrative limits established in the *Supplement Analysis for Continued Operation of LLNL and SNL* (DOE 1999a:vol. I). To evaluate air quality impacts, estimated criteria, hazardous, and toxic pollutant concentrations were compared with the applicable Federal and State standards and guidelines. This comparison is presented as Table 4–5. Maximum air pollutant concentrations from operations at LLNL are in compliance with the applicable guidelines and regulations for the pollutants of concern. Vehicle emissions associated with the No Action activities at LLNL would likely be unchanged.

Table 4–5. Evaluation of LLNL Air Pollutant Concentrations Associated with Altnerative 1: No Action; Continued Storage at the Site

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a] (Fg/m^3)	No Action Concentration[b] (Fg/m^3)	Percent of Standard or Guideline
Carbon monoxide	8 hours	10,000	69.69	0.70
	1 hour	23,000	235.50	1.0
Nitrogen dioxide	Annual	100	6.08	6.1
	1 hour	470	1,205.75	257
PM_{10}	Annual	30	0.83	2.8
	24 hours	50	16.18	32
Sulfur dioxide	Annual	80	0.08	0.10
	24 hours	105	1.59	1.5
	3 hours	1,300	10.44	0.80
	1 hour	655	16.01	2.4

[a] California Standard as stated in the *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (DOE 1996b:vol. I).

[b] Based on the total pollutant concentrations presented for the Combined Program Impacts in the *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (DOE 1996b:vol. I, 4-366).

Key: LLNL, Lawrence Livermore National Laboratory.

The continuing operations at LLNL would result in no appreciable change from current levels of traffic noise and onsite operational noise. Nontraffic noise sources are far enough away from offsite areas that the contribution to offsite noise levels would continue to be small, and noise operations would not be expected to cause annoyance to the public. However, some noise sources could be close enough to onsite noise-sensitive areas to result in impacts, such as the disturbance of wildlife.

4.2.1.6 LANL

Activities associated with the No Action Alternative at LANL would generate criteria, hazardous, and toxic air pollutants. The types of sources associated with operations include boilers, diesel generators that are periodically tested and operated, various processes, and vehicle emissions. No Action activities would include the continuation of plutonium storage, as discussed in the *Storage and Disposition PEIS* (DOE 1996a:4-366). To evaluate the air quality impacts, criteria, hazardous, and toxic pollutant concentrations from the No Action

Alternative were compared with the applicable Federal and State standards and guidelines. This comparison is presented as Table 4–6. Maximum air pollutant concentrations from operations at LANL are in compliance

Table 4–6. Evaluation of LANL Air Pollutant Concentrations Associated With Alternative 1: No Action; Continued Storage of Plutonium at the Site

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	No Action Concentration (Fg/m³)[b]	Percent of Standard or Guideline
Criteria pollutants				
Carbon monoxide	8 hours	7,800	3,000	38
	1 hour	11,750	5,060	43
Nitrogen dioxide	Annual	74	24	32
	24 hour	147	119	81
PM_{10}	Annual	50	11	22
	24 hours	150	39	26
Sulfur dioxide	Annual	41	26	63
	24 hours	205	171	83
	3 hours	1,025	459	45
Other regulated pollutants				
[Text deleted.]				
Total suspended particulates	Annual	60	14	23
	24 hours	150	48	32

[a] New Mexico Ambient Air Quality Standard as stated in the *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory* (DOE 1999b).

[b] Based on the total pollutant concentrations presented for the Expanded Operations Alternative in the *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory* (DOE 1999b).

[Text deleted.]

Key: LANL, Los Alamos National Laboratory.

Source: DOE 1999b.

with the applicable guidelines and regulations for the pollutants of concern. Vehicle emissions associated with No Action activities at LANL would likely be unchanged.

The continuing operations at LANL would result in no appreciable change from current levels of traffic noise and onsite operational noise. Nontraffic noise sources are far enough away from offsite areas that the contribution to offsite noise levels would continue to be small. Given the size of the site, noise emissions from operational activities would not be expected to cause annoyance to the public. However, some noise sources could be close enough to onsite noise-sensitive areas to result in impacts, such as the disturbance of wildlife.

4.2.1.7 RFETS

Activities associated with the No Action Alternative at RFETS would generate criteria, hazardous, and toxic, air pollutants. The types of sources associated with operations include boilers, diesel generators that are periodically tested and operated, various processes, and vehicle emissions. No Action activities would include the continuation of plutonium storage, as discussed in the *Storage and Disposition PEIS* (DOE 1996a:4-346). To evaluate the air quality impacts, criteria, hazardous, and toxic pollutant concentrations from the No Action Alternative were compared with the applicable Federal and State standards and guidelines. This comparison is presented as Table 4–7. During dry and windy conditions, increased PM_{10} and total suspended particulate

concentrations could be expected from ongoing construction associated with activities outside the scope of this SPD EIS. Nevertheless, the site should remain in compliance with applicable Federal and State regulations for the air pollutants of concern.

Table 4–7. Evaluation of RFETS Air Pollutant Concentrations Associated With Alternative 1: No Action; Continued Storage of Plutonium at the Site

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	No Action Concentration (Fg/m^3)[b]	Percent of Standard or Guideline
Criteria pollutants				
Carbon monoxide	8 hours	10,000	145	1.5
	1 hour	40,000	534	1.3
Nitrogen dioxide	Annual	100	4.14	4.1
PM_{10}	Annual	50	0.235	0.5
	24 hours	150	17.4	12.0
Sulfur dioxide	Annual	80	0.295	0.37
	24 hours	365	21.8	6.0
	3 hours	700	64.6	9.2
Other regulated pollutants				
Hydrogen sulfide	1 hour	142	<0.01	0.007
Total suspended particulates	Annual	75	0.284	0.38
	24 hours	150	21.0	14.0

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Total site contribution, including plutonium storage operations and other approved facilities projected to be in operation in 2005.

Key: RFETS, Rocky Flats Environmental Technology Site.

Source: Adapted from DOE 1996a; EPA 1997a.

Vehicle emissions associated with No Action activities at RFETS would likely be unchanged.

The continuing operations at RFETS would result in no appreciable change from current levels of traffic noise and onsite operational noise. Nontraffic noise sources are far enough away from offsite areas that the contribution to offsite noise levels would continue to be small. Given the size of the site, noise emissions from operational activities would not be expected to annoy the public. However, some noise sources could be close enough to onsite noise-sensitive areas to result in impacts, such as the disturbance of wildlife.

Section 176(c) of the 1990 Clean Air Act (CAA) amendments requires that all Federal actions conform with the applicable State implementation plan. EPA has implemented rules governing determination of the conformity of all Federal actions in nonattainment and maintenance areas. Because the RFETS area is considered a nonattainment area for ozone, PM_{10}, and carbon monoxide, proposed actions at this site must be evaluated for applicability of the conformity regulations. The No Action Alternative would effect no change in direct or indirect emissions from RFETS. Accordingly, there is no need for a RFETS conformity determination relative to this alternative.

4.2.2 Waste Management

4.2.2.1 Hanford

Wastes generated by activities associated with storage of surplus plutonium at Hanford are a portion of the existing site waste generation rates presented in Section 3.2.2.1. Because the rates of waste generation from continued storage of surplus plutonium at Hanford should not appreciably change from current rates, impacts on waste management facilities would not change from those currently experienced. Because the current waste generation rates from the storage of surplus plutonium at Hanford are part of the planning basis for Hanford, continued storage should not have a major impact on waste management activities at the site.

Depending in part on decisions in the RODs for the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS), wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for transuranic (TRU) waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current Waste Isolation Pilot Plant (WIPP) waste acceptance criteria and shipped to WIPP for disposal. Shipment of TRU waste from Hanford to WIPP is expected to begin in 2000 (Aragon 1999). Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that low-level waste (LLW), mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at Hanford are being evaluated in the *Hanford Site Solid (Radioactive and Hazardous) Waste Program EIS* that is being prepared by the DOE Richland Operations Office (DOE 1997b).

4.2.2.2 INEEL

Wastes generated by activities associated with the storage of surplus plutonium at INEEL are a portion of the existing site waste generation rates presented in Section 3.3.2.1. Because the rates of waste generation from continued storage of surplus plutonium at INEEL should not appreciably change from current rates, impacts on waste management facilities would not change from those currently experienced. Because the current waste generation rates from the storage of surplus plutonium at INEEL are part of the planning basis for INEEL, continued storage should not have a major impact on waste management activities at the site.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. The first shipment of TRU waste from INEEL to WIPP was made in April 1999. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at INEEL are described in the *DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Programs Final EIS* (DOE 1995a).

4.2.2.3 Pantex

Wastes generated by activities associated with the storage of surplus plutonium pits at Pantex are a portion of the existing site waste generation rates presented in Section 3.4.2.1. Because the rates of waste generation from continued storage of surplus plutonium at Pantex should not appreciably change from current rates, impacts on waste management facilities would not change from those currently experienced. Because the current waste

generation rates from the storage of surplus plutonium at Pantex are part of the planning basis for Pantex, continued storage should not have a major impact on waste management activities at the site.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated on the site, or treated and disposed of off the site in DOE or commercial facilities. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. TRU waste would not be routinely generated. Impacts of treatment and storage of radioactive, hazardous, mixed, and nonhazardous wastes at Pantex are described in the *Final EIS for the Continued Operation of Pantex and Associated Storage of Nuclear Weapon Components* (DOE 1996c). LLW from Pantex is currently shipped to the Nevada Test Site (NTS) for disposal. Impacts of disposal of LLW at NTS are described in the *Final EIS for the NTS and Off-Site Locations in the State of Nevada* (DOE 1996d).

4.2.2.4 SRS

The No Action Alternative at SRS involves the continued storage of surplus plutonium in existing facilities, with materials moved to APSF, if built. Impacts on the waste management infrastructure associated with construction and operation of APSF are described in the *Final EIS Interim Management of Nuclear Materials* (DOE 1995b:2-60). That EIS indicates that there would be no major impacts on SRS waste management systems from the storage of plutonium at APSF, if built.

Wastes generated by activities associated with the storage of surplus plutonium at SRS are a portion of the existing site waste generation rates presented in Section 3.5.2.1. Because the rates of waste generation from continued storage of surplus plutonium at SRS should not appreciably change from current rates, impacts on waste management facilities would not change from those currently experienced. Because the current waste generation rates from the storage of surplus plutonium at SRS are part of the planning basis for SRS, continued storage should not have a major impact on waste management activities at the site.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Shipment of TRU waste from SRS to WIPP is expected to begin in 2000 (Aragon 1999). Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995c).

4.2.2.5 LLNL

Waste generated by activities associated with the storage of surplus plutonium at LLNL would not be expected to increase existing site waste generation rates. Because the current waste generation rates from the storage of surplus plutonium at LLNL are part of the planning basis for LLNL, continued storage would not be expected to have a major impact on waste management activities at the site.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and

shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonhazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of waste at LLNL are described in the *Supplement Analysis for Continued Operation of LLNL and SNL* (DOE 1999a:vol. I).

4.2.2.6 LANL

Waste generated by activities associated with the storage of surplus plutonium at LANL are a portion of the existing site waste generation rates presented in Section 3.6.4.2 of Chapter 3. Because the rates of waste generation from continued storage of surplus plutonium at LANL are not expected to appreciably change from current rates, impacts on waste management facilities would not change from those currently experienced. Because the current waste generation rates from the storage of surplus plutonium at LANL are part of the planning basis for LANL, continued storage would not be expected to have a major impact on waste management activities at the site.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. The first shipment of TRU waste from LANL to WIPP was made in March 1999 (Richardson 1999). Per the ROD for hazardous waste issued on August 5, 1998, nonhazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of waste at LANL are described in the *Site-Wide EIS for the Continued Operation of Los Alamos National Laboratory* (DOE 1999b).

4.2.2.7 RFETS

Waste generated by activities associated with the storage of surplus nonpit plutonium at RFETS are a portion of the existing site waste generation rates. Because the rates of waste generation from continued storage of surplus nonpit plutonium at RFETS are not expected to appreciably change from current rates, impacts on waste management facilities would not change from those currently experienced. Because the current waste generation rates from the storage of surplus nonpit plutonium at RFETS are part of the planning basis for RFETS, continued storage would not be expected to have a major impact on waste management activities at the site. RFETS has stored plutonium since 1956 and is adequately equipped to manage the wastes from the storage mission using the existing waste management infrastructure (DOE 1996a:4-359).

The nuclear weapons mission of the RFETS was terminated in 1994. The only remaining mission of the site is cleanup and remediation. The Rocky Flats Cleanup Agreement establishes a legally binding relationship between DOE, EPA, and the Colorado Department of Public Health and Environment that governs cleanup of the site (DOE 1998b:48). Waste generated by cleanup activities is expected to be much greater than wastes generated from continued storage of surplus nonpit plutonium. The impacts of the wastes generated by site cleanup activities would be addressed in individual remedial action feasibility studies (DOE 1996a:4-359).

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. The first shipment of TRU waste from RFETS to WIPP was made in June 1999. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that

LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

4.2.3 Socioeconomics

Under the No Action Alternative, the existing storage facilities at the candidate sites would remain operational. No new employment or in-migration of workers would be required. Thus, there would be no additional impacts on the socioeconomic conditions near the sites.

4.2.4 Human Health Risk

4.2.4.1 Hanford

Radiological Impacts. Table 4–8 presents the dose to the population within 80 km (50 mi) from storage in the year 2030 and the projected number of fatal cancers in this population from 50 years of storage as shown in the *Storage and Disposition PEIS*. Included in the table are the calculated annual doses to the maximally exposed member of the public and the average exposed member of the public from the continued storage of plutonium, and a projection of the fatal cancer risk to these individuals from 50 years of storage. An annual dose of 0.047 person-rem would be incurred by the population of 621,000. The corresponding number of fatal cancers in this population from 50 years of storage would be 1.2×10^{-3}. An annual dose of 4.1×10^{-4} mrem has been calculated for the maximally exposed individual (MEI). From 50 years of storage, the corresponding risk of fatal cancer to this individual would be 1.0×10^{-8}. To put these doses into perspective, comparisons with natural background radiation doses are also provided in the table. The storage doses are much lower than those from total site operations.

Table 4–8. Potential Radiological Impacts on the Public of Alternative 1: No Action; Continued Storage of Plutonium at Hanford

Population dose within 80 km for year 2030	
Atmospheric release pathway (person-rem)	0.047
Liquid release pathway (person-rem)	0
Atmospheric and liquid release pathways combined (person-rem)	0.047
Percent of natural background[a]	2.5×10^{-5}
50-year fatal cancers	1.2×10^{-3}
Annual dose to the maximally exposed individual	
Atmospheric release pathway (mrem)	4.1×10^{-4}
Total liquid release pathway (mrem)	0
Atmospheric and liquid release pathways combined (mrem)	4.1×10^{-4}
Percent of natural background[a]	1.4×10^{-4}
50-year fatal cancer risk	1.0×10^{-8}
Annual dose to the average exposed individual within 80 km[b]	
Atmospheric and liquid release pathways combined (mrem)	7.6×10^{-5}
50-year fatal cancer risk	1.9×10^{-9}

[a] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2030 would receive 186,300 person-rem.

[b] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford in 2030 (621,000).

Source: DOE 1996a.

Under the No Action Alternative, the annual average dose to a worker involved in storage operations and the annual dose to the total storage workforce would be 250 mrem and 46 person-rem, respectively, as shown in Table 4–9. The risk of fatal cancer to the average worker from 50 years of storage operations would be 5.0×10^{-3}, and the projected number of fatal cancers in the total storage workforce from 50 years of operation would be 0.92.

Table 4–9. Potential Radiological Impacts on Workers of Alternative 1: No Action; Continued Storage of Plutonium at Hanford

Total dose (person-rem/yr)	46
50-year fatal cancers	0.92
Average worker dose (mrem/yr)	250
50-year fatal cancer risk	5.0×10^{-3}

Note: Under the No Action Alternative, 225 in-plant workers (including 185 monitored for radiation exposure) would be required to operate the storage facility. The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d). However, the maximum dose to a worker involved in storage operations would be kept below 500 mrem/yr. Based on a review of worker doses associated with similar operations, an average worker dose of 250 mrem/yr has been conservatively assumed. An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1996a.

Hazardous Chemical Impacts. Hazardous chemical impacts of the No Action Alternative would be the same as those of current site operations. The Hazard Index for the MEI from normal operations at Hanford would be 6×10^{-5}, which indicates that adverse, noncancer health effects should not occur; the cancer risk is expected to be zero. The Hazard Index for the onsite worker would be 4×10^{-3}, which also suggests that noncancer effects are not expected; the cancer risk is expected to be zero (DOE 1996a:4-62).

4.2.4.2 INEEL

Radiological Impacts. Table 4–10 presents the dose to the population within 80 km (50 mi) from storage in the year 2030 and the projected number of fatal cancers in this population from 50 years of storage as shown in the *Storage and Disposition PEIS*. Included in the table are the calculated annual doses to the maximally exposed member of the public and the average exposed member of the public from the continued storage of plutonium, and a projection of the fatal cancer risk to these individuals from 50 years of storage.

An annual dose of 7.6×10^{-5} person-rem would be incurred by the population of 269,000. The corresponding number of fatal cancers in this population from 50 years of storage would be 1.9×10^{-6}. An annual dose of 1.4×10^{-5} mrem has been calculated for the MEI. From 50 years of storage, the corresponding risk of fatal cancer to this individual would be 3.5×10^{-10}. To put these doses into perspective, comparisons with natural background radiation doses are also provided in the table. The storage doses are much lower than those from total site operations.

Under the No Action Alternative, the annual average dose to a worker involved in storage operations and the annual dose to the total storage workforce would be 26 mrem and 1.5 person-rem, respectively, as shown in Table 4–11. The associated risk of fatal cancer to the average worker from 50 years of storage operations would be 5.1×10^{-4}, and the projected number of fatal cancers in the total storage workforce from 50 years of operation would be 0.029.

Hazardous Chemical Impacts. Hazardous chemical impacts of the No Action Alternative would be the same as those of current site operations. Thus, the Hazard Index for the MEI at INEEL from normal operations would be 2×10^{-2}, which indicates that adverse, noncancer health effects should not occur; the cancer risk is expected to be 3.6×10^{-6}. The Hazard Index for the onsite worker would be 0.2, which also suggests that noncancer effects are not expected; the cancer risk is expected to be 8×10^{-4} (DOE 1996a:4-163).

Table 4–10. Potential Radiological Impacts on the Public of Alternative 1: No Action; Continued Storage of Plutonium at INEEL

Population dose within 80 km for year 2030	
Atmospheric release pathway (person-rem)	7.6×10^{-5}
Liquid release pathway (person-rem)	0
Atmospheric and liquid release pathways combined (person-rem)	7.6×10^{-5}
Percent of natural background[a]	7.8×10^{-8}
50-year fatal cancers	1.9×10^{-6}
Annual dose to the maximally exposed individual	
Atmospheric release pathway (mrem)	1.4×10^{-5}
Total liquid release pathway (mrem)	0
Atmospheric and liquid release pathways combined (mrem)	1.4×10^{-5}
Percent of natural background[a]	3.9×10^{-6}
50-year fatal cancer risk	3.5×10^{-10}
Annual dose to the average exposed individual within 80 km[b]	
Atmospheric and liquid release pathways combined (mrem)	2.8×10^{-7}
50-year fatal cancer risk	7.1×10^{-12}

[a] The annual natural background radiation level at INEEL is 361 mrem for the average individual; the population within 80 km (50 mi) in 2030 would receive 97,100 person-rem.

[b] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of INEEL in 2030 (269,000).

Source: DOE 1996a; Mitchell et al. 1997.

Table 4–11. Potential Radiological Impacts on Workers of Alternative 1: No Action; Continued Storage of Plutonium at INEEL

Total dose (person-rem/yr)	1.5
50-year fatal cancers	0.029
Average worker dose (mrem/yr)	26
50-year fatal cancer risk	5.1×10^{-4}

Note: No Action Alternative storage worker doses are based on an average of the 1994 to 1996 measured doses for 57 workers totaling 1.5 person-rem/yr deep dose (assumed whole body). The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d). However, the maximum dose to a worker involved in storage operations would be kept below 500 mrem/yr. Based on a review of worker doses associated with similar operations, an average worker dose of 26 mrem/yr has been conservatively assumed. An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1996a.

4.2.4.3 Pantex

Radiological Impacts. Table 4–12 presents the dose to the population within 80 km (50 mi) from storage in the year 2030 and the projected number of fatal cancers in this population from 50 years of storage. To support this analysis, it was assumed that the gasket on the AL–R8 sealed insert (SI) storage container would need to be replaced after 30 years. This activity is not expected to result in any additional dose to the public, but would result in an additional dose to those workers involved with the gasket replacement activity. Included in the table are the calculated annual doses to the maximally exposed member of the public and the average exposed member of the public from the continued storage of plutonium, and a projection of the fatal cancer risks to these individuals from 50 years of storage. An annual dose of 6.3×10^{-6} person-rem would be incurred by the

Table 4–12. Potential Radiological Impacts on the Public of Alternative 1: No Action; Continued Storage of Plutonium at Pantex

Population dose within 80 km for year 2030	
Atmospheric release pathway (person-rem)	(a)
Liquid release pathway (person-rem)	0
Atmospheric and liquid release pathways combined (person-rem)	6.3×10^{-6}
Percent of natural background[b]	5.4×10^{-9}
50-year fatal cancers	1.6×10^{-7}
Annual dose to the maximally exposed individual	
Atmospheric release pathway (mrem)	(a)
Total liquid release pathway (mrem)	0
Atmospheric and liquid release pathways combined (mrem)	1.8×10^{-8}
Percent of natural background[b]	5.4×10^{-9}
50-year fatal cancer risk	4.5×10^{-13}
Annual dose to the average exposed individual within 80 km[c]	
Atmospheric and liquid release pathways combined (mrem)	1.8×10^{-8}
50-year fatal cancer risk	4.5×10^{-13}

[a] The atmospheric releases for the No Action Alternative would not be measurable above background radiation. The atmospheric and liquid release pathways combined was calculated with measured data from direct doses outside the facility.

[b] The annual natural background radiation level at Pantex is 332 mrem for the average individual; the population within 80 km (50 mi) in 2030 would receive 116,200 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Pantex in 2030 (350,000).

Key: RFETS, Rocky Flats Environmental Technology Site.

Note: The quantity of plutonium pits at Pantex to be stored in upgraded facilities in Zone 12 would be slightly increased by the addition of pits from RFETS. The overall effect of moving Pantex and RFETS pits from Zone 4 to upgraded Zone 12 storage facilities would result in lower potential releases of radioactive materials (and hence, impacts) to the public. All values shown in the above table are associated with Zone 4 releases only; therefore, they serve as upper bounding estimates for potential impacts incurred from Zone 12 releases (i.e., potential impacts from Zone 12 releases would not exceed the values presented above). However, DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

Source: DOE 1996a.

population of 350,000. The corresponding number of fatal cancers in this population from 50 years of storage would be 1.6×10^{-7}. An annual dose of 1.8×10^{-8} mrem has been calculated for the MEI. From 50 years of

storage, the corresponding risk of fatal cancer to this individual would be 4.5×10^{-13}. To put these doses into perspective, comparisons with natural background radiation doses are also provided in the table. The storage doses are much lower than those from total site operations.

Under the No Action Alternative, the annual average dose to a worker involved in storage operations and the annual dose to the total storage workforce would be 116 mrem and 3 person-rem, respectively. In addition, gasket replacement activities (replacing up to 20,000 gaskets) would result in an additional dose of 160 person-rem to the workforce. Assuming that 2,000 storage containers were redone each year for 10 years, these workers would receive an average dose of 320 mrem/yr. The projected number of fatal cancers in the packaging workforce from 10 years of gasket replacements would be 0.064. As shown in Table 4–13, the associated risk of fatal cancer to the average worker from 50 years of storage operations would be 2.3×10^{-3}, and the projected number of fatal cancers in the total storage workforce from 50 years of operation would be 0.06.

Table 4–13. Potential Radiological Impacts on Workers of Alternative 1: No Action; Continued Storage of Plutonium at Pantex

Impact	Storage Worker	Packaging Worker
Total dose (person-rem/yr)	3	16
50-year fatal cancers	0.060	NA
10-year fatal cancers	NA	0.064
Average worker dose (mrem/yr)	116	320
50-year fatal cancer risk	2.3×10^{-3}	NA
10-year fatal cancer risk	NA	1.3×10^{-3}

Key: RFETS, Rocky Flats Environmental Technology Site; NA, not applicable.

Note: Under the No Action Alternative (with pits from RFETS), 25 in-plant workers monitored for radiation exposure would be required to operate the storage facility. Over a 10-year period, an additional 50 workers per year would be required to replace gaskets in all the AL–R8 sealed inserts to be used for the entire storage period. The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d). However, the maximum dose to a worker involved in storage operations would be kept below 500 mrem/yr. An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Hazardous Chemical Impacts. Modification of Zone 12[4] for continued storage would slightly reduce the hazardous chemical impacts of normal operations. The Hazard Index for the MEI would be 6×10^{-3}, which indicates that adverse, noncancer effects should not occur; the cancer risk is expected to be 1×10^{-8}. The Hazard Index for the onsite worker would be 6×10^{-3}, which also suggests that noncancer effects are not expected; the cancer risk is expected to be 5×10^{-7} (DOE 1996a:4-220).

4.2.4.4 SRS

[4] DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

Radiological Impacts. Table 4–14 presents the dose to the population within 80 km (50 mi) from storage in the year 2030 and the projected number of fatal cancers in this population from 50 years of storage as shown in the *Storage and Disposition PEIS*. Included in the table are the calculated annual doses to the maximally exposed member of the public and the average exposed member of the public from the continued storage of plutonium, and a projection of the fatal cancer risks to these individuals from 50 years of storage. An annual dose of 2.9×10^{-4} person-rem would be incurred by the population of 893,000. The corresponding number of fatal cancers in this population from 50 years of storage would be 7.2×10^{-6}. An annual dose of 6.8×10^{-6} mrem has been calculated for the MEI. From 50 years of storage, the corresponding risk of fatal cancer to this individual would be 1.7×10^{-10}. To put these doses into perspective, comparisons with natural background radiation doses are also provided in the table.

Under the No Action Alternative, the annual average dose to a worker involved in storage operations and the annual dose to the total storage workforce would be 250 mrem and 7.5 person-rem, respectively, as shown in Table 4–15. The associated risk of fatal cancer to the average worker from 50 years of storage operations would be 5.0×10^{-3}, and the projected number of fatal cancers in the total storage workforce from 50 years of operation would be 0.15.

Table 4–14. Potential Radiological Impacts on the Public of Alternative 1: No Action; Continued Storage of Plutonium at SRS

Population dose within 80 km for year 2030	
Atmospheric release pathway (person-rem)	2.8×10^{-4}
Total liquid release pathway (person-rem)[a]	1.0×10^{-5}
Atmospheric and liquid release pathways combined (person-rem)	2.9×10^{-4}
Percent of natural background[b]	1.1×10^{-7}
50-year fatal cancers	7.2×10^{-6}
Annual dose to the maximally exposed individual	
Atmospheric release pathway (mrem)	6.2×10^{-6}
Total liquid release pathway (mrem)[a]	6.1×10^{-7}
Atmospheric and liquid release pathways combined (mrem)	6.8×10^{-6}
Percent of natural background[b]	2.3×10^{-6}
50-year fatal cancer risk	1.7×10^{-10}
Annual dose to the average exposed individual within 80 km[c]	
Atmospheric and liquid release pathways combined (mrem)	3.2×10^{-7}
50-year fatal cancer risk	8.0×10^{-12}

[a] Includes the drinking water pathway.

[b] The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2030 would receive 263,000 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of SRS in 2030 (893,000).

Source: DOE 1996a.

Table 4–15. Potential Radiological Impacts on Workers of Alternative 1: No Action; ContinuedStorage of Plutonium at SRS

Total dose (person-rem/yr)	7.5
50-year fatal cancers	0.15
Average worker dose (mrem/yr)	250
50-year fatal cancer risk	5.0×10^{-3}

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d). However, the maximum dose to a worker involved in storage operations would be kept below 500 mrem/yr. Based on a review of worker doses associated with similar operations, an average worker dose of 250 mrem/yr has been conservatively assumed. An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1996a.

Hazardous Chemical Impacts. Hazardous chemical impacts of the No Action Alternative would be the same as those for current site operations. The Hazard Index for the MEI at SRS would be 5×10^{-3}, which indicates that adverse, noncancer health effects should not occur; the cancer risk is expected to be 1×10^{-7}. The Hazard Index for the onsite worker would be 1.2, which suggests that onsite workers may experience adverse health effects as a result of the exposures; the cancer risk is expected to be 2×10^{-4} (DOE 1996a:4-324).

4.2.4.5 LLNL

Radiological Impacts. Table 4–16 presents the dose to the population within 80 km (50 mi) from storage in the year 2030 and the projected number of fatal cancers in this population from 50 years of storage. The table also includes the calculated annual doses to the maximally exposed member of the public and the average

Table 4–16. Potential Radiological Impacts on the Public of Alternative 1: No Action; Continued Storage of Plutonium at LLNL[a]

Population dose within 80 km for year 2030	
Atmospheric release pathway (person-rem)	0.0067
Total liquid release pathway (person-rem)[a]	0
Atmospheric and liquid release pathways combined (person-rem)	0.0067
Percent of natural background[b]	2.2×10^{-7}
50-year fatal cancers	1.7×10^{-4}
Annual dose to the maximally exposed individual	
Atmospheric release pathway (mrem)	3.1×10^{-4}
Total liquid release pathway (mrem)[a]	0
Atmospheric and liquid release pathways combined (mrem)	3.1×10^{-4}
Percent of natural background[b]	1.0×10^{-4}
50-year fatal cancer risk	7.8×10^{-9}
Annual dose to the average exposed individual within 80 km[c]	
Atmospheric and liquid release pathways combined (mrem)	6.6×10^{-7}
50-year fatal cancer risk	1.7×10^{-11}

[a] To conservatively estimate "no action" impacts at LLNL, "Upgraded Pu Storage Facility" releases were extracted from DOE 1996a:M-15.

[b] The annual natural background radiation level at LLNL is 300 mrem for the average individual; the population within 80 km (50 mi) in 2030 would receive 3,040,500 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of SRS in 2030 (10,135,000).

Key: LLNL, Lawrence Livermore National Laboratory.

Source: DOE 1996a:M-15.

exposed member of the public from continued storage of plutonium, and projects the fatal cancer risk to these individuals from 50 years of storage. An annual dose of 0.0067 person-rem would be incurred by the population of 10,135,000. The corresponding number of fatal cancers in this population from 50 years of storage would be 1.7×10^{-4}. An annual dose of 3.1×10^{-4} mrem is calculated for the MEI. From 50 years of storage, the corresponding risk of fatal cancer to this individual would be 7.8×10^{-9}. To put these doses into perspective, comparisons with natural background radiation doses are included in the table.

Under the No Action Alternative, the annual average dose to a worker involved with storage operations and the annual dose to the total storage workforce would be 250 mrem and 25 person-rem, respectively, as shown in Table 4–17. The risk of fatal cancer to the average worker from 50 years of storage operations would be 5.0×10^{-3}, and the projected number of fatal cancers in the total storage workforce from 50 years of operation would be 0.50.

Hazardous Chemical Impacts. The hazardous chemical impacts of the No Action Alternative would be the same as those of current site operations. The Hazard Index for the MEI from normal operations at LLNL would be 1.13, which suggests that the maximally exposed member of the public may experience adverse health effects as a result of exposures; the cancer risk is expected to be 5×10^{-7}. The Hazard Index for the onsite worker would be 2.4, which suggests that onsite workers may also experience adverse health effects as a result of the exposures; the cancer risk is expected to be 5×10^{-6} (DOE 1996b:4-392).

4.2.4.6 LANL

Radiological Impacts. Table 4–18 presents the dose to the population within 80 km (50 mi) from storage in the year 2030 and the projected number of fatal cancers in this population from 50 years of storage as shown

Table 4–17. Potential Radiological Impacts on Workers of Alternative 1: No Action; Continued Storage of Plutonium at LLNL

Total dose (person-rem/yr)	25
50-year fatal cancers	0.50
Average worker dose (mrem/yr)	250
50-year fatal cancer risk	5.0×10^{-3}

Key: LLNL, Lawrence Livermore National Laboratory.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d). However, the maximum dose to a worker involved in storage operations would be kept below 500 mrem/yr. Based on a review of worker doses associated with similar operations, an average worker dose of 250 mrem/yr has been conservatively assumed. An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1996a:M-16.

Table 4–18. Potential Radiological Impacts on the Public of Alternative 1: No Action; Continued Storage of Plutonium at LANL

Population dose within 80 km for year 2030	
Atmospheric release pathway (person-rem)	2.7
Liquid release pathway (person-rem)	~0
Atmospheric and liquid release pathways combined (person-rem)	2.7
Percent of natural background[a]	2.8×10^{-3}
50-year fatal cancers	0.068
Annual dose to the maximally exposed individual[b]	
Atmospheric release pathway (mrem)	5.7
Total liquid release pathway (mrem)	0.80
Atmospheric and liquid release pathways combined (mrem)	6.5
Percent of natural background[a]	1.9
50-year fatal cancer risk	1.6×10^{-4}
Annual dose to the average exposed individual within 80 km[c]	
Atmospheric release pathway (mrem)	9.7×10^{-3}
50-year fatal cancer risk	2.4×10^{-7}

[a] The annual natural background radiation level at LANL is 342 mrem for the average individual; the population within 80 km (50 mi) in 2030 would receive 95,000 person-rem.
[b] Although the maximally exposed individual receives a dose, no population groups are exposed to any liquid pathways.
[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of the site in 2030 (278,000).
Key: LANL, Los Alamos National Laboratory.
Source: DOE 1996a:4-376.

in the *Storage and Disposition PEIS*. The table also includes the calculated annual doses to the maximally exposed member of the public and the average exposed member of the public from continued storage of plutonium, and projects the fatal cancer risk to these individuals from 50 years of storage. An annual dose of

2.7 person-rem would be incurred by the population of 278,000. The corresponding number of fatal cancers in this population from 50 years of storage would be 0.068. An annual dose of 6.5 mrem is calculated for the MEI. From 50 years of storage, the corresponding risk of fatal cancer to this individual would be 1.6×10^{-4}.

To put these doses into perspective, comparisons with natural background radiation doses are included in the table.

Under the No Action Alternative, the annual average dose to a worker involved with storage operations and the annual dose to the total storage workforce would be 250 mrem and 12.5 person-rem, respectively, as shown in Table 4–19. The risk of fatal cancer to the average worker from 50 years of storage operations would be 5.0×10^{-3}, and the projected number of fatal cancers in the total storage workforce from 50 years of operation would be 0.25.

Table 4–19. Potential Radiological Impacts on Workers of Alternative 1: No Action; Continued Storage of Plutonium at LANL

Total dose (person-rem/yr)	12.5
50-year fatal cancers	0.25
Average worker dose (mrem/yr)	250
50-year fatal cancer risk	5.0×10^{-3}

Key: LANL, Los Alamos National Laboratory.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d). It is assumed that there are 50 workers badged with dosimeters to monitor radiation exposure, with a conservatively estimated average dose of 250 mrem/yr per worker. An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1996a:4-377.

Hazardous Chemical Impacts. The hazardous chemical impacts of the No Action Alternative would be the same as those of current site operations. The Hazard Index for the MEI from normal operations at LANL would be 3×10^{-2}, which indicates that adverse, noncancer health effects should not occur; the cancer risk is expected to be 5×10^{-6}. The Hazard Index for the onsite worker would be 5×10^{-2}, which also suggests that noncancer effects are not expected; the cancer risk is expected to be 2×10^{-4} (DOE 1996a:4-377).

4.2.4.7 RFETS

Radiological Impacts. Table 4–20 presents the dose to the population within 80 km (50 mi) from storage in the year 2030 and the projected number of fatal cancers in this population from 50 years of storage as shown in the *Storage and Disposition PEIS*. The table also includes the calculated annual doses to the maximally exposed member of the public and the average exposed member of the public from continued storage of plutonium, and projects the fatal cancer risk to these individuals from 50 years of storage. An annual dose of 0.10 person-rem would be incurred by the population of 3,116,000. The corresponding number of fatal cancers in this population from 50 years of storage would be 2.5×10^{-3}. An annual dose of 0.48 mrem is calculated for the MEI. From 50 years of storage, the corresponding risk of fatal cancer to this individual would be 1.2×10^{-5}. To put these doses into perspective, comparisons with natural background radiation doses are included in the table.

Under the No Action Alternative, the annual average dose to a worker involved with storage operations and the annual dose to the total storage workforce would be 250 mrem and 25 person-rem, respectively, as shown in

Table 4–21. The risk of fatal cancer to the average worker from 50 years of storage operations would be 5.0×10^{-3}, and the projected number of fatal cancers in the total storage workforce from 50 years of operation would be 0.50.

Table 4–20. Potential Radiological Impacts on the Public of Alternative 1: No Action; Continued Storage of Plutonium at RFETS

Population dose within 80 km for year 2030	
Atmospheric release pathway (person-rem)	0.10
Liquid release pathway (person-rem)	0
Atmospheric and liquid release pathways combined (person-rem)	0.10
Percent of natural background[a]	9.1×10^{-6}
50-year fatal cancers	2.5×10^{-3}
Annual dose to the maximally exposed individual	
Atmospheric release pathway (mrem)	0.13
Total liquid release pathway (mrem)	0.35
Atmospheric and liquid release pathways combined (mrem)	0.48
Percent of natural background[a]	0.14
50-year fatal cancer risk	1.2×10^{-5}
Annual dose to the average exposed individual within 80 km[b]	
Atmospheric release pathway (mrem)	3.2×10^{-5}
50-year fatal cancer risk	8.0×10^{-10}

[a] The annual natural background radiation level at RFETS is 353 mrem for the average individual; the population within 80 km (50 mi) in 2030 would receive 1,100,000 person-rem.
[b] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of the site in 2030 (3,116,000).
Key: RFETS, Rocky Flats Environmental Technology Site.
Source: DOE 1996a:4-356.

Table 4–21. Potential Radiological Impacts on Workers of Alternative 1: No Action; Continued Storage of Plutonium at RFETS

Total dose (person-rem/yr)	25
50-year fatal cancers	0.50
Average worker dose (mrem/yr)	250
50-year fatal cancer risk	5.0×10^{-3}

Key: RFETS, Rocky Flats Environmental Technology Site.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d). It is assumed that there are 100 workers badged with dosimeters to monitor radiation exposure, with a conservatively estimated average dose of 250 mrem/yr per worker. An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1996a:4-357.

Hazardous Chemical Impacts. The hazardous chemical impacts of the No Action Alternative would be the same as those of current site operations. The Hazard Index for the MEI from normal operations at RFETS would be 1×10^{-3}, which indicates that adverse, noncancer health effects should not occur; the cancer risk is expected to be 2×10^{-8}. The Hazard Index for the onsite worker would be 1×10^{-2}, which also suggests that noncancer effects are not expected; the cancer risk is expected to be 2×10^{-6} (DOE 1996a:4-357).

4.2.5 Facility Accidents

The facilities involved in plutonium storage under the No Action Alternative are operated in accordance with DOE orders, which ensure that the risk to the public of prompt fatalities due to accidents, or cancer fatalities due to operations are minimized. The safety of workers and the public from accidents at existing facilities is also controlled by Technical Safety Requirements specified in detail in a Safety Analysis Report (SAR) or a Basis for Interim Operations (BIO) document prepared and maintained specifically for a facility or a process within a facility. Under these controls, any change in approved operations or facilities could curtail operations until it can be established that worker and public safety has not been compromised.

4.2.5.1 Hanford

As discussed in the *Storage and Disposition PEIS* (DOE 1996a:4-62–4-63), the *Plutonium Finishing Plant Safety Analysis Report* (WHC-SD-CP-SAR-021) analyzes a wide spectrum of accidents that are primarily associated with processing rather than vault storage. This is because a release from a vault would require more severe accident conditions than are normally analyzed in a SAR. The accidents in the SAR consist of potential process accidents such as fires, explosions, and criticality as well as an externally initiated aircraft crash and earthquake. An estimate of the effects of potential accidents in the existing storage vault at Hanford can be derived from similar storage accidents that have been postulated for an upgraded storage facility. A severe-consequence, low-frequency accident for storage under the No Action Alternative would be a beyond-design-basis earthquake. If this accident were to occur, there would be an estimated 0.12 LCF in the offsite population within 80 km (50 mi). The estimated frequency of the earthquake with sufficient damage to cause a release is 1.0×10^{-7} per year. Consistent with the treatment of beyond-design-basis earthquake in this SPD EIS, this corresponds to a frequency in the range from extremely unlikely to beyond extremely unlikely. For the MEI and noninvolved worker, there would be latent cancer fatality (LCF) probabilities of 1.7×10^{-5} and 2.2×10^{-3}, respectively. [Text deleted.]

4.2.5.2 INEEL

As discussed in the *Storage and Disposition PEIS* (DOE 1996a:4-163), the *Final Safety Analysis Report for the Fuel Manufacturing Facility, Building 704* (ANL-IFR-57) and the *Final Safety Analysis Report of the Zero Power Plutonium Reactor Facility* (ANL-7471) at ANL–W analyzed a wide spectrum of design basis accidents. These studies indicate that these facilities are low hazard based on the effects of design basis accidents. However, these studies do not normally analyze the effects of severe accidents. An estimate of the effects of potential severe accidents in the existing storage vault at INEEL can be derived from similar storage accidents that have been postulated for an upgraded storage facility. A severe-consequence, low-frequency accident for storage under the No Action Alternative would be a beyond-design-basis earthquake. If this accident were to occur, there would be an estimated 0.33 LCF in the offsite population within 80 km (50 mi). The estimated frequency of the earthquake with sufficient damage to cause a release is 1.0×10^{-7} per year. Consistent with the treatment of beyond-design-basis earthquake in this SPD EIS, this corresponds to a frequency in the range from extremely unlikely to beyond extremely unlikely. For the MEI and noninvolved worker, there would be LCF probabilities of 9.8×10^{-4} and 2.0×10^{-2}, respectively. [Text deleted.]

4.2.5.3 Pantex

Under the No Action Alternative, surplus plutonium pits would be stored at Pantex in upgraded facilities in Zone 12 South.[5] The *Storage and Disposition PEIS* (DOE 1996a:4-221–4-222), postulates a set of accidents involving upgraded storage of surplus plutonium pits that could result in releases of plutonium impacting noninvolved workers and the offsite population. For that set of accidents, the maximum consequences would be from a beyond-design-basis earthquake (estimated probability of occurrence: 1.0×10^{-7} per year), which would cause an estimated 0.26 LCF in the population within 80 km (50 mi) of the Pantex site. In terms of the treatment of beyond-design-basis earthquakes in this SPD EIS, that figure corresponds to a frequency in the range of extremely unlikely to beyond extremely unlikely. For the MEI and the noninvolved worker, the LCF probabilities would be 1.7×10^{-3} and 4.7×10^{-3}, respectively. [Text deleted.] As described in the *Pantex Sitewide EIS* (DOE 199c:4-272-4-291), an aircraft crash into Zone 12 could result in plutonium dispersal due to either explosion or fire. The frequencies of an aircraft crash resulting in either of these plutonium dispersal events are beyond extremely unlikely. The LCF probabilities for the MEI would be 3.0×10^{-2} and 1.7×10^{-2} for explosive release and fire release, respectively. The noninvolved worker may not survive the impact event. If the individual did survive, the LCF probability would be 1.6×10^{-2} for explosive release, and would approach 1.0 for fire release.

4.2.5.4 SRS

Under the No Action Alternative, plutonium at SRS would be stored in APSF, if built. If APSF were not built, plutonium would continue to be stored in current storage locations.[6] Design modifications of the storage facility would ensure that the continued storage of plutonium is in accordance with contemporary DOE orders and applicable regulations, and that the risks to the public of prompt fatalities due to accidents and of LCFs due to operations are minimized.

The *Storage and Disposition PEIS* (DOE 1996a:4-327), postulates a set of accidents involving storage of plutonium pits that could result in releases of plutonium impacting noninvolved workers and the offsite population. For that set of accidents, the maximum consequences would be from a beyond-design-basis earthquake (estimated probability of occurrence: 1.0×10^{-7} per year), which would cause an estimated 0.098 LCF in the population within 80 km (50 mi) of SRS. In terms of the treatment of beyond-design-basis earthquakes in this SPD EIS, that figure corresponds to a frequency in the range from extremely unlikely to beyond extremely unlikely. For the MEI and the noninvolved worker, the LCF probabilities would be 2.0×10^{-5} and 9.8×10^{-4}, respectively. [Text deleted.]

4.2.5.5 LLNL

Under the No Action Alternative, plutonium would continue to be stored at the site in exisiting facilities. [Text deleted.]

4.2.5.6 LANL

Under the No Action Alternative, plutonium would continue to be stored at the site in existing facilities. [Text deleted.]

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[5] DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

[6] DOE would prepare a supplement analysis, and a supplement to and an amended ROD for, the *Storage and Disposition PEIS*, if required to address continued storage of surplus plutonium at current locations.

4.2.5.7 RFETS

Under the No Action Alternative, plutonium pits would no longer be stored at the site, but other nonpit plutonium material would continue to be stored in existing facilities. [Text deleted.]

4.2.6 Transportation

As the No Action Alternative would involve no intersite transportation of radioactive materials between any of the candidate sites, no transportation impacts would be expected if this alternative were implemented.

4.2.7 Environmental Justice

4.2.7.1 Hanford

As discussed in other parts of Section 4.2, routine operations conducted under the No Action Alternative would pose no significant health or other environmental risks to the public. The likelihood of an LCF for the MEI over 50 years of storage would be approximately 1 in 100 million, and the expected number of LCFs among the general population residing in the potentially affected area would be 1.2×10^{-3} (see Table 4–8). Radiological and nonradiological risks posed by implementation of the No Action Alternative would be small regardless of the racial and ethnic composition of the population, and independent of the economic status of individuals comprising the population. Operation of storage facilities at Hanford under the No Action Alternative would have no disproportionately high and adverse effects on minority or low-income populations.

4.2.7.2 INEEL

As discussed in other parts of Section 4.2, routine operations conducted at INEEL under the No Action Alternative would pose no significant health or other environmental risks to the public. The likelihood of an LCF for the MEI over 50 years of storage would be essentially zero, and the expected number of LCFs among the general population residing in the potentially affected area would be 1.9×10^{-6} (see Table 4–10). Radiological and nonradiological risks posed by implementation of the No Action Alternative would be small regardless of the racial and ethnic composition of the population, and independent of the economic status of individuals comprising the population. Operation of storage facilities at INEEL under the No Action Alternative would have no disproportionately high and adverse effects on minority or low-income populations.

4.2.7.3 Pantex

As discussed in other parts of Section 4.2, routine operations conducted at Pantex under the No Action Alternative would pose no significant health or other environmental risks to the public. The likelihood of an LCF for the MEI over 50 years of storage would be essentially zero, and the expected number of LCFs among the general population residing in the potentially affected area would be 1.6×10^{-7} (see Table 4–12). Radiological and nonradiological risks posed by implementation of the No Action Alternative would be small regardless of the racial and ethnic composition of the population, and independent of the economic status of individuals comprising the population. Operation of storage facilities at Pantex under the No Action Alternative would have no disproportionately high and adverse effects on minority or low-income populations.

4.2.7.4 SRS

As discussed in other parts of Section 4.2, routine operations conducted at SRS under the No Action Alternative would pose no significant health or other environmental risks to the public. The likelihood of an LCF for the MEI over 50 years of storage would be essentially zero, and the expected number of LCFs among the general

population residing in the potentially affected area would be 7.2×10^{-6} (see Table 4–14). Radiological and nonradiological risks posed by implementation of the No Action Alternative would be small regardless of the racial and ethnic composition of the population, and independent of the economic status of individuals comprising the population. Operation of storage facilities at SRS under the No Action Alternative would have no disproportionately high and adverse effects on minority or low-income populations.

4.2.7.5 LLNL

As discussed in other parts of Section 4.2, routine operations conducted under the No Action Alternative would pose no significant health or other environmental risks to the public. The likelihood of an LCF for the MEI over 50 years of storage would be approximately 7.8×10^{-9}, and the expected number of LCFs among the general population residing in the potentially affected area would be 1.7×10^{-4} (see Table 4–16). Radiological and nonradiological risks posed by implementation of the No Action Alternative would be small independent of the racial and ethnic composition of the population, and independent of the economic status of individuals comprising the population. Operation of storage facilities at LLNL under the No Action Alternative would have no disproportionately high and adverse effects on minority or low-income populations.

4.2.7.6 LANL

As discussed in other parts of Section 4.2, routine operations conducted under the No Action Alternative would pose no significant health or other environmental risks to the public. The likelihood of an LCF for the MEI would be approximately 1.6×10^{-4}, and the expected number of LCFs among the general population residing in the potentially affected area would be 6.8×10^{-2} (see Table 4–18). Radiological and nonradiological risks posed by implementation of the No Action Alternative would be small independent of the racial and ethnic composition of the population, and independent of the economic status of individuals comprising the population. Operation of storage facilities at LANL under the No Action Alternative would have no disproportionately high and adverse effects on minority or low-income populations.

4.2.7.7 RFETS

As discussed in other parts of Section 4.2, routine operations conducted under the No Action Alternative would pose no significant health or other environmental risks to the public. The likelihood of an LCF for the MEI over 50 years of storage would be approximately 1.2×10^{-5}, and the expected number of LCFs among the general population residing in the potentially affected area would be 2.5×10^{-3} (see Table 4–20). Radiological and nonradiological risks posed by implementation of the No Action Alternative would be small independent of the racial and ethnic composition of the population, and independent of the economic status of individuals comprising the population. Operation of storage facilities at RFETS under the No Action Alternative would have no disproportionately high and adverse effects on minority or low-income populations.

4.2.8 Geology and Soils

4.2.8.1 Hanford

Continued storage of surplus plutonium, or the No Action Alternative, at Hanford would have no additional impacts on the geologic or soil resources. In the *Storage and Disposition PEIS*, hazards from the large-scale geologic conditions were analyzed in detail: the analysis indicated that these hazards present an acceptable risk to long-term storage facilities. More detailed descriptions of the impacts of the potential geologic hazards at Hanford are included in the *Storage and Disposition PEIS* (DOE 1996a:4-45–4-47). Potential effects of accidents initiated by natural phenomena such as earthquakes are discussed in Section 4.2.5.1.

Because no ground-disturbing activities would be needed for the No Action Alternative at Hanford, the soil attributes at current facility locations are inconsequential. Continued storage of surplus plutonium would not impact available geologic resources. Other than crushed rock, sand, and gravel, no economically viable geologic resources have been identified at Hanford. No soils at Hanford are currently classified as prime farmland.

4.2.8.2 INEEL

Continued storage of surplus plutonium, or the No Action Alternative, at INEEL would have no additional impacts on the geologic or soil resources. In the *Storage and Disposition PEIS*, hazards from the large-scale geologic conditions were analyzed in detail: the analysis indicated that these hazards present an acceptable risk to long-term storage facilities. More detailed descriptions of the impacts of the potential geologic hazards at INEEL are included in the *Storage and Disposition PEIS* (DOE 1996a:4-148–4-150). Potential effects of accidents initiated by natural phenomena such as earthquakes are discussed in Section 4.2.5.2.

Because no ground-disturbing activities would be needed for the No Action Alternative at INEEL, the soil attributes at current facility locations are inconsequential. Continued storage of surplus plutonium would not impact available geologic resources. Other than sand, gravel, and pumice, no economically viable geologic resources have been identified at INEEL. No soils at INEEL are currently classified as prime farmland.

4.2.8.3 Pantex

Continued storage of surplus plutonium, or the No Action Alternative, at Pantex would have no additional impacts on the geologic or soil resources. In the *Storage and Disposition PEIS*, hazards from the large-scale geologic conditions were analyzed in detail: the analysis indicated that these hazards present an acceptable risk to long-term storage facilities. More detailed descriptions of the impacts of the potential geologic hazards at Pantex are included in the *Storage and Disposition PEIS* (DOE 1996a:4-204–4-206). Potential effects of accidents initiated by natural phenomena such as earthquakes are discussed in Section 4.2.5.3.

Modifying Zone 12 facilities to provide for continued plutonium storage was determined to have no direct or indirect effects on geologic resources (DOE 1996a:4-204, 4-205).[7] No economically viable geologic resources have been identified at Pantex. Pantex is underlain by soils of the Pullman-Randall association. The Pullman soil is classified as prime farmland. Pantex is exempt from the Farmland Protection Policy Act (FPPA) under Section 1540(c)(4) (7 USC Section 4201) because the acquisition of Pantex property occurred prior to the FPPA effective date of June 22, 1982 (DOE 1996c:4-22).

4.2.8.4 SRS

Continued storage of surplus plutonium, or the No Action Alternative, at SRS would have no additional impacts on the geologic or soil resources. In the *Storage and Disposition PEIS*, hazards from the large-scale geologic conditions were analyzed in detail. The analysis indicated that these hazards present an acceptable risk to long-term storage facilities. More detailed descriptions of the impacts of the potential geologic hazards at SRS are included in the *Storage and Disposition PEIS* (DOE 1996a:4-309–4-311). Potential effects of accidents initiated by natural phenomena such as earthquakes are discussed in Section 4.2.5.4.

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[7] DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

Because no ground-disturbing activities beyond those analyzed in the *Storage and Disposition PEIS* would be needed for the No Action Alternative at SRS, the soil attributes at current facility locations are inconsequential. Continued storage of surplus plutonium would not impact available geological resources. No economically viable geologic resources have been identified at SRS. No soils at SRS are currently classified as prime farmland.

4.2.8.5 LLNL

Continued storage of surplus plutonium, or the No Action Alternative, at LLNL would not impact available geologic resources. Detailed descriptions of the impacts of the potential geologic hazards at LLNL are included in the *Supplement Analysis for Continued Operation of LLNL and SNL* (DOE 1999a). Potential effects of accidents initiated by natural phenomena such as earthquakes are discussed in Section 4.2.5.5. Because no ground-disturbing activities would be needed for the No Action Alternative at LLNL, the soil attributes at current facility locations are inconsequential. A significant portion of the site is classified as undeveloped and industrial uses occupy a substantial amount of land. No soils at LLNL are currently classified as prime farmland.

4.2.8.6 LANL

Continued storage of surplus plutonium, or the No Action Alternative, at LANL would have no additional impacts on the geologic or soil resources. In the *Storage and Disposition PEIS*, hazards from the large-scale geologic conditions were analyzed in detail. The analysis indicated that these hazards present an acceptable risk to long-term storage facilities. More detailed descriptions of the impacts of the potential geological hazards at LANL are included in the *Storage and Disposition PEIS* (DOE 1996a:4-371). Potential effects of accidents initiated by natural phenomena such as earthquakes are discussed in Section 4.2.5.6.

Because no ground-disturbing activities would be needed for the No Action Alternative at LANL, the soil attributes at current facility locations are inconsequential. Continued storage of surplus plutonium would not impact available geologic resources. No economically viable geologic resources have been identified at LANL. No soils at LANL are currently classified as prime farmland.

4.2.8.7 RFETS

Continued storage of surplus plutonium, or the No Action Alternative, at RFETS would have no additional impacts on the geologic or soil resources. In the *Storage and Disposition PEIS*, hazards from the large-scale geologic conditions were analyzed in detail. The analysis indicated that these hazards present an acceptable risk to long-term storage facilities. More detailed descriptions of the impacts of the potential geological hazards at RFETS are included in the *Storage and Disposition PEIS* (DOE 1996a:4-350). Potential effects of accidents initiated by natural phenomena such as earthquakes are discussed in Section 4.2.5.7.

Because no ground-disturbing activities associated with this program would be needed for the No Action Alternative at RFETS, the soil attributes at current facility locations are inconsequential. Continued storage of surplus plutonium would not impact available geologic resources. No economically viable geologic resources have been identified at RFETS. No soils at RFETS are currently classified as prime farmland.

4.2.9 Water Resources

4.2.9.1 Hanford

The *Storage and Disposition PEIS* found that surface water withdrawals from the Columbia River are not expected to increase from the current usage of 13.5 billion l/yr (3.6 billion gal/yr). Restoration programs would

continue, and water quality should improve. No additional impacts on groundwater are anticipated (DOE 1996a:4-39).

4.2.9.2 INEEL

The *Storage and Disposition PEIS* found that continued operation of long-term storage facilities at INEEL would not affect water resources. No surface water would be used for construction and normal operation of these facilities. No additional impacts on groundwater are anticipated. Current groundwater use should decrease, and existing tritium plumes in groundwater, including perched groundwater, should continue to migrate southwest. Studies show that water withdrawals could change the existing plumes' direction to the east (DOE 1996a:4-143).

4.2.9.3 Pantex

The *Storage and Disposition PEIS* found that no demands on surface waters would occur. Because surface water is not used, there would be no impact on surface water availability or quality (DOE 1996a:4-198). The analysis also found that as baseline conditions and operations continued, groundwater usage would decrease from 836 million l/yr (221 million gal/yr) to 249 million l/yr (65.7 million gal/yr) by 2005. Groundwater would continue to be withdrawn from the Ogallala aquifer from wells on the Pantex property. Groundwater restoration activities would continue, including pump, treatment, and reinjection activities (DOE 1996a:4-198).

4.2.9.4 SRS

The *Storage and Disposition PEIS* found that surface water withdrawals from the Savannah River will decrease from 140.4 billion l/yr (37.1 billion gal/yr) to 127 billion l/yr (33.6 billion gal/yr) by 2005. As a result of reduced discharges to streams, the analysis further concluded surface water quality would improve. The analysis also found that additional withdrawals to support long-term storage facilities at SRS would have minimal impacts on regional groundwater levels. Water requirements to support these facilities were expected to represent much less than 1 percent of projected annual withdrawals (DOE 1996a:4-303–4-306).

4.2.9.5 LLNL

The *Supplement Analysis for Continued Operation of LLNL and SNL* (DOE 1999a:vol. I) found that the continued operation of plutonium storage facilities at LLNL within administrative limits would not affect water resources. Projected water demand of 1 billion l/yr (265 million gal/yr) represents only a small fraction of the water available to LLNL from its municipal suppliers (DOE 1999a).

4.2.9.6 LANL

The *Storage and Disposition PEIS* found that continued operation of long-term storage facilities at LANL would not affect water resources. No surface water would be used for construction and normal operation of these facilities. No additional impacts on groundwater are expected (DOE 1996a:4-369–370).

4.2.9.7 RFETS

The *Storage and Disposition PEIS* found that continued operation of long-term storage facilities at RFETS would not affect water resources. No surface water would be used for construction and normal operation of these facilities. No additional impacts on groundwater are expected (DOE 1996a:4-348–349).

4.2.10 Ecological Resources

4.2.10.1 Hanford

Under the No Action Alternative, there would not be any construction or demolition of buildings, and any modifications required to ensure safe storage would not result in any appreciable change to current conditions. Because no new construction would occur, the No Action Alternative would have no impact on ecological resources, including terrestrial and aquatic resources, wetlands, and threatened and endangered species.

4.2.10.2 INEEL

Under the No Action Alternative, there would not be any construction or demolition of buildings, and any modifications required to ensure safe storage would not result in any appreciable change to current conditions. Because no new construction would occur, the No Action Alternative would have no impact on ecological resources, including terrestrial and aquatic resources, wetlands, and threatened and endangered species.

4.2.10.3 Pantex

Under the No Action Alternative, Zone 12 facilities would be upgraded to provide for continued storage of surplus plutonium materials.[8] The *Storage and Disposition PEIS* (DOE 1996a:4-207) determined that upgrading these facilities would cause minimal disturbance of biological resources. The baseline resources described in Chapter 3 are the existing biotic conditions.

4.2.10.4 SRS

In accordance with the ROD (December 12, 1995) for the *Final EIS, Interim Management of Nuclear Materials*, DOE was planning to construct a new APSF in F-Area. This facility, if built, would enable SRS to stabilize and package plutonium metals and oxides to meet storage criteria and to provide space for storage of all plutonium and special actinide materials. Environmental consequences from this action are documented in the associated EIS (DOE 1995b). If APSF were not built, plutonium would continue to be stored in current storage locations, and DOE would prepare a supplement analysis, and a supplement to and an amended ROD for, the *Storage and Disposition PEIS*, if required to address continued storage of surplus plutonium at current locations.

4.2.10.5 LLNL

Under the No Action Alternative, there would not be any construction or demolition of buildings, and any modifications required to ensure safe storage would not result in any appreciable change to current conditions. Because no new construction would occur, the No Action Alternative would have no impact on ecological resources, including terrestrial and aquatic resources, wetlands, and threatened and endangered species.

4.2.10.6 LANL

Under the No Action Alternative, there would not be any construction or demolition of buildings, and any modifications required to ensure safe storage would not result in any appreciable change to current conditions.

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[8] DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

Because no new construction would occur, the No Action Alternative would have no impact on ecological resources, including terrestrial and aquatic resources, wetlands, and threatened and endangered species.

4.2.10.7 RFETS

Under the No Action Alternative, there would not be any construction or demolition of buildings, and any modifications required to ensure safe storage would not result in any appreciable change to current conditions. Because no new construction would occur, the No Action Alternative would have no impact on ecological resources, including terrestrial and aquatic resources, wetlands, and threatened and endangered species.

4.2.11 Cultural and Paleontological Resources

4.2.11.1 Hanford

Under the No Action Alternative, DOE would continue storage of plutonium material in the Plutonium Finishing Plant (PFP) in stabilized forms pursuant to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94–1. Therefore, no impacts on cultural or paleontological resources from the continued storage mission under the No Action Alternative would be expected.

4.2.11.2 INEEL

Under the No Action Alternative, DOE would continue storage of plutonium material at ANL–W ZPPR and FMF vaults in stabilized forms pursuant to DNFSB Recommendation 94–1. Therefore, no impacts on cultural or paleontological resources from the continued storage mission under the No Action Alternative would be expected.

4.2.11.3 Pantex

Under the No Action Alternative, Zone 12 facilities would be upgraded to provide for continued storage of surplus plutonium materials.[9] Impacts on cultural or paleontological resources should be minimal. Therefore, no impacts on cultural or paleontological resources from the continued storage mission under the No Action Alternative would be expected.

4.2.11.4 SRS

Under the No Action Alternative, DOE would continue storage of plutonium material in F-Area in stabilized forms pursuant to DNFSB Recommendation 94–1. Therefore, no impacts on cultural or paleontological resources from the continued storage mission under the No Action Alternative would be expected.

4.2.11.5 LLNL

Under the No Action Alternative, DOE would continue storage of plutonium material in Building 332 in stabilized forms pursuant to DNFSB Recommendation 94–1. Therefore, no impacts on cultural or paleontological resources from the continued storage mission under the No Action Alternative would be expected.

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[9] DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

4.2.11.6 LANL

Under the No Action Alternative, DOE would continue storage of plutonium material in NMSF in stabilized form pursuant to DNFSB Recommendation 94–1. Therefore, no impacts on cultural or paleontological resources from the continued storage mission under the No Action Alternative would be expected.

4.2.11.7 RFETS

Under the No Action Alternative, DOE would continue storage of plutonium material in a existing facilities in stabilized form pursuant to DNFSB Recommendation 94–1. Therefore, no impacts on cultural or paleontological resources from the continued storage mission under the No Action Alternative would be expected.

4.2.12 Land Use and Visual Resources

With the exception of Pantex, where either Zone 4 or Zone 12 facilities would be upgraded to provide for continued storage of surplus plutonium materials, there would not be a change in existing land use at any of the sites. This construction would take place on previously disturbed land, and therefore would not cause a major change in any existing land-use plans at the site. Upgrades at Pantex would not result in any impacts to visual resources.

4.2.13 Infrastructure

4.2.13.1 Hanford

The current infrastructure at Hanford is capable of supporting all anticipated missions and functions associated with the No Action Alternative. However, certain actions under that alternative could result in changes to the site infrastructure, but they are not expected to result in any major impact. For instance, upgrades of PFP and support services and utilities could be required to complete stabilization and packaging activities for the current inventory of weapons-usable plutonium. Further detailed discussion on Hanford infrastructure can be found in the *Storage and Disposition PEIS* (DOE 1996a:4-29).

4.2.13.2 INEEL

The INEEL infrastructure would, without major modifications, be capable of supporting all anticipated missions and functions associated with the No Action Alternative. No major site infrastructure changes would be required. Detailed data on INEEL infrastructure are presented in the *Storage and Disposition PEIS* (DOE 1996a:4-134, 4-135).

4.2.13.3 Pantex

The Pantex infrastructure would be capable of supporting all anticipated missions and functions associated with the No Action Alternative. No major site infrastructure changes are required. Detailed data on Pantex infrastructure are presented in the *Storage and Disposition PEIS* (DOE 1996a:4-295, 4-296).

4.2.13.4 SRS

The SRS infrastructure would be capable of supporting all anticipated missions and functions associated with the No Action Alternative. No major site infrastructure changes are required. Detailed data on SRS infrastructure are presented in the *Storage and Disposition PEIS* (DOE 1996a:4-186, 4-187).

4.2.13.5 LLNL

The LLNL infrastructure would be capable of supporting all anticipated missions and functions associated with the No Action Alternative. No major infrastructure changes are required. Detailed data on LLNL infrastructure are presented in the *Supplement Analysis for Continued Operation of LLNL and SNL* (DOE 1999a).

4.2.13.6 LANL

The LANL infrastructure would be capable of supporting all anticipated missions and functions associated with the No Action Alternative. No major infrastructure changes are required. Detailed data on LANL infrastructure are presented in the *Storage and Disposition PEIS* (DOE 1996a:4-365).

4.2.13.7 RFETS

The RFETS infrastructure would be capable of supporting all anticipated missions and functions associated with the No Action Alternative. No major infrastructure changes are required. Detailed data on RFETS infrastructure are presented in the *Storage and Disposition PEIS* (DOE 1996a:4-345).

4.3 ALTERNATIVE 2

Alternative 2 would involve constructing and operating all three facilities for surplus plutonium disposition at Hanford. The pit conversion and immobilization facilities would be located in the existing Fuels and Materials Examination Facility (FMEF) building, and the MOX facility, in a new building near FMEF in the 400 Area.

4.3.1 Construction

4.3.1.1 Air Quality and Noise

Sources of potential air quality impacts of construction under Alternative 2 at Hanford include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from Hanford construction activities, with standards and guidelines is presented as Table 4–22. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards as a result of Hanford activities. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat from current emissions during the planned construction period because of an expected decrease in overall site employment.

The location of these facilities relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with construction of these facilities would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 7.1 km [4.4 mi]), noise emissions from construction equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that the contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Traffic associated with construction of these facilities would likely produce less than a 1-dB increase in noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Construction workers could be exposed to noise levels higher than the acceptable limits specified by the Occupational Safety and Health Administration (OSHA) in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of standard silencing packages on construction equipment, administrative controls, engineering controls, and personal hearing protection equipment.

Table 4–22. Evaluation of Air Pollutant Concentrations Associated With Construction Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	2.18	36.3	0.36
	1 hour	40,000	14.9	63.2	0.16
Nitrogen dioxide	Annual	100	0.169	0.419	0.42
PM_{10}	Annual	50	0.169	0.186	0.37
	24 hours	150	6.55	7.32	4.9
Sulfur dioxide	Annual	50	0.0164	1.65	3.2
	24 hours	260	0.183	9.09	3.5
	3 hours	1,300	1.24	30.9	2.4
	1 hour	660	3.72	36.6	5.5
Other regulated pollutants					
Total suspended particulates	Annual	60	0.327	0.344	0.57
	24 hours	150	12.3	13.1	8.7
Hazardous and other toxic compounds					
Other toxics[b]	Annual	0.12	0.000008	0.000014	0.012

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; WDEC 1994.

4.3.1.2 Waste Management

Table 4–23 compares the wastes generated during the construction of surplus plutonium disposition facilities at Hanford with the existing treatment, storage, and disposal capacity for the various waste types. It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during construction. Nonradioactive wastes generated during construction would be the responsibility of the construction contractor and would be managed in accordance with existing procedures largely at offsite facilities. In addition, no soil contaminated with hazardous or radioactive constituents should be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and applicable Federal and State regulations. Construction waste generation would be the same for the ceramic and glass immobilization technologies because the same size facility would be built under either scenario.

Hazardous wastes generated during the construction of surplus plutonium disposition facilities would be typical of those generated during the construction of an industrial facility. Any hazardous wastes generated during construction would be packaged in containers approved by the U.S. Department of Transportation (DOT) and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during construction should not have a major impact on the Hanford hazardous waste management system.

Table 4–23. Potential Waste Management Impacts of Construction Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	50	NA	NA	NA
Nonhazardous				
Liquid	30,000	13[c]	NA	13[d]
Solid	9,600	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of the 400 Area sanitary sewer.

[d] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

Nonhazardous solid wastes generated during the construction of surplus plutonium disposition facilities would be packaged in conformance with standard industrial practice, for recycling or disposal largely at offsite facilities. The additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at Hanford.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during the construction of surplus plutonium disposition facilities would be managed at the Energy Northwest (formerly Washington Public Power Supply System [WPPSS]) Sewage Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during the construction of these facilities is estimated to be 13 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 13 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd^3/yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of these wastes at Hanford should not have a major impact on the nonhazardous liquid waste treatment system during construction.

4.3.1.3 Socioeconomics

Construction-related employment requirements under Alternative 2 would be as indicated in Table 4–24.

At its peak in 2003, construction of the three new surplus plutonium disposition facilities at Hanford under this alternative would require 1,235 construction workers and should generate another 1,268 indirect jobs in the region. As this total increase of 2,503 direct and indirect jobs represents 0.6 percent of the projected regional economic area (REA) workforce, it should have no major impact on the REA. Moreover, it should have little effect on the community services currently offered in the region of influence (ROI). In fact, it should help offset the 15 percent reduction in Hanford's total workforce (i.e., from 12,882 to 11,000 workers) projected for the years 1997–2005.

Table 4–24. Construction Employment Requirements for Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

Year	Pit Conversion	Immobilization	MOX	Total
2001	76	0	0	76
2002	116	277	441	834
2003	72	391	772	1,235
2004	0	343	508	851
2005	0	228	221	449
2006	0	0	208	208

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.
Source: DOE 1999c; UC 1998a, UC 1999a, UC 1999b.

4.3.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. According to the results of recent radiation surveys conducted in the 400 Area, a construction worker would not be expected to receive any additional dose above natural background levels (Antonio 1998). Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at Hanford under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

4.3.1.5 Facility Accidents

Surplus plutonium disposition construction activities at Hanford could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 3,653 person-years of construction labor and standard industrial accident rates, approximately 360 cases of nonfatal occupational injury or illness and 0.51 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.3.1.6 Environmental Justice

As discussed in other parts of Section 4.3.1, construction under Alternative 2 would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, construction activities at Hanford under Alternative 2 would have no significant impacts on minority or low-income populations.

4.3.2 Operations

4.3.2.1 Air Quality and Noise

Potential air quality impacts of the operation of facilities under Alternative 2 at Hanford were analyzed using the Industrial Source Computer Short-Term Model Version 3 (ISCST3). Operational impacts would result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from surplus plutonium disposition facilities, with standards and guidelines is presented as Table 4–25. Concentrations for immobilization in the ceramic and glass forms are the same. Concentrations of air pollutants would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during operation would be mitigated; for example, high-efficiency particulate air (HEPA) filtration has been included in the design of these facilities.

Table 4–25. Evaluation of Air Pollutant Concentrations Associated With Operations Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.651	34.7	0.35
	1 hour	40,000	4.43	52.7	0.13
Nitrogen dioxide	Annual	100	0.0873	0.337	0.34
PM_{10}	Annual	50	0.00541	0.023	0.047
	24 hours	150	0.0601	0.83	0.55
Sulfur dioxide	Annual	50	0.00496	1.64	3.1
	24 hours	260	0.0551	8.97	3.4
	3 hours	1,300	0.375	30	2.3
	1 hour	660	1.12	34	5.2
Other regulated pollutants					
Total suspended particulates	Annual	60	0.00541	0.023	0.039
	24 hours	150	0.0601	0.83	0.55
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.

Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.

Source: EPA 1997a; WDEC 1994.

For a discussion of how the operation of these facilities would affect the site's ability to continue to meet limits of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) regarding airborne radiological emissions, see Section 4.32.1.4. There are no other NESHAPs limits applicable to operation of these facilities. The increased concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from the operation of these facilities would be a small fraction of the Prevention of Significant Deterioration (PSD) Class II area increments as summarized in Table 4–26.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat because of an expected decrease in overall site employment during this timeframe.

The combustion of fossil fuels associated with Alternative 2 would result in the emission of carbon dioxide, one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative would represent less than 8×10^{-6} percent of the 1995 annual U.S. emissions of carbon dioxide

from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

Table 4–26. Evaluation of Air Pollutant Increases Associated With Operations Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Increment
Nitrogen dioxide	Annual	0.0873	25	0.35
PM_{10}	Annual	0.00541	17	0.032
	24 hours	0.0601	30	0.2
Sulfur dioxide	Annual	0.00496	20	0.025
	24 hours	0.0551	91	0.061
	3 hours	0.375	512	0.073

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; PSD, prevention of significant deterioration.
Source: EPA 1997b.

The location of these facilities relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operations would include new or existing sources (e.g., cooling systems, vents, motors, material-handling equipment), employee vehicles, and truck traffic. Traffic noise associated with operation of these facilities would occur on the site and along offsite local and regional transportation routes used to bring materials and workers to the site. Given the distance to the site boundary (about 7.1 km [4.4 mi]), noise emissions from equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could have onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Noise from traffic associated with operation of these facilities would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Operations workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

4.3.2.2 Waste Management

Table 4–27 compares the existing site treatment, storage, and disposal capacities with the expected waste generation rates from operating surplus plutonium disposition facilities at Hanford. Although high-level waste (HLW) would be used in the immobilization process, no HLW would be generated by surplus plutonium disposition facilities. Waste generation should be the same for the ceramic and glass immobilization technologies.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Current schedules for shipment of TRU waste to WIPP would accommodate shipment of contact-handled TRU waste from surplus plutonium disposition facilities beginning in 2016 (DOE 1997c:17). Therefore, in order to be conservative, it is assumed the TRU waste would be stored on the site until

2016. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities.

Table 4–27. Potential Waste Management Impacts of Operations Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[c]	180	10	11	1 of WIPP
LLW	230	NA	NA	<1
Mixed LLW	5	<1	<1	<1
Hazardous	80	NA	NA	NA
Nonhazardous				
Liquid	110,000	48[d]	NA	48[e]
Solid	2,600	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[c] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[d] Percent of capacity of the 400 Area sanitary sewer.

[e] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at Hanford will be evaluated in the *Hanford Site Solid (Radioactive and Hazardous) Waste Program EIS* that is being prepared by the DOE Richland Operations Office (DOE 1997b).

TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities. Drum-gas testing, real-time radiography, and loading the TRU Waste Package Transporter (TRUPACT) for shipment to WIPP would occur at the Waste Receiving and Processing Facility at Hanford.

TRU waste generated at surplus plutonium disposition facilities is estimated to be 10 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of the Waste Receiving and Processing Facility. A total of 1,800 m^3 (2,350 yd^3) of TRU waste would be generated over the 10-year operation period. If all the TRU waste were stored on the site, this would be 11 percent of the 17,000-m^3 (22,200-yd^3) storage capacity available at Hanford. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of about 0.26 ha (0.64 acre) would be required. Therefore, impacts of the management of additional quantities of TRU waste at Hanford should not be major. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997d).

The 1,800 m^3 (2,350 yd^3) of TRU wastes generated by these facilities would be 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and 1 percent of the current 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997e:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997e).

LLW would be packaged, certified, and accumulated at the new facilities before transfer for additional treatment and disposal in existing onsite facilities. A total of 2,300 m^3 (3,000 yd^3) of LLW would be generated over the operations period. LLW generated at surplus plutonium disposition facilities is estimated to be less than 1 percent of the 1.74 million-m^3 (2.28 million-yd^3) capacity of the LLW Burial Grounds and 1 percent of the 230,000-m^3 (301,000-yd^3) capacity of the Grout Vaults. Using the 3,480-m^3/ha (1,842-yd^3/acre) disposal land usage factor for Hanford published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 2,300 m^3 (3,000 yd^3) of waste would require 0.67 ha (1.7 acres) of disposal space at Hanford. Therefore, impacts of the management of this additional LLW at Hanford should not be major.

Mixed LLW would be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan for Hanford. Mixed LLW generated at surplus plutonium disposition facilities is estimated to be less than 1 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of the Waste Receiving and Processing Facility, less than 1 percent of the 16,800-m^3 (22,000-yd^3) storage capacity of the Central Waste Complex, and less than 1 percent of the 14,200-m^3 (18,600-yd^3) planned disposal capacity of the Radioactive Mixed Waste Disposal Facility. Therefore, the management of this additional waste at Hanford should not have a major impact on the mixed LLW management system.

If all TRU waste and mixed LLW generated at surplus plutonium disposition facilities were processed in the Waste Receiving and Processing Facility, this additional waste would be 10 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of that facility.

Any hazardous wastes generated during operation would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during the operations period should not have a major impact on the Hanford hazardous waste management system.

Nonhazardous solid waste would be packaged and transported in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent for offsite disposal. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at Hanford.

Nonhazardous wastewater would be treated if necessary before being discharged to the 400 Area sanitary sewer system, which connects to the Energy Northwest (formerly WPPSS) Sewage Treatment Facility. Nonhazardous liquid waste generated at surplus plutonium disposition facilities is estimated to be 48 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 48 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd^3/yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of nonhazardous liquid waste at Hanford should not have a major impact on the treatment system.

4.3.2.3 Socioeconomics

After construction, startup, and testing of all the surplus plutonium disposition facilities at Hanford in 2007 under Alternative 2, 1,165 additional workers would be required to operate them (DOE 1999c; UC 1998a, 1999a, 1999b). This level of employment should generate another 2,950 indirect jobs in the region. As the total employment increase of 4,115 direct and indirect jobs represents less than 1.0 percent of the projected REA workforce, it should have no major impact on the REA. Some of the new jobs created under this alternative could be filled from the ranks of the unemployed, currently 11 percent of the REA's population.

The total employment requirement could have minor impacts on community services in the ROI, as it should coincide with an increase in overall site employment at Hanford in connection with construction of the tank waste remediation system. Assuming that 91 percent of the new employees associated with this alternative would reside in the ROI, the 3,744 new jobs would increase the region's population by approximately 6,947 persons. This population increase, in conjunction with the normal population growth forecast by the State of Washington, would engender increased construction of local housing units. Given the current population-to-student ratio in the ROI, a population of this size would be expected to include 1,438 students, and local school districts would have to increase the number of classrooms to accommodate them.

Community services in the ROI would be expected to change to accommodate the population growth as follows: 90 teachers would be added to maintain the current student-to-teacher ratio of 16:1; 11 police officers would be added to maintain the current officer-to-population ratio of 1.5:1,000; 23 firefighters would be added to maintain the current firefighter-to-population ratio of 3.4:1,000; and 10 physicians would be added to maintain the current physician-to-population ratio of 1.4:1,000. Thus, an additional 133 positions would have to be created to maintain community services at current levels. Hospitals in the ROI would experience a drop from 2.1 beds to 2.0 per 1,000 persons unless additional beds were provided. Average school capacity would increase to 95.4 percent from the current 92.5 percent unless additional classrooms were built. None of these projected changes would have a major impact on the level of community services currently offered in the ROI.

4.3.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment, and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 2 would be as follows.

Radiological Impacts. Table 4–28 reflects the potential radiological impacts on three individual receptor groups: the population living within 80 km (50 mi) of Hanford in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts the projected aggregate latent fatal cancer risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Given incident-free operation of all three facilities, the total population dose in the year 2010 would be 7.2 person-rem. The corresponding number of LCFs in this population from 10 years of operation would be 0.036. The dose to the maximally exposed member of the public from annual operation of all three facilities would be 0.022 mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 1.1×10^{-7}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the Safe Drinking Water Act (SDWA), and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–29; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose would be 500 mrem to pit conversion facility workers, 750 mrem to immobilization facility workers, and 65 mrem to MOX facility workers. The annual dose received by the total site workforce for each of these facilities would be an estimated 192, 274, and 22 person-rem, respectively. The risks and numbers of LCFs among the different workers from 10 years of operation are included in Table 4–29. Doses to individual workers would be kept to minimal levels

Table 4–28. Potential Radiological Impacts on the Public of Operations Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

Impact	Pit Conversion	Immobilization Ceramic	Immobilization Glass	MOX[a]	Total[b]
Population within 80 km for year 2010					
Dose (person-rem)	6.9	7.8×10^{-3}	7.1×10^{-3}	0.29	7.2
Percent of natural background[c]	5.9×10^{-3}	6.7×10^{-6}	6.1×10^{-6}	2.5×10^{-4}	6.2×10^{-3}
10-year latent fatal cancers	0.034	3.9×10^{-5}	3.6×10^{-5}	1.5×10^{-3}	0.036
Maximally exposed individual					
Annual dose (mrem)	0.017	1.1×10^{-4}	9.7×10^{-5}	4.8×10^{-3}	0.022
Percent of natural background[c]	5.7×10^{-3}	3.7×10^{-5}	3.2×10^{-5}	1.6×10^{-3}	7.3×10^{-3}
10-year latent fatal cancer risk	8.5×10^{-8}	5.5×10^{-10}	4.9×10^{-10}	2.4×10^{-8}	1.1×10^{-7}
Average exposed individual within 80 km[d]					
Annual dose (mrem)	0.017	2.0×10^{-5}	1.8×10^{-5}	7.5×10^{-4}	0.018
10-year latent fatal cancer risk	8.5×10^{-8}	1.0×10^{-10}	9.0×10^{-11}	3.8×10^{-9}	8.9×10^{-8}

[a] As described in Section 4.26.1.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] Totals are additive in all cases because the same groups or individuals would receive doses from all three facilities. The total includes the higher of the values for the ceramic and glass immobilization alternatives.

[c] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.

[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford in 2010 (387,800).

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Source: Appendix J.

Table 4–29. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

Impact	Pit Conversion	Immobilization (Ceramic or Glass)	MOX	Total
Number of badged workers	383	365	331	1,079
Total dose (person-rem/yr)	192	274	22	488
10-year latent fatal cancers	0.77	1.1	0.088	2.0
Average worker dose (mrem/yr)	500	750	65	452[a]
10-year latent fatal cancer risk	2.0×10^{-3}	3.0×10^{-3}	2.6×10^{-4}	1.8×10^{-3}

[a] Represents an average of the doses for all three facilities.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998a, 1998b, 1999a, 1999b.

by instituting badged monitoring, administrative limits, and as-low-as-is-reasonably-achievable (ALARA) programs (which would include worker rotations).

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at Hanford under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released as a result of operations.

4.3.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion, immobilization, and MOX facilities at Hanford are presented in Tables 4–30 through 4–33. Doses reported would not be exceeded in 95 percent of weather conditions. Accident scenarios analyzed include low-frequency/high-consequence design basis operational accidents and an extremely low-frequency/high-consequence beyond-design-basis accident involving a building collapse. For the purposes of this analysis, the accident was assumed to be a catastrophic earthquake. The accidents analyzed are representative of the spectrum of potential accidents; analyses of different accidents may be available in the past, ongoing, or future National Environmental Policy Act (NEPA) reviews or SARs.

Table 4–30. Accident Impacts of Pit Conversion Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

		Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Fire	Unlikely	1.1×10^{-5}	4.3×10^{-9}	1.6×10^{-6}	8.1×10^{-10}	5.3×10^{-3}	2.6×10^{-6}
Explosion	Unlikely	2.8×10^{-3}	1.1×10^{-6}	4.2×10^{-4}	2.1×10^{-7}	1.4	6.8×10^{-4}
Leaks/spills of nuclear material	Extremely unlikely	3.9×10^{-6}	1.6×10^{-9}	5.9×10^{-7}	3.0×10^{-10}	1.9×10^{-3}	9.5×10^{-7}
Tritium release	Extremely unlikely	4.5×10^{-1}	1.8×10^{-4}	6.8×10^{-2}	3.4×10^{-5}	2.2×10^{2}	1.1×10^{-1}
Criticality	Extremely unlikely	3.3×10^{-2}	1.3×10^{-5}	3.4×10^{-3}	1.7×10^{-6}	5.4	2.7×10^{-3}
Design basis earthquake	Unlikely	3.5×10^{-4}	1.4×10^{-7}	5.2×10^{-5}	2.6×10^{-8}	1.7×10^{-1}	8.4×10^{-5}
Beyond-design-basis fire	Beyond extremely unlikely	1.1×10^{-1}	4.3×10^{-5}	4.1×10^{-3}	2.0×10^{-6}	9.9	4.9×10^{-3}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	2.5×10^{2}	9.9×10^{-2}	9.4	4.7×10^{-3}	2.3×10^{4}	11

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality and tritium exposure, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility.

Source: Calculated using the source terms in Table K–3 and the MACCS2 computer code.

More details on the method of analysis and specific accident scenarios are presented in Appendix F.11, and more details on the consequences are presented in Appendix K. Each accident type (e.g., fire, explosion) considered is expected to bound the consequences of a range of similar accidents with lower consequences and risk.

Estimates of radiological consequences have been developed for the noninvolved worker and the MEI in the general population. Consequences are presented in terms of the radiological dose (in rem) and the probability

Table 4–31. Accident Impacts of Ceramic Immobilization Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

		Impacts on Noninvolved Worker		Impact at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Criticality	Extremely unlikely	3.3×10^{-2}	1.3×10^{-5}	3.4×10^{-3}	1.7×10^{-6}	5.4	2.7×10^{-3}
Explosion in HYDOX furnace	Unlikely	3.8×10^{-3}	1.5×10^{-6}	5.8×10^{-4}	2.9×10^{-7}	1.9	9.4×10^{-4}
Glovebox fire (calcining furnace)	Extremely unlikely	3.0×10^{-7}	1.2×10^{-10}	4.6×10^{-8}	2.3×10^{-11}	1.5×10^{-4}	7.4×10^{-8}
Hydrogen explosion	Unlikely	4.2×10^{-4}	1.7×10^{-7}	6.4×10^{-5}	3.2×10^{-8}	2.1×10^{-1}	1.0×10^{-4}
Glovebox fire (sintering furnace)	Extremely unlikely	1.7×10^{-6}	6.8×10^{-10}	2.6×10^{-7}	1.3×10^{-10}	8.3×10^{-4}	4.1×10^{-7}
Design basis earthquake	Unlikely	4.3×10^{-4}	1.7×10^{-7}	6.4×10^{-5}	3.2×10^{-8}	2.1×10^{-1}	1.0×10^{-4}
Beyond-design-basis fire	Beyond extremely unlikely	1.7×10^{-2}	6.8×10^{-6}	6.5×10^{-4}	3.2×10^{-7}	1.6	7.8×10^{-4}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	1.5×10^{2}	6.2×10^{-2}	5.8	2.9×10^{-3}	1.4×10^{4}	7.1

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility; HYDOX, hydride oxidation.

Source: Calculated using the source terms in Table K–4 and the MACCS2 computer code.

that the dose would result in an LCF. The probability coefficients for determining the likelihood of fatal cancer, given a dose, are taken from the *1990 Recommendations of the International Commission on Radiation Protection* (ICRP 1991). For low doses or low dose rates, a probability coefficient of 4.0×10^{-4} LCF per rem is

applied for workers, and 5.0×10^{-4} LCF per rem for the public. For high doses received at a high rate, probability coefficients of 8.0×10^{-4} and 1.0×10^{-3} LCF per rem are applied for workers and the public, respectively. These higher-probability coefficients apply for doses above 20 rem and dose rates above 10 rem/hr. At much higher doses, prompt fatalities rather than LCFs may be the primary concern.

The frequency listed for each accident category represents the estimated overall annual probability of occurrence for that type of accident. Because the estimated uncertainty of the accident frequencies is about a factor of 10 or more, the frequencies are characterized as anticipated, unlikely, extremely unlikely, and beyond extremely unlikely, representing estimated frequency ranges of greater than 10^{-2}, 10^{-2} to 10^{-4}, 10^{-4} to 10^{-6}, and less than 10^{-6} per year, respectively.

Public. The most severe consequences of a design basis accident for the pit conversion facility would be associated with a tritium release; the most severe for the immobilization and MOX facilities, a nuclear

Table 4–32. Accident Impacts of Glass Immobilization Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

		Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Criticality	Extremely unlikely	3.3×10^{-2}	1.3×10^{-5}	3.4×10^{-3}	1.7×10^{-6}	5.4	2.7×10^{-3}
Explosion in HYDOX furnace	Unlikely	3.8×10^{-3}	1.5×10^{-6}	5.8×10^{-4}	2.9×10^{-7}	1.9	9.4×10^{-4}
Glovebox fire (calcining furnace)	Extremely unlikely	3.0×10^{-7}	1.2×10^{-10}	4.6×10^{-8}	2.3×10^{-11}	1.5×10^{-4}	7.4×10^{-8}
Hydrogen explosion	Unlikely	4.2×10^{-4}	1.7×10^{-7}	6.4×10^{-5}	3.2×10^{-8}	2.1×10^{-1}	1.0×10^{-4}
Melter eruption	Unlikely	1.6×10^{-6}	6.3×10^{-10}	2.4×10^{-7}	1.2×10^{-10}	7.7×10^{-4}	3.8×10^{-7}
Melter spill	Unlikely	3.7×10^{-7}	1.5×10^{-10}	5.6×10^{-8}	2.8×10^{-11}	1.8×10^{-4}	9.0×10^{-8}
Design basis earthquake	Unlikely	3.7×10^{-4}	1.5×10^{-7}	5.6×10^{-5}	2.8×10^{-8}	1.8×10^{-1}	9.1×10^{-5}
Beyond-design-basis fire	Beyond extremely unlikely	3.1×10^{-3}	1.2×10^{-6}	1.2×10^{-4}	5.8×10^{-8}	2.8×10^{-1}	1.4×10^{-4}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	1.4×10^{2}	5.4×10^{-2}	5.1	2.6×10^{-3}	1.2×10^{4}	6.2

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility; HYDOX, hydride oxidation.

Source: Calculated using the source terms in Table K–5 and the MACCS2 computer code.

criticality. Bounding radiological consequences for the MEI are from the tritium release, which would result in a dose of 0.068 rem, corresponding to an LCF probability of 3.4×10^{-5}. A nuclear criticality of 10^{19} fissions would result in an MEI dose of 3.4×10^{-3} rem at the immobilization facility and 3.5×10^{-2} rem at the MOX facility. Consequences of the tritium release for the general population in the environs of Hanford would include an estimated 0.11 LCF. The frequency of such an accident is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year.

The combined radiological effects from total collapse of all three facilities in the beyond-design-basis earthquake would be approximately 46 LCFs. It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause

widespread failure of homes, office buildings, and other structures in the surrounding area. The overall impact of such an event must therefore be seen in the context not only of the potential radiological impacts of these other facilities, but of hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of such an earthquake is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

Table 4–33. Accident Impacts of MOX Facility Under Alternative 2: Pit Conversion in FMEF, Immobilization in FMEF and HLWVF, and MOX in New Construction at Hanford

		Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Criticality	Extremely unlikely	6.1×10^{-1}	2.5×10^{-4}	3.5×10^{-2}	1.7×10^{-5}	5.5×10^{1}	2.8×10^{-2}
Explosion in sintering furnace	Extremely unlikely	2.9×10^{-3}	1.2×10^{-6}	1.1×10^{-4}	5.7×10^{-8}	3.2×10^{-1}	1.6×10^{-4}
Ion exchange exotherm	Unlikely	1.3×10^{-4}	5.1×10^{-8}	5.0×10^{-6}	2.5×10^{-9}	1.4×10^{-2}	7.0×10^{-6}
Fire	Unlikely	2.1×10^{-5}	8.4×10^{-9}	8.3×10^{-7}	4.2×10^{-10}	2.3×10^{-3}	1.2×10^{-6}
Spill	Extremely unlikely	2.6×10^{-5}	1.1×10^{-8}	1.0×10^{-6}	5.2×10^{-10}	2.9×10^{-3}	1.5×10^{-6}
Design basis earthquake	Unlikely	4.1×10^{-4}	1.7×10^{-7}	1.6×10^{-5}	8.2×10^{-9}	4.6×10^{-2}	2.3×10^{-5}
Beyond-design-basis fire	Beyond extremely unlikely	3.8×10^{-1}	1.5×10^{-4}	1.5×10^{-2}	7.3×10^{-6}	3.5×10^{1}	1.8×10^{-2}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	6.1×10^{2}	2.4×10^{-1}	2.3×10^{1}	1.2×10^{-2}	5.6×10^{4}	2.8×10^{1}

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Source: Calculated using the source terms in Table K–9 and the MACCS2 computer code.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. A worker closer than 1,000 m (3,281 ft) from the accident would generally receive a higher dose; a worker farther away, a lower one. At some sites where the distance to the site boundary is less than 1,000 m (3,281 ft), the worker is assumed to be at the site boundary. For design basis accidents,

the radiological consequences for this worker were estimated to be the highest for the criticality at the MOX facility. The consequences of such an accident would include an LCF probability of 2.5×10^{-4}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at Hanford could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 12,030 person-years of labor and the standard DOE occupational accident rates, approximately 430 cases of nonfatal occupational injury or illness and 0.32 fatality could be expected for the duration of operations.

4.3.2.6 Transportation

Operational transportation impacts may be divided into two parts: impacts due to incident-free transportation and those due to transportation accidents. They may be further divided into nonradiological and radiological impacts. Nonradiological impacts are specifically vehicular, such as vehicular emissions and traffic accidents. Radiological impacts are those related to the dose received by transportation workers and the public during normal operations and in the case of accidents in which the radioactive materials being shipped may be released. For more detailed information on the transportation analysis performed for this SPD EIS, see Appendix L.

Under Alternative 2, transportation to and from Hanford would include the classified shipment of plutonium pits and clean plutonium metal via safe, secure trailer/SafeGuards Transport (SST/SGT) from sites throughout the DOE complex to the pit conversion facility.[10] During dismantlement of the pits, some highly enriched uranium (HEU) would be recovered. The pit conversion facility would ship HEU via SST/SGT to Oak Ridge Reservation (ORR) for storage.[11] After conversion, the plutonium in the pit conversion facility would be in the form of

[10] Work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 SI container for long-term storage. The AL–R8 is not an offsite shipping container as was the AT–400A analyzed in the SPD Draft EIS. Therefore, if the decision were made to site the pit conversion facility at a site other than Pantex, the surplus pits would have to be taken out of the AL–R8 SI and placed in a yet-to-be-developed shipping container. This operation would also require the replacement of some pit-holding fixtures to meet transportation requirements. Under such alternatives, this change would result in a total repackaging exposure of 208 person-rem to Pantex personnel. An increase in worker doses of this magnitude could result in an increase in the expected number of LCFs of 8.3×10^{-2} over the life of the program.

[11] Classified nuclear material parts would also result from pit disassembly. Although current plans are to store these parts at the pit conversion facility, this SPD EIS analyzes the possible transport of these nuclear material parts to LANL. Therefore, the transportation impacts are slightly overstated.

plutonium dioxide. This material would be transferred through a secure tunnel to the MOX facility at Hanford for fabrication into MOX fuel pellets.

MOX fuel fabrication also requires uranium dioxide. Quantifying the uranium dioxide transportation requirements for this SPD EIS involved selecting representative sites for the source of the depleted uranium hexafluoride and the conversion facility. A DOE enrichment facility near Portsmouth, Ohio, was chosen as a representative site for the source of the depleted uranium hexafluoride, and the nuclear fuel fabrication facility in Wilmington, North Carolina, as representative of a uranium conversion facility. These sites were also used as representative sites in the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996e). It is assumed that depleted uranium hexafluoride would be shipped via commercial truck to the uranium conversion facility, where it would be converted into uranium dioxide. After conversion, the depleted uranium dioxide would be shipped via commercial truck from the conversion facility to the MOX facility at Hanford. This material would be blended with plutonium dioxide at the MOX facility, fabricated into MOX fuel pellets, and placed in MOX fuel rods. After fabrication, the MOX fuel rods would be shipped to a domestic, commercial reactor site (Catawba, McGuire, or North Anna), where they would be placed in fuel assemblies and irradiated. Shipments of unirradiated MOX fuel rods would be made in an SST/SGT because unirradiated MOX fuel in large enough quantities is subject to the same security concerns as pure weapons-grade plutonium. For the purpose of this transportation analysis, it is assumed that all MOX fuel is shipped from the MOX facility to the most distant reactor site, North Anna.

Immobilization at Hanford under this alternative would require that surplus nonpit plutonium in various forms be shipped from current storage locations (i.e., SRS, Hanford, INEEL, LLNL, LANL, and RFETS) to the immobilization facility at Hanford. Even though these materials are not clean plutonium metal or pits, the quantity of the plutonium contained in them would require that they be treated as materials that could be used in nuclear weapons, and thus that shipments be made in SST/SGTs.

Under the preferred technology alternative for immobilization, the surplus plutonium would be immobilized in a ceramic matrix in small cans at the immobilization facility, placed in HLW canisters, and transported via specially designed trucks to the high-level-waste vitrification facility (HLWVF) in the 200 Area. This intrasite transportation—from 400 Area to 200 Area—could require the temporary shutdown of roads on the Hanford site. It would, however, provide for all the necessary security and for reduced risk to the public; SST/SGTs would not be required.

Use of the preferred ceramic (versus glass) matrix for immobilization would also require a small amount of depleted uranium dioxide (i.e., less than 10 t [11 tons] per year). It is assumed that this depleted uranium dioxide would be produced and shipped in the same manner as the depleted uranium dioxide needed by the MOX facility.

After the immobilized plutonium was encased by HLW at HLWVF, it would be shipped to a potential geologic repository for ultimate disposition. Because HLW would be displaced by the cans of immobilized plutonium suspended in the HLW canister, additional canisters—to accommodate the displaced HLW—would be required over the life of the immobilization program. According to estimates, up to 145 additional canisters of HLW would be needed to meet the demands of surplus plutonium disposition under Alternative 2. The *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (*Yucca Mountain Draft EIS*) (DOE 1999d) evaluates different options for the shipment of these canisters to a potential geologic repository using either trucks or trains. The analysis revealed that shipment by train would pose the lower risk. However, no ROD has yet been issued regarding these shipments. To bound the risks associated with these additional shipments, this SPD EIS conservatively assumes that all of these shipments would be made by truck, one canister per truck.

Every alternative considered in this SPD EIS would require routine transportation of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities on the sites. This transportation would be handled

in the same manner as other site waste shipments, and as shown in Sections 4.3.1.2 and 4.3.2.2, would involve no major increase in the amounts of waste already being managed at these sites. The shipments would pose no greater risks than the ordinary waste shipments at these sites as analyzed in the WM PEIS.

In all, approximately 2,400 shipments of radioactive materials would be carried out by DOE under this alternative. The total distance traveled on public roads by trucks carrying radioactive materials would be 7.5 million km (4.6 million mi).

Impacts of Incident-Free Transportation. The dose to transportation workers from all transportation activities entailed by this alternative has been estimated at 30 person-rem; the dose to the public, 41 person-rem. Accordingly, incident–free transportation of radioactive material associated with this alternative would result in 0.012 LCF among transportation workers and 0.020 LCF in the total affected population over the duration of the transportation activities. (LCFs associated with radiological releases were estimated by multiplying the occupational [worker] dose by 4.0×10^{-4} cancer per person-rem of exposure, and the public accident and accident-free doses by 5.0×10^{-4} cancer per person-rem of exposure [ICRP 1991]). The estimated number of nonradiological fatalities from vehicular emissions associated with this alternative is 0.025.

Impacts of Accidents During Transportation (Consequences). The maximum foreseeable offsite transportation accident under this alternative (probability of occurrence: greater than 1 in 10 million per year) is a shipment of plutonium pits from one of DOE's storage locations to the pit conversion facility with a severity category VIII accident in a rural population zone under neutral (average) weather conditions. If this accident were to occur, it could result in a dose of 87 person-rem to the public for an LCF risk of 0.044 and 96 rem to the hypothetical MEI for an LCF risk of 0.096. (The MEI receives a larger dose than the population because it is unlikely that a person would be in position, and remain in position, to receive this hypothetical maximum dose.) No fatalities would be expected to occur. The probability of more severe accidents, different weather conditions at the time of accident, or occurrence in a more densely populated area were also evaluated, and estimated to have a probability lower than 1 chance in 10 million per year. (See Appendix L.6.)

Impacts of Accidents During Transportation (Risks). The total transportation accident risks were estimated by summing the risks to the affected population from all hypothetical accidents. For Alternative 2, those risks are as follows: a radiological dose to the population of 7 person-rem, resulting in a total population risk of 0.004 LCF; and traffic accidents resulting in 0.074 fatalities.

4.3.2.7 Environmental Justice

As discussed in other parts of Section 4.3.2, routine operations conducted under Alternative 2 would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near Hanford would be approximately 1 in 9 million (see Table 4–28). The number of LCFs expected among the general population residing near Hanford from accident-free operations would be 0.036.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public (see Section 4.3.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–30 through 4–33). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the site pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.3.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 2 would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.4 ALTERNATIVE 3

Alternative 3 would involve constructing and operating all three facilities for surplus plutonium disposition at SRS. All three facilities would be located in new buildings in F-Area.

4.4.1 Construction

4.4.1.1 Air Quality and Noise

Sources of potential air quality impacts of construction under Alternative 3 at SRS include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from SRS construction activities, with standards and guidelines is presented as Table 4–34. Concentrations of air pollutants, especially for PM_{10} and total suspended particulates, would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Table 4–34. Evaluation of Air Pollutant Concentrations Associated With Construction Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	SPD Increment (Fg/m^3)	Total Site Concentration (Fg/m^3)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	4.35	675	6.8
	1 hour	40,000	19.8	5,120	13
Nitrogen dioxide	Annual	100	0.189	11.6	12
PM_{10}	Annual	50	0.0969	5.04	10
	24 hours	150	6.39	92.1	61
Sulfur dioxide	Annual	80	0.0562	16.7	21
	24 hours	365	1.39	223	61
	3 hours	1,300	8.31	733	56
Other regulated pollutants					
Total suspended particulates	Annual	75	0.19	45.6	61
Hazardous and other toxic compounds					
Other toxics[b]	24 hours	150	0.000224	20.7	14

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: DWPF, Defense Waste Processing Facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; SCDHEC 1996a.

Total vehicle emissions associated with activities at SRS would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of these facilities relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with the construction of these facilities would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 8.7 km [5.4 mi]), noise emissions from construction equipment would not be expected to annoy the public. These noise sources would be far enough away from offsite areas that the contribution to offsite noise levels would be small. Some noise sources could have onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur in F- or S-Area (see Section 4.26). Noise from traffic associated with the construction of these facilities would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Construction workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of standard silencing packages on construction equipment, administrative controls, engineering controls, and personal hearing protection equipment.

4.4.1.2 Waste Management

Table 4–35 compares the wastes generated during the construction of surplus plutonium disposition facilities at SRS with the existing treatment, storage, and disposal capacity for the various waste types. It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during the 3-year construction period. In addition, no soil contaminated with hazardous or radioactive constituents should be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and applicable Federal and State regulations. Construction waste generation would be the same for the ceramic and glass immobilization technologies because the same size facility would be built under either scenario. For this SPD EIS, it is assumed that hazardous waste and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

Table 4–35. Potential Waste Management Impacts of Construction Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

		Estimated Additional Waste Generation as a Percent of[b]		
Waste Type[a]	**Estimated Additional Waste Generation (m^3/yr)**	**Characterization or Treatment Capacity**	**Storage Capacity**	**Disposal Capacity**
Hazardous	100	NA	NA	NA
Nonhazardous				
Liquid	47,000	17[c]	NA	3[d]
Solid	11,000	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of F-Area sanitary sewer.

[d] Percent of capacity of Central Sanitary Wastewater Treatment Facility.

Key: DWPF, Defense Waste Processing Facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste will be treated and disposed of off the site by the construction contractor).

Hazardous wastes generated during the construction of surplus plutonium disposition facilities would be typical of those generated during the construction of an industrial facility. Any hazardous wastes generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during construction should not have a major impact on the SRS hazardous waste management system.

Nonhazardous solid wastes generated during the construction of surplus plutonium disposition facilities would be packaged in conformance with standard industrial practice and shipped to commercial or municipal facilities for recycling or disposal. Because these wastes would be managed largely at non-DOE facilities, the additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at SRS.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during the construction of surplus plutonium disposition facilities would be managed at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during the construction of these facilities is estimated to be 17 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 3 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, management of these wastes at SRS should not have a major impact on the nonhazardous liquid waste treatment system during construction.

4.4.1.3 Socioeconomics

Construction-related employment requirements under Alternative 3 would be as indicated in Table 4–36.

Table 4–36. Construction Employment Requirements for Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

Year	Pit Conversion	Immobilization	MOX	Total
2001	297	0	0	297
2002	451	506	441	1,398
2003	276	920	772	1,968
2004	0	1,014	508	1,522
2005	0	552	221	773
2006	0	0	208	208

Key: DWPF, Defense Waste Processing Facility.
Source: DOE 1999c; UC 1998c, 1999c, 1999d.

At its peak in 2003, construction of the three new surplus plutonium disposition facilities at SRS under this alternative would require 1,968 construction workers and should generate another 1,580 indirect jobs in the region. As the total employment increase of 3,548 direct and indirect jobs represents only 1.3 percent of the projected REA workforce, it should have no major impact on the REA. Moreover, it should have little impact on the community services currently offered in the ROI. In fact, it should help offset the 20 percent reduction in SRS's total workforce (i.e., from 15,032 to 12,000 workers) projected for the years 1997–2005.

4.4.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. A summary of radiological impacts of construction activities on workers at risk is presented in Table 4–37. Construction worker exposures to radiation that derives from other activities at the site, past or present, would be kept as low as is reasonably achievable. To this end, construction workers would be monitored (badged) as appropriate.

Table 4–37. Potential Radiological Impacts on Construction Workers of Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion[a]	Immobilization[b]	MOX[c]	Total
Total dose (person-rem/yr)	1.4	1.5	1.2	4.1
Annual latent fatal cancers[d]	5.6×10^{-4}	6.0×10^{-4}	4.8×10^{-4}	1.6×10^{-3}
Average worker dose (mrem/yr)	4	4	4	4[e]
Annual latent fatal cancer risk	1.6×10^{-6}	1.6×10^{-6}	1.6×10^{-6}	1.6×10^{-6}

[a] An estimated average of 341 workers would be associated with annual construction operations.
[b] An estimated average of 374 workers would be associated with annual construction operations at the new facility location adjacent to APSF, if built. The number would be the same for immobilization in either ceramic or glass.
[c] An estimated average of 292 workers would be associated with annual construction operations.
[d] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations, per ICRP 1991.
[e] Represents an average of the doses for all three facilities.
Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility.
Note: The radiological limit for construction workers is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: ICRP 1991; NAS 1990; UC 1998c, 1998d, 1999c, 1999d.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of surplus plutonium disposition facility construction activities at SRS under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

4.4.1.5 Facility Accidents

The construction of new surplus plutonium disposition facilities at SRS could result in worker injuries or fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 6,166 person-years of construction labor and standard industrial accident rates, approximately 610 cases of nonfatal occupational injury or illness and 0.86 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.4.1.6 Environmental Justice

As discussed in other parts of Section 4.4.1, construction under Alternative 3 would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, the construction of new facilities at SRS under Alternative 3 would have no significant impacts on minority or low-income populations.

4.4.2 Operations

4.4.2.1 Air Quality and Noise

Potential air quality impacts of the operation of facilities under Alternative 3 at SRS were analyzed using ISCST3. Operational impacts would result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles.

A comparison of maximum air pollutant concentrations, including the contribution from surplus plutonium disposition facilities, with standards and guidelines is presented as Table 4–38. Concentrations for immobilization in the ceramic and glass forms are the same. [Text deleted.] Concentrations of air pollutants would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards. Air pollution impacts during operation would be mitigated; for example, HEPA filtration has been included in the design of these facilities.

Table 4–38. Evaluation of Air Pollutant Concentrations Associated With Operations Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	SPD Increment (Fg/m^3)	Total Site Concentration (Fg/m^3)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.37	671	6.7
	1 hour	40,000	1.4	5,100	13
Nitrogen dioxide	Annual	100	0.0634	11.4	11
PM_{10}	Annual	50	0.00423	4.94	9.9
	24 hours	150	0.0688	85.8	57
Sulfur dioxide	Annual	80	0.124	16.8	21
	24 hours	365	1.7	224	61
	3 hours	1,300	4.48	729	56
Other regulated pollutants					
Total suspended particulates	Annual	75	0.00423	45.4	61
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Key: DWPF, Defense Waste Processing Facility; SPD, surplus plutonium disposition.
Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.
Source: EPA 1997a; SCDHEC 1996a.

For a discussion of how the operation of these facilities would affect the site's ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.4.4. There are no other NESHAPs limits applicable to operation of these facilities.

The increased concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from the operation of these facilities would be a small fraction of the PSD Class II area increments, as summarized in Table 4–39.

Total vehicle emissions associated with activities at SRS would likely decrease somewhat from current emissions because of a decrease in overall site employment during this timeframe.

Table 4–39. Evaluation of Air Pollutant Increases Associated With Operations Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Increase in Concentration (Fg/m^3)	PSD Class II Area Allowable Increment (Fg/m^3)	Percent of Increment
Nitrogen dioxide	Annual	0.0634	25	0.25
PM_{10}	Annual	0.00423	17	0.025
	24 hours	0.0688	30	0.23
Sulfur dioxide	Annual	0.124	20	0.62
	24 hours	1.70	91	1.9
	3 hours	4.48	512	0.88

Key: DWPF, Defense Waste Processing Facility; PSD, prevention of significant deterioration.
Source: EPA 1997b.

The combustion of fossil fuels associated with Alternative 3 would result in the emission of carbon dioxide, one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative would represent less than 2×10^{-4} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

The location of these facilities relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operations would include new or existing sources (e.g., cooling systems, vents, motors, material-handling equipment), employee vehicles, and truck traffic. Traffic noise associated with operation of these facilities would occur on the site and along offsite local and regional transportation routes used to bring materials and workers to the site. Given the distance to the site boundary (about 8.7 km [5.4 mi]), noise emissions from equipment would not be expected to annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could have onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur in F- or S-Area (see Section 4.26). Noise from traffic associated with operation of these facilities would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Operations workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulation (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

4.4.2.2 Waste Management

Table 4–40 compares the existing site treatment, storage, and disposal capacities with the expected waste generation rates from operating surplus plutonium disposition facilities at SRS. Although HLW would be used in the immobilization process, no HLW would be generated by surplus plutonium disposition facilities. Waste generation should be the same for the ceramic and glass immobilization technologies.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and

shipped to WIPP for disposal. Current schedules for shipment of TRU waste to WIPP would accommodate shipment of contact-handled TRU waste from surplus plutonium disposition facilities beginning

Table 4–40. Potential Waste Management Impacts of Operations Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[c]	180	10	5	1 of WIPP
LLW	240	1	NA	8
Mixed LLW	5	<1	3	NA
Hazardous	94	1	18	NA
Nonhazardous				
Liquid	110,000	40[d]	NA	8[e]
Solid	3,100	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[c] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[d] Percent of capacity of F-Area sanitary sewer.

[e] Percent of capacity of Central Sanitary Wastewater Treatment Facility.

Key: DWPF, Defense Waste Processing Facility; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

in 2016 (DOE 1997c:17). Therefore, in order to be conservative it is assumed the TRU waste would be stored on the site until 2016. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility, and treated and disposed of offsite at commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995c).

TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU Waste Characterization and Certification Facility at SRS.

TRU waste generated at surplus plutonium disposition facilities is estimated to be 10 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 1,800 m^3 (2,350 yd^3) of TRU waste would be generated over the 10-year operation period. If all the TRU waste were stored on the site, this would be 5 percent of the 34,400-m^3 (45,000-yd^3) storage capacity available at the TRU Waste Storage Pads. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of about 0.26 ha (0.64 acre) would be required. Therefore, impacts of the management of additional quantities of TRU waste at SRS should not be major. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997d) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997e).

The 1,800 m^3 (2,350 yd^3) of TRU wastes generated by these facilities would be 1 percent of the 143,000-m^3 (187,000-yd^3) contact-handled TRU waste that DOE plans to dispose of at WIPP and 1 percent of the current

168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997e:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997e).

LLW would be packaged, certified, and accumulated at the new facilities before transfer for additional treatment and disposal in existing onsite facilities. A total of 2,400 m^3 (3,140 yd^3) of LLW would be generated over the operations period. LLW generated at surplus plutonium disposition facilities is estimated to be 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility and 8 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687 m^3/ha disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 2,400 m^3 (3,140 yd^3) of waste would require 0.27 ha (0.67 acre) of disposal space at SRS. Therefore, impacts of the management of this additional LLW at SRS should not be major.

Mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan for SRS. Mixed LLW generated at surplus plutonium disposition facilities is estimated to be less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 3 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

Hazardous waste would be packaged at the generating facility for treatment and disposal at a combination of onsite and offsite facilities. Assuming that all hazardous waste is managed on the site, hazardous waste generated at surplus plutonium disposition facilities is estimated to be 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 18 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage buildings. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system. If all LLW, mixed LLW, and hazardous wastes generated at surplus plutonium disposition facilities were treated in the Consolidated Incineration Facility, this additional waste would be 2 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of that facility.

Nonhazardous solid waste would be packaged and transported in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent to the Three Rivers Landfill for disposal (DOE 1998c:3-42). It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous wastewater would be treated if necessary before being discharged to the F-Area sanitary sewer system, which connects to the Central Sanitary Wastewater Treatment Facility. Nonhazardous liquid waste generated by surplus plutonium disposition facilities is estimated to be 40 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 8 percent of the 1,449,050-m^3yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, management of nonhazardous liquid waste at SRS should not have a major impact on the treatment system.

4.4.2.3 Socioeconomics

After construction, startup, and testing of the new SRS facilities in 2007 under Alternative 3, an estimated 1,120 new workers would be required to operate them (DOE 1999c; UC 1998c, UC 1999c, 1999d). This level of employment should generate another 2,003 indirect jobs in the region. As the total employment requirement of 3,123 direct and indirect jobs represents 1 percent of the projected REA workforce, it should have no major impact on the REA. Moreover, the additional jobs would have little impact on community services currently

offered in the ROI. In fact, they should help offset the reduction in SRS's total workforce projected for the years 1997–2010 of 33 percent (i.e., 15,032 to 10,000 workers).

4.4.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 3 would be as follows.

Radiological Impacts. Table 4–41 reflects the potential radiological impacts on three individual receptor groups: the population living within 80 km (50 mi) of SRS in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts projected aggregate latent fatal cancer risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Table 4–41. Potential Radiological Impacts on the Public of Operations Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	Immobilization		MOX[a]	Total[b]
		Ceramic	Glass		
Population within 80 km for year 2010					
Dose (person-rem)	1.6	2.8×10^{-3}	2.6×10^{-3}	0.18	1.8
Percent of natural background[c]	6.9×10^{-4}	1.2×10^{-6}	1.1×10^{-6}	7.8×10^{-5}	7.8×10^{-4}
10-year latent fatal cancers	8.0×10^{-3}	1.4×10^{-5}	1.3×10^{-5}	9.1×10^{-4}	9.0×10^{-3}
Maximally exposed individual					
Annual dose (mrem)	3.7×10^{-3}	2.8×10^{-5}	2.6×10^{-5}	3.7×10^{-3}	7.4×10^{-3}
Percent of natural background[c]	1.3×10^{-3}	9.5×10^{-6}	8.8×10^{-6}	1.3×10^{-3}	2.5×10^{-3}
10-year latent fatal cancer risk	1.9×10^{-8}	1.4×10^{-10}	1.3×10^{-10}	1.9×10^{-8}	3.7×10^{-8}
Average exposed individual within 80 km[d]					
Annual dose (mrem)	2.0×10^{-3}	3.6×10^{-6}	3.3×10^{-6}	2.3×10^{-4}	2.2×10^{-3}
10-year latent fatal cancer risk	1.0×10^{-8}	1.8×10^{-11}	1.6×10^{-11}	1.2×10^{-9}	1.1×10^{-8}

[a] Includes a component from liquid pathways because it is possible that liquid releases could reach these pathways at SRS.

[b] Totals are additive in all cases because the same groups or individuals would receive doses from all three facilities. The total includes the higher of the values for the ceramic and glass immobilization alternatives.

[c] The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive approximately 232,000 person-rem.

[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of APSF, if built, in 2010 (approximately 790,000).

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility.

Source: Appendix J.

Given incident-free operation of all three facilities, the total population dose in the year 2010 would be 1.8 person-rem. The corresponding number of LCFs in this population from 10 years of operation would be 9.0×10^{-3}. The dose to the maximally exposed member of the public from annual operation of all three facilities would be 7.4×10^{-3} mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 3.7×10^{-8}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with the operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–42; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose would be 500 mrem to pit conversion facility workers, 750 mrem to immobilization facility workers, and 65 mrem to MOX facility workers. The annual dose received by the total site workforce for each of these facilities is estimated to be 192, 242, and 22 person-rem, respectively. The risks and numbers of LCFs among the different workers from 10 years of operation are included in Table 4–42. Doses to individual workers would be kept to minimal levels by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Table 4–42. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	Immobilization (Ceramic or Glass)	MOX	Total
Number of badged workers	383	323	331	1037
Total dose (person-rem/yr)	192	242	22	456
10-year latent fatal cancers	0.77	0.97	0.088	1.8
Average worker dose (mrem/yr)	500	750	65	440[a]
10-year latent fatal cancer risk	2.0×10^{-3}	3.0×10^{-3}	2.6×10^{-4}	1.8×10^{-3}

[a] Represents an average of the doses for all three facilities.

Key: DWPF, Defense Waste Processing Facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998c, 1998d, 1999c, 1999d.

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at SRS under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released as a result of operations.

4.4.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion, immobilization, and MOX facilities at SRS are presented in Tables 4–43 through 4–46. More details on the method of analysis, assumptions, and specific accident scenarios are presented in the discussion of Alternative 2 in Section 4.3.2.5.

Public. The most severe consequences of a design basis accident for the pit conversion facility would be associated with a tritium release; the most severe for the immobilization and MOX facilities, a nuclear criticality. Bounding radiological consequences for the MEI are from the tritium release, which would result in a dose of 0.028 rem, corresponding to an LCF probability of 1.4×10^{-5}. A nuclear criticality of 10^{19} fissions would result in an MEI dose of 1.6×10^{-3} rem at the immobilization facility and 0.016 rem at the MOX facility. Consequences of the tritium release accident for the general population in the environs of SRS would include an estimated

0.050 LCF. The frequency of such an accident is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year.

The combined radiological effects from total collapse of all three facilities in the beyond-design-basis earthquake would be approximately 18 LCFs. It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause widespread failure of homes, office buildings, and other structures in the surrounding area. The overall impact of such an event must therefore be seen in the context not only of the potential radiological

Table 4–43. Accident Impacts of Pit Conversion Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

		Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Fire	Unlikely	6.2×10^{-6}	2.5×10^{-9}	6.7×10^{-7}	3.3×10^{-10}	2.4×10^{-3}	1.2×10^{-6}
Explosion	Unlikely	1.6×10^{-3}	6.5×10^{-7}	1.8×10^{-4}	8.8×10^{-8}	6.2×10^{-1}	3.1×10^{-4}
Leaks/spills of nuclear material	Extremely unlikely	2.3×10^{-6}	9.1×10^{-10}	2.5×10^{-7}	1.2×10^{-10}	8.7×10^{-4}	4.3×10^{-7}
Tritium release	Extremely unlikely	2.6×10^{-1}	1.0×10^{-4}	2.8×10^{-2}	1.4×10^{-5}	1.0×10^{2}	5.0×10^{-2}
Criticality	Extremely unlikely	1.7×10^{-2}	6.7×10^{-6}	1.8×10^{-3}	9.2×10^{-7}	1.8	9.0×10^{-4}
Design basis earthquake	Unlikely	2.0×10^{-4}	8.0×10^{-8}	2.2×10^{-5}	1.1×10^{-8}	7.7×10^{-2}	3.8×10^{-5}
Beyond-design-basis fire	Beyond extremely unlikely	4.0×10^{-2}	1.6×10^{-5}	1.6×10^{-3}	7.8×10^{-7}	3.7	1.9×10^{-3}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	9.2×10^{1}	3.7×10^{-2}	3.6	1.8×10^{-3}	8.5×10^{3}	4.3

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality and tritium exposure, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility.

Source: Calculated using the source terms in Table K–14 and the MACCS2 computer code.

impacts of these other facilities, but of hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of such an earthquake is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and

assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. For design basis accidents, the radiological consequences for this worker were estimated to be the highest for the criticality at the MOX facility. The consequences of such an accident would include an LCF probability of 1.2×10^{-4}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have

Table 4–44. Accident Impacts of Ceramic Immobilization Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

		Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Criticality	Extremely unlikely	1.0×10^{-2}	4.2×10^{-6}	1.6×10^{-3}	7.8×10^{-7}	1.5	7.5×10^{-4}
Explosion in HYDOX furnace	Unlikely	8.6×10^{-4}	3.4×10^{-7}	1.6×10^{-4}	8.1×10^{-8}	7.1×10^{-1}	3.5×10^{-4}
Glovebox fire (calcining furnace)	Extremely unlikely	6.8×10^{-8}	2.7×10^{-11}	1.3×10^{-8}	6.5×10^{-12}	5.6×10^{-5}	2.8×10^{-8}
Hydrogen explosion	Unlikely	9.5×10^{-5}	3.8×10^{-8}	1.8×10^{-5}	9.0×10^{-9}	7.8×10^{-2}	3.8×10^{-5}
Glovebox fire (sintering furnace)	Extremely unlikely	3.8×10^{-7}	1.5×10^{-10}	7.2×10^{-8}	3.6×10^{-11}	3.1×10^{-4}	1.5×10^{-7}
Design basis earthquake	Unlikely	9.6×10^{-5}	3.8×10^{-8}	1.8×10^{-5}	9.1×10^{-9}	7.9×10^{-2}	3.9×10^{-5}
Beyond-design-basis fire	Beyond extremely unlikely	6.3×10^{-3}	2.5×10^{-6}	2.5×10^{-4}	1.2×10^{-7}	5.8×10^{-1}	2.9×10^{-4}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	5.7×10^{1}	2.3×10^{-2}	2.2	1.1×10^{-3}	5.3×10^{3}	2.7

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility; HYDOX, hydride oxidation.

Source: Calculated using the source terms in Table K–15 and the MACCS2 computer code.

substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at SRS could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated

employment of 11,535 person-years of labor and the standard DOE occupational accident rates, approximately 420 cases of nonfatal occupational injury or illness and 0.31 fatality could be expected for the duration of operations.

Table 4–45. Accident Impacts of Glass Immobilization Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

		Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Criticality	Extremely unlikely	1.0×10^{-2}	4.2×10^{-6}	1.6×10^{-3}	7.8×10^{-7}	1.5	8.0×10^{-4}
Explosion in HYDOX furnace	Unlikely	8.6×10^{-4}	3.4×10^{-7}	1.6×10^{-4}	8.1×10^{-8}	7.1×10^{-1}	3.5×10^{-4}
Glovebox fire (calcining furnace)	Extremely unlikely	6.8×10^{-8}	2.7×10^{-11}	1.3×10^{-8}	6.5×10^{-12}	5.6×10^{-5}	2.8×10^{-8}
Hydrogen explosion	Unlikely	9.5×10^{-5}	3.8×10^{-8}	1.8×10^{-5}	9.0×10^{-9}	7.8×10^{-2}	3.8×10^{-5}
Melter eruption	Unlikely	3.5×10^{-7}	1.4×10^{-10}	6.7×10^{-8}	3.3×10^{-11}	2.9×10^{-4}	1.4×10^{-7}
Melter spill	Unlikely	8.3×10^{-8}	3.3×10^{-11}	1.6×10^{-8}	7.8×10^{-12}	6.8×10^{-5}	3.3×10^{-8}
Design basis earthquake	Unlikely	8.3×10^{-5}	3.3×10^{-8}	1.6×10^{-5}	7.9×10^{-9}	6.9×10^{-2}	3.4×10^{-5}
Beyond-design-basis fire	Beyond extremely unlikely	1.1×10^{-3}	4.6×10^{-7}	4.4×10^{-5}	2.2×10^{-8}	1.0×10^{-1}	5.3×10^{-5}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	5.0×10^{1}	2.0×10^{-2}	2.0	9.8×10^{-4}	4.6×10^{3}	2.3

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility; HYDOX, hydride oxidation.

Source: Calculated using the source terms in Table K–16 and the MACCS2 computer code.

Table 4–46. Accident Impacts of MOX Facility Under Alternative 3: Pit Conversion and MOX in New Construction and Immobilization in New Construction and DWPF at SRS

		Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Criticality	Extremely unlikely	3.0×10^{-1}	1.2×10^{-4}	1.6×10^{-2}	8.0×10^{-6}	1.6×10^{1}	8.0×10^{-3}
Explosion in sintering furnace	Extremely unlikely	1.2×10^{-3}	4.6×10^{-7}	4.8×10^{-5}	2.4×10^{-8}	1.2×10^{-1}	6.1×10^{-5}
Ion exchange exotherm	Unlikely	5.1×10^{-5}	2.0×10^{-8}	2.1×10^{-6}	1.1×10^{-9}	5.3×10^{-3}	2.7×10^{-6}
Fire	Unlikely	8.4×10^{-6}	3.4×10^{-9}	3.5×10^{-7}	1.8×10^{-10}	8.8×10^{-4}	4.4×10^{-7}
Spill	Extremely unlikely	1.1×10^{-5}	4.2×10^{-9}	4.4×10^{-7}	2.2×10^{-10}	1.1×10^{-3}	5.5×10^{-7}
Design basis earthquake	Unlikely	1.7×10^{-4}	6.6×10^{-8}	6.9×10^{-6}	3.5×10^{-9}	1.7×10^{-2}	8.7×10^{-6}
Beyond-design-basis fire	Beyond extremely unlikely	1.4×10^{-1}	5.7×10^{-5}	5.6×10^{-3}	2.8×10^{-6}	1.3×10^{1}	6.7×10^{-3}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	2.3×10^{2}	9.1×10^{-2}	8.8	4.4×10^{-3}	2.1×10^{4}	1.1×10^{1}

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility.

Source: Calculated using the source terms in Table K–19 and the MACCS2 computer code.

4.4.2.6 Transportation

Operational transportation impacts may be divided into two parts: impacts due to incident-free transportation and those due to transportation accidents. They may be further divided into nonradiological and radiological impacts. Nonradiological impacts are specifically vehicular, such as vehicular emissions and traffic accidents. Radiological impacts are those related to the dose received by transportation workers and the public during normal operations and in the case of accidents in which the radioactive materials being shipped may be released. For more detailed information on the transportation analysis performed for this SPD EIS, see Appendix L.

Under Alternative 3, transportation to and from SRS would include the shipment of plutonium pits and clean plutonium metal via SST/SGT from sites throughout the DOE complex to the pit conversion facility.[12] During dismantlement of the pits, some HEU would be recovered. The pit conversion facility would ship HEU via SST/SGT to ORR for storage.[13] After conversion, the plutonium in the pit conversion facility would be in the form of plutonium dioxide. This material would be transferred through a secure tunnel to the MOX facility at SRS for fabrication into MOX fuel pellets.

MOX fuel fabrication also requires uranium dioxide. Quantifying the uranium dioxide transportation requirements for this SPD EIS involved selecting representative sites for the source of the depleted uranium hexafluoride and the conversion facility. A DOE enrichment facility near Portsmouth, Ohio, was chosen as a representative site for the source of the depleted uranium hexafluoride, and the nuclear fuel fabrication facility in Wilmington, North Carolina, as representative of a uranium conversion facility. These sites were also used as representative sites in the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996e). It is assumed that depleted uranium hexafluoride needed for MOX fuel would be shipped via commercial truck to the uranium conversion facility, where it would be converted into uranium dioxide (see Section 4.3.2.6). After conversion, the depleted uranium dioxide would be shipped via commercial truck from the conversion facility to the MOX facility at SRS. This material would be blended with plutonium dioxide at the MOX facility, fabricated into MOX fuel pellets, and placed in MOX fuel rods. After fabrication, the MOX fuel rods would be shipped to a domestic reactor site, where they would be placed in fuel assemblies and irradiated. Shipments of unirradiated MOX fuel rods would be made in an SST/SGT because unirradiated MOX fuel in large enough quantities is subject to the same security concerns as pure weapons-grade plutonium. It is assumed in this transportation analysis that all MOX fuel is shipped from the MOX facility to the most distant reactor site, North Anna.

Immobilization at SRS under this alternative would require that surplus nonpit plutonium in various forms be shipped from current storage locations (i.e., SRS, Hanford, INEEL, LLNL, LANL, and RFETS) to the immobilization facility at SRS. Even though these materials are not clean plutonium metal or pits, the quantity of the plutonium contained in them would require that they be treated as materials that could be used in nuclear weapons, and thus that shipments be made in SST/SGTs.

Under the preferred technology alternative for immobilization, the surplus plutonium would be immobilized in a ceramic matrix in small cans at the immobilization facility, placed in HLW canisters, and transported via specially designed trucks to the Defense Waste Processing Facility (DWPF) in S-Area. This intrasite transportation—from F-Area to S-Area—could require the temporary shutdown of roads on SRS. It would, however, provide for all the necessary security and for reduced risk to the public; SST/SGTs would not be required.

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[12] Work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 SI container for long-term storage. The AL–R8 is not an offsite shipping container as was the AT–400A analyzed in the SPD Draft EIS. Therefore, if the decision were made to site the pit conversion facility at a site other than Pantex, the surplus pits would have to be taken out of the AL–R8 SI and placed in a yet-to-be-developed shipping container. This operation would also require the replacement of some pit-holding fixtures to meet transportation requirements. Under such alternatives, this change would result in a total repackaging exposure of 208 person-rem to Pantex personnel. An increase in worker doses of this magnitude could result in an increase in the expected number of LCFs of 8.3×10^{-2} over the life of the program.

[13] Classified nuclear material parts would also result from pit disassembly. Although current plans are to store these parts at the pit conversion facility, this SPD EIS analyzes the possible transport of these nuclear material parts to LANL. Therefore, the transportation impacts are slightly overstated.

Use of the preferred ceramic (versus glass) matrix for immobilization would also require a small amount of depleted uranium dioxide (i.e., less than 10 t [11 tons] per year). It is assumed that this depleted uranium dioxide would be produced and shipped in the same manner as the depleted uranium dioxide needed by the MOX facility.

After the immobilized plutonium was encased by HLW at DWPF, it would be shipped to a potential geologic repository for ultimate disposition. Because HLW would be displaced by the cans of immobilized plutonium suspended in the HLW canister, additional canisters—to accommodate the displaced HLW—would be required over the life of the immobilization program. According to estimates, up to 145 additional canisters of HLW would be needed to meet the demands of surplus plutonium disposition under Alternative 3. The *Yucca Mountain Draft EIS* evaluates different options for the shipment of these canisters to a potential geologic repository using either trucks or trains. The analysis revealed that shipment by train would pose the lower risk. However, no ROD has yet been issued regarding these shipments. To bound the risks associated with these additional shipments, this SPD EIS conservatively assumes that all of these shipments would be made by truck, one canister per truck..

Every alternative considered in this SPD EIS would require routine transportation of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities on the sites. This transportation would be handled in the same manner as other site waste shipments, and as shown in Sections 4.3.1.2 and 4.3.2.2, would involve no major increase in the amounts of waste already being managed at these sites. The shipments would pose no greater risks than the ordinary waste shipments at these sites as analyzed in the WM PEIS.

In all, approximately 2,500 shipments of radioactive materials would be carried out by DOE under this alternative. The total distance traveled on public roads by trucks carrying radioactive materials would be 4.3 million km (2.7 million mi).

Impacts of Incident-Free Transportation. The dose to transportation workers from all transportation activities entailed by this alternative has been estimated at 60 person-rem; the dose to the public, 67 person-rem. Accordingly, incident-free transportation of radioactive material associated with this alternative would result in 0.024 LCF among transportation workers and 0.034 LCF in the total affected population over the duration of the transportation activities. The estimated number of nonradiological fatalities from vehicular emissions associated with this alternative is 0.019.

Impacts of Accidents During Transportation (Consequences). The maximum foreseeable offsite transportation accident under this Alternative (probability of occurrence: greater than 1 in 10 million per year) is a shipment of plutonium pits from one of DOE's storage locations to the pit conversion facility with a severity category VIII accident in a rural population zone under neutral (average) weather conditions. If this accident were to occur, it could result in a dose of 87 person-rem to the public for an LCF risk of 0.044 and 96 rem to the hypothetical MEI for an LCF risk of 0.096. (The MEI receives a larger dose than the population because it is unlikely that a person would be in position, and remain in position, to receive this hypothetical maximum dose.) No fatalities would be expected to occur. The probability of more severe accidents, different weather conditions at the time of accident, or occurrence in a more densely populated area were also evaluated, and estimated to have a probability lower than 1 chance in 10 million per year. (See Appendix L.6.)

Impacts of Accidents During Transportation (Risks). The total transportation accident risks were estimated by summing the risks to the affected population from all hypothetical accidents. For Alternative 3, those risks are as follows: a radiological dose to the population of 7 person-rem, resulting in a total population risk of 0.004 LCF; and traffic accidents resulting in 0.053 fatality.

4.4.2.7 Environmental Justice

As discussed in other parts of Section 4.4.2, routine operations conducted under Alternative 3 would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near SRS would be approximately 1 in 30 million (see Table 4–41). The number of LCFs expected among the general population residing near SRS from accident-free operations would be approximately 9.0×10^{-3}.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public (see Section 4.4.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–43 through 4–46). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the site pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.4.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 3 would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.5 [Section deleted because alternative deleted.]

4.6 ALTERNATIVE 4A

Alternative 4A would involve constructing and operating the pit conversion facility in Zone 4 West at Pantex and the immobilization and MOX facilities at Hanford. The immobilization facility would be located in the existing FMEF building, and the MOX facility would be located in new buildings near FMEF in the 400 Area.

4.6.1 Construction

4.6.1.1 Air Quality and Noise

Sources of potential air quality impacts of construction under Alternative 4A at Pantex include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from Pantex construction activities, with standards and guidelines is presented as Table 4–47. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Total vehicle emissions associated with activities at Pantex would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of this facility at Pantex relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with the construction of this facility would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 1.6 km [1.0 mi]), noise emissions from construction equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Traffic associated with the construction of this facility would likely produce a 1-dB increase or less in noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Construction workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of standard silencing packages on construction equipment, administrative controls, engineering controls, and personal hearing protection equipment.

Sources of potential air quality impacts of construction under Alternative 4A at Hanford, including modification of FMEF for plutonium conversion and immobilization and the construction of a new MOX facility, were analyzed. Construction impacts result from emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

Table 4–47. Evaluation of Pantex Air Pollutant Concentrations Associated With Construction Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	3.77	623	6.2
	1 hour	40,000	23.5	3,020	7.5
Nitrogen dioxide	Annual	100	0.501	2.44	2.4
PM_{10}	Annual	50	0.349	9.14	18
	24 hours	150	4.18	93.6	62
Sulfur dioxide	Annual	80	0.0326	0.033	0.041
	24 hours	365	0.392	0.392	0.11
	3 hours	1,300	1.71	1.71	0.13
	30 minutes	1,048	6.98	6.98	0.67
Other regulated pollutants					
Total suspended particulates	3 hours	200	42.7	42.7[b]	21
	1 hour	400	174	174[b]	44
Hazardous and other toxic compounds					
Other toxics[c]	Annual	3[d]	0	0.0547	1.8
	1 hour	75[d]	0	19.4	26

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Three- and 1-hr concentrations for total suspended particulates are not listed for existing sources in the source document. Only the contribution from sources associated with the alternative are represented.

[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed for benzene.

[Text deleted.]

[d] Effects-screening level of the Texas Natural Resource Conservation Commission. Such levels are not ambient air standards, but merely "tools" used by the Toxicology and Risk Assessment staff to evaluate impacts of air pollutant emissions. Thus, exceedance of the screening levels by ambient air contaminants does not necessarily indicate a problem. That circumstance, however, would prompt a more thorough evaluation.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; TNRCC 1997a, 1997b.

A comparison of maximum air pollutant concentrations, including the contribution from Hanford construction activities, with standards and guidelines is presented as Table 4–48. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards as a result of activities at Hanford. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. The concentrations of toxic air pollutants such as benzene would be unchanged from the No Action Alternative (see discussion of these concentrations in Section 4.2.1.3). Air pollution impacts during operation would be mitigated by including HEPA filtration in the design of these facilities.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat because of an expected decrease in overall site employment during this timeframe.

The location of these facilities at Hanford relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with the

Table 4–48. Evaluation at Hanford of Air Pollutant Concentrations Associated With Construction Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	SPD Increment (Fg/m^3)	Total Site Concentration (Fg/m^3)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	1.39	35.5	0.36
	1 hour	40,000	9.42	57.7	0.14
Nitrogen dioxide	Annual	100	0.109	0.359	0.36
PM_{10}	Annual	50	0.0784	0.0963	0.19
	24 hours	150	3.43	4.2	2.8
Sulfur dioxide	Annual	50	0.011	1.64	3.2
	24 hours	260	0.123	9.03	3.4
	3 hours	1,300	0.834	30.4	2.3
	1 hour	660	2.5	35.4	5.4
Other regulated pollutants					
Total suspended particulates	Annual	60	0.136	0.154	0.26
	24 hours	150	6.04	6.81	4.5
Hazardous and other toxic compounds					
Other toxics[b]	Annual	0.12	0.000008	0.000014	0.012

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; WDEC 1994.

construction of these facilities would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 7.1 km [4.4 mi]), noise emissions from construction equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife. Noise would not affect threatened and endangered species because there are no threatened and endangered species habitats near the facility site (see Section 4.26). Traffic associated with the construction of these facilities would likely produce less than a 1-dB increase in noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Construction workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of standard silencing packages on construction equipment, administrative controls, engineering controls, and personal hearing protection equipment.

4.6.1.2 Waste Management

Tables 4–49 and 4–50 compare the wastes generated during the construction of surplus plutonium disposition facilities at Pantex and Hanford with the existing treatment, storage, and disposal capacity for the various waste

Table 4–49. Potential Waste Management Impacts of Construction at Pantex Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	50	NA	NA	NA
Nonhazardous				
Liquid	5,300	NA	NA	1[c]
Solid	120	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of the Wastewater Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

Table 4–50. Potential Waste Management Impacts of Construction at Hanford Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	27	NA	NA	NA
Nonhazardous				
Liquid	25,000	11[c]	NA	11[d]
Solid	9,000	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of the 400 Area sanitary sewer.

[d] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

types at each site. It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during the 3-year construction period. In addition, no soil contaminated with hazardous or radioactive constituents should be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and applicable Federal and State regulations. Construction waste generation would be the same

for the ceramic and glass immobilization technologies because the same size facility would be built under either scenario. For this SPD EIS, it is assumed that hazardous waste and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

Hazardous wastes generated during the construction of surplus plutonium disposition facilities would be typical of those generated during the construction of an industrial facility. Any hazardous wastes generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during construction should not have a major impact on the Pantex or Hanford hazardous waste management systems.

Nonhazardous solid wastes generated during the construction of surplus plutonium disposition facilities would be packaged in conformance with standard industrial practice and shipped to offsite commercial facilities for recycling or disposal. The additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management systems at Pantex or Hanford.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during construction of the pit conversion facility at Pantex would be managed on the site by the Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during the construction of these facilities is estimated to be less than 1 percent of the 946,250-m^3/yr (1,237,700-yd^3/yr) capacity of the Wastewater Treatment Facility, and within the 473,125-m^3/yr (618,848-yd^3/yr) excess capacity of the Pantex Wastewater Treatment Facility (M&H 1997:29). Therefore, management of these wastes at Pantex should not have a major impact on the nonhazardous liquid waste treatment system during construction.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during construction of the immobilization and MOX facilities would be managed on the site at the Energy Northwest (formerly WPPSS) Sewage Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during the construction of these facilities is estimated to be 11 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 11 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd^3/yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of these wastes at Hanford should not have a major impact on the nonhazardous liquid waste treatment system during construction.

4.6.1.3 Socioeconomics

Construction-related employment requirements under Alternative 4A would be as indicated in Table 4–51.

Table 4–51. Construction Employment Requirements for Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Year	Pit Conversion	Immobilization	MOX	Total
2001	297	0	0	297
2002	451	207	441	1,099
2003	276	376	772	1,424
2004	0	414	508	922
2005	0	226	221	447
2006	0	0	208	208

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.
Source: DOE 1999c; UC 1998e, UC 1999a, 1999b.

At its peak in 2002, construction of the new pit conversion facility at Pantex under this alternative would require 451 construction workers and generate another 381 indirect jobs in the region. As this total employment requirement of 832 direct and indirect jobs represents only 0.3 percent of the projected REA workforce, it should have no major impact on the REA. Moreover, it should have little impact on community services within the ROI. In fact, it should help offset the nearly 40 percent reduction in the Pantex total workforce (i.e., from 2,944 to 1,750 workers) projected for the years 1997–2005.

At its peak in 2003, construction of the immobiliation and MOX facilities at Hanford would require 1,148 construction workers and should generate another 1,178 indirect jobs in the region. This total employment requirement of 2,326 direct and indirect jobs represents only 0.6 percent of the projected REA workforce, and thus should have no major impact on the REA. It should also have little effect on the community services currently offered in the ROI. In fact, it should help offset the nearly 15 percent reduction in Hanford's workforce (i.e., from 12,882 to approximately 11,000 workers) projected for the years 1997–2005.

4.6.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. According to results of recent radiation surveys (DOE 1997f; Antonio 1998) conducted in the Zone 4 area at Pantex and the 400 Area at Hanford, construction workers would not be expected to receive any additional radiation exposure above natural background levels in those areas. Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at Hanford under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

No hazardous chemicals would be released as a result of construction activities at Pantex under this alternative; thus, no cancer or adverse, noncancer health effects would occur.

4.6.1.5 Facility Accidents

The construction of surplus plutonium disposition facilities at Pantex and Hanford could result in worker injuries or fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 4,397 person-years of construction labor and standard industrial accident rates, approximately 440 cases of nonfatal occupational injury or illness and 0.61 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.6.1.6 Environmental Justice

As discussed in the other parts of Section 4.6.1, construction under Alternative 4A would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, construction activities at Pantex and Hanford under Alternative 4A would have no significant impacts on minority or low-income populations.

4.6.2 Operations

4.6.2.1 Air Quality and Noise

Potential air quality impacts of the operation of the new pit conversion facility under Alternative 4A at Pantex were analyzed using ISCST3. Operational impacts would result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from the pit conversion facility, with standards and guidelines is presented as Table 4–52. Concentrations of air pollutants would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards.

Table 4–52. Evaluation of Pantex Air Pollutant Concentrations Associated With Operations Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	SPD Increment (Fg/m^3)	Total Site Concentration (Fg/m^3)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.381	620	6.2
	1 hour	40,000	2.14	2,990	7.5
Nitrogen dioxide	Annual	100	0.0374	1.98	2
PM_{10}	Annual	50	0.00215	8.79	18
	24 hours	150	0.0225	89.5	60
Sulfur dioxide	Annual	80	0.00064	0.00064	0.0008
	24 hours	365	0.00753	0.00755	0.0021
	3 hours	1,300	0.0327	0.0328	0.0025
	30 minutes	1,048	0.129	0.129	0.012
Other regulated pollutants					
Total suspended particulates	3 hours	200	0.0937	0.0937[b]	0.047
	1 hour	400	0.274	0.274[b]	0.068
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Three- and 1-hr concentrations for total suspended particulates are not reported for existing sources. Only the contribution from sources associated with the alternative are represented.

[Text deleted.]

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.

Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.

Source: EPA 1997a; TNRCC 1997a, 1997b.

Air pollution impacts during operation would be mitigated; for example, HEPA filtration has been included in the design of this facility.

For a discussion of how the operation of the pit conversion facility at Pantex would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.3.4. There are no other NESHAPs limits applicable to operation of this facility.

The increases in air pollutant concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from the operation of this facility would be a small fraction of the PSD Class II area increments as summarized in Table 4–53.

Total vehicle emissions associated with activities at Pantex would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of this facility at Pantex relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operation would include new or existing sources (e.g., cooling systems, vents, motors, and material-handling equipment), employee vehicles, and truck traffic. Traffic noise associated with operation of this facility would occur on the site and along offsite local and regional transportation routes used to bring materials and workers to the site. Given the distance to the site boundary (about 1.6 km [1.0 mi]), noise emissions from equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could have onsite impacts, such as the disturbance of

Table 4–53. Evaluation of Pantex Air Pollutant Increases Associated With Operations Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Increment
Nitrogen dioxide	Annual	0.0374	25	0.15
PM_{10}	Annual	0.00215	17	0.013
	24 hours	0.0225	30	0.075
Sulfur dioxide	Annual	0.00064	20	0.0032
	24 hours	0.00753	91	0.0083
	3 hours	0.0327	512	0.0064

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; PSD, prevention of significant deterioration.
Source: EPA 1997b.

wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Traffic associated with operation of this facility would likely produce less than a 1-dB increase in noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Operations workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

Potential air quality impacts of the operation of facilities under Alternative 4A at Hanford were analyzed using ISCST3. Operational impacts would result from process emissions, emergency diesel generator testing, trucks

moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from surplus plutonium disposition facilities, with standards and guidelines is presented as Table 4–54. Concentrations for immobilization in the ceramic and glass forms are the same. Concentrations of air pollutants would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards as a result of activities at Hanford. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue.

For a discussion of how the operation of the immobilization and MOX facilities at Hanford would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.1.4. There are no other NESHAPs limits applicable to operation of these facilities.

The increases in air pollutant concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from the operation of these facilities would be a small fraction of the PSD Class II area increments as summarized in Table 4–55.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat because of an expected decrease in overall site employment during this timeframe.

Table 4–54. Evaluation of Hanford Air Pollutant Concentrations Associated With Operations Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.374	34.5	0.35
	1 hour	40,000	2.55	50.8	0.13
Nitrogen dioxide	Annual	100	0.052	0.302	0.3
PM_{10}	Annual	50	0.00367	0.022	0.043
	24 hours	150	0.0407	0.811	0.54
Sulfur dioxide	Annual	50	0.00343	1.63	3.1
	24 hours	260	0.0382	8.95	3.4
	3 hours	1,300	0.26	29.9	2.3
	1 hour	660	0.779	33.7	5.1
Other regulated pollutants					
Total suspended particulates	Annual	60	0.00367	0.0216	0.036
	24 hours	150	0.0407	0.811	0.54
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.

Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.

Source: EPA 1997a; WDEC 1994.

Table 4–55. Evaluation of Hanford Air Pollutant Increases Associated With Operations Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Increment
Nitrogen dioxide	Annual	0.052	25	0.21
PM_{10}	Annual	0.00367	17	0.022
	24 hours	0.0407	30	0.14
Sulfur dioxide	Annual	0.00343	20	0.017
	24 hours	0.0382	91	0.042
	3 hours	0.26	512	0.051

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; PSD, prevention of significant deterioration.
Source: EPA 1997b.

The location of these facilities at Hanford relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operations would include new or existing sources (e.g., cooling systems, vents, motors, material-handling equipment), employee vehicles, and truck traffic. Traffic noise associated with operation of these facilities would occur on the site and along offsite local and regional transportation routes used to bring materials and workers to the site. Given the distance to the site boundary (about 7.1 km [4.4 mi]), noise emissions from equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. However, some noise sources could have onsite impacts, such as the disturbance of wildlife. Noise impacts would not affect threatened and endangered species because there are no threatened and endangered species habitats near the facility site (see Section 4.26). Noise from traffic associated with operation of these facilities would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Operations workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

The combustion of fossil fuels associated with Alternative 4A would result in the emission of carbon dioxide, which is one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative represent less than 6×10^{-5} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

4.6.2.2 Waste Management

Tables 4–56 and 4–57 compare the existing site treatment, storage, and disposal capacities with the expected waste generation rates from operating surplus plutonium disposition facilities at Pantex and Hanford. Although HLW would be used in the immobilization process, no HLW would be generated by surplus plutonium disposition facilities. Waste generation at Hanford should be the same for the ceramic and glass immobilization technologies.

Table 4–56. Potential Waste Management Impacts of Operations at Pantex Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford[a]

Waste Type[b]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[c]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[d]	18	NA	NA	<1 of WIPP
LLW	60	8	25	<1 of NTS
Mixed LLW	1	NA	NA	NA
Hazardous	2	<1	NA	NA
Nonhazardous				
Liquid	25,000	3[e]	NA	3[e]
Solid	1,800	NA	NA	NA

[a] Information summarized from Appendix H.

[b] See definitions in Appendix F.8.

[c] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[d] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[e] Percent of capacity of the Wastewater Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); NTS, Nevada Test Site; TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated (Pantex and Hanford) and disposed of (Hanford) on the sites or at other DOE sites or commercial facilities. According to the ROD

Table 4–57. Potential Waste Management Impacts of Operations at Hanford Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford[a]

Waste Type[b]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[c]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[d]	160	9	9	1 of WIPP
LLW	170	NA	NA	<1
Mixed LLW	4	<1	<1	<1
Hazardous	78	NA	NA	NA
Nonhazardous				
Liquid	66,000	28[e]	NA	28[f]
Solid	780	NA	NA	NA

[a] Information summarized from Appendix H.

[b] See definitions in Appendix F.8.

[c] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[d] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[e] Percent of capacity of the 400 Area sanitary sewer.

[f] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Current schedules for shipment of TRU waste to WIPP would accommodate shipment of contact-handled TRU waste from surplus plutonium disposition facilities beginning in 2016 (DOE 1997c:17). Therefore, in order to be conservative, it is assumed the TRU waste would be stored on the site until 2016. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment and storage of radioactive, hazardous, mixed, and nonhazardous wastes at Pantex are described in the *Final EIS for the Continued Operation of Pantex and Associated Storage of Nuclear Weapon Components* (DOE 1996c). Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at Hanford will be evaluated in the *Hanford Site Solid (Radioactive and Hazardous) Waste Program EIS* that is being prepared by the DOE Richland Operations Office (DOE 1997b).

TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the Waste Receiving and Processing Facility at Hanford and a new facility at Pantex.

TRU waste generated at the pit conversion facility at Pantex is estimated to be a total of 180 m^3 (235 yd^3) over the 10-year operation period. Because TRU waste is not currently generated or stored at Pantex, storage space would be provided within the pit conversion facility. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of approximately 260 m^2 (2,800 ft^2) would be required. This would be 1.5 percent of the 17,345 m^2(186,700 ft^2)

of floor space available in the pit conversion facility. Therefore, impacts of the management of TRU waste at Pantex should not be major.

TRU waste generated at the immobilization and MOX facilities at Hanford is estimated to be 9 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of the Waste Receiving and Processing Facility. A total of 1,600 m^3 (2,090 yd^3) of TRU waste would be generated over the 10-year operation period. If all the TRU waste were stored on the site, this would be 9 percent of the 17,000-m^3 (22,200-yd^3) storage capacity available at Hanford. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of about 0.23 ha (0.57 acre) would be required. Therefore, impacts of the management of additional quantities of TRU waste at Hanford should not be major. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997d).

The 1,780 m^3 (2,328 yd^3) of TRU wastes generated by the surplus plutonium disposition facilities at Hanford and Pantex would be 1 percent of the 143,000-m^3 (187,000-yd^3) contact-handled TRU waste that DOE plans to dispose of at WIPP and 1 percent of the current 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997e:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997e).

LLW generated at Pantex would be treated, packaged, certified, and accumulated at the pit conversion facility before transfer for additional treatment and disposal in onsite and offsite facilities. LLW generated at the pit conversion facility is estimated to be 8 percent of the 750-m^3/yr (980-yd^3/yr) capacity of the planned Hazardous Waste Treatment and Processing Facility. Waste would be stored on the site on an interim basis before being shipped for offsite disposal. If the shipment of LLW to offsite disposal were delayed, about 600 m^3 (780 yd^3) of LLW may need to be stored at Pantex. This is about 25 percent of the approximately 2,400-m^3 (3,140-yd^3) existing storage capacity at Pantex. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of about 0.1 ha (0.25 acre) is required. Therefore, impacts of the storage of additional quantities of LLW at Pantex should not be major.

LLW from Pantex is currently shipped to NTS for disposal. The additional LLW from operation of the pit conversion facility at Pantex would be 3 percent of the 20,000-m^3 (26,000-yd^3) LLW disposed of at NTS in 1995 and less than 1 percent of the 500,000-m^3 (650,000-yd^3) disposal capacity at NTS. Using the 6,085 m^3/ha disposal land usage factor for NTS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), the additional LLW from Pantex would require 0.1-ha (0.25-acre) of disposal space at NTS or a similar facility. Therefore, impacts of the management of this additional LLW should not be major. Impacts of disposal of LLW at NTS are described in the *Final EIS for the NTS and Off-Site Locations in the State of Nevada* (DOE 1996d).

At Hanford, LLW would be packaged, certified, and accumulated at the immobilization and MOX facilities before transfer for additional treatment and disposal in existing onsite facilities. A total of 1,700 m^3 (2,220 yd^3) of LLW would be generated over the operations period. LLW generated at surplus plutonium disposition facilities is estimated to be less than 1 percent of the 1.74 million-m^3 (2.28 million-yd^3) capacity of the LLW Burial Grounds and 1 percent of the 230,000-m^3 (301,000-yd^3) capacity of the Grout Vaults. Using the 3,480 m^3/ha disposal land usage factor for Hanford published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 1,700 m^3 (2,220 yd^3) of waste would require 0.50-ha (1.2 acre) disposal space at Hanford. Therefore, impacts of the management of this additional LLW at Hanford should not be major.

Mixed LLW would be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan for Pantex. Pantex currently ships mixed LLW to Envirocare of Utah and Diversified Scientific Services, Inc. of Tennessee. These facilities or other treatment or disposal facilities that meet DOE criteria would be used to manage the 10 m^3 (13 yd^3) of waste that would be generated. Therefore, the management of this additional waste at Pantex should not have a major impact on the mixed LLW management system.

At Hanford, mixed LLW would be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan. Mixed LLW generated at the immobilization and MOX facilities is estimated to be less than 1 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of the Waste Receiving and Processing Facility, less than 1 percent of the 16,800-m^3 (22,000-yd^3) capacity of the Central Waste Complex, and less than 1 percent of the 14,200-m^3 (18,600-yd^3) planned disposal capacity of the Radioactive Mixed Waste Disposal Facility. Therefore, the management of this additional waste at Hanford should not have a major impact on the mixed LLW management system. If all TRU waste and mixed LLW generated at surplus plutonium disposition facilities at Hanford were processed in the Waste Receiving and Processing Facility, this additional waste would be 9 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of that facility.

Any hazardous wastes generated during operation of the pit conversion facility at Pantex would be packaged in DOT-approved containers and shipped off the site to licensed commercial recycling, treatment, and disposal facilities. Because these wastes would be less than 1 percent of the 750-m^3/yr (980-yd^3/yr) capacity of the planned Hazardous Waste Treatment and Processing Facility and would be disposed of at offsite commercial facilities, the additional waste load generated during the operations period should not have a major impact on the Pantex hazardous waste management system. If all LLW and hazardous wastes generated at the pit conversion facility at Pantex were processed in the planned Hazardous Waste Treatment and Processing Facility, this additional waste would be 8 percent of the 750-m^3/yr (980-yd^3/yr) capacity of that facility.

At Hanford, hazardous wastes generated during operation of the immobilization and MOX facilities would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during the operations period should not have a major impact on the hazardous waste management system at Hanford.

Nonhazardous solid waste would be packaged and transported in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent for offsite disposal. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management systems at Pantex and Hanford.

Nonhazardous wastewater generated by the pit conversion facility would be treated if necessary before being discharged to the Pantex Wastewater Treatment Facility. Nonhazardous liquid waste generated by surplus plutonium disposition facilities at Pantex is estimated to be 3 percent of the 946,250-m^3/yr (1,237,700-yd^3/yr) capacity of the Wastewater Treatment Facility and within the 473,125-m^3/yr (618,848-yd^3/yr) excess capacity of the Pantex Wastewater Treatment Facility (M&H 1997:29). Therefore, management of nonhazardous liquid waste at Pantex should not have a major impact on the treatment system.

At Hanford, nonhazardous wastewater generated by the immobilization and MOX facilities would be treated if necessary before being discharged to the 400 area sanitary sewer system, which connects to the Energy Northwest (formerly WPPSS) Sewage Treatment Facility. Nonhazardous liquid waste generated by surplus plutonium disposition facilities at Hanford is estimated to be 28 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 28 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd^3/yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of nonhazardous liquid waste at Hanford should not have a major impact on the treatment system.

4.6.2.3 Socioeconomics

Under Alternative 4A, operation of the pit conversion facility at Pantex would begin in 2004 and should require 400 new workers (UC 1998e). This level of employment should generate another 1,355 indirect jobs within the

region. As the total employment requirement of 1,755 direct and indirect jobs represents only 0.7 percent of the projected REA workforce, there should be no major impact on the REA. Moreover, the additional required workers should not markedly impact community services within the Pantex ROI. In fact, they should help offset the nearly 40 percent reduction in the total Pantex workforce (i.e., from 2,944 to 1,750 workers) projected for the years 1997–2010.

After construction, startup, and testing of the immobilization and MOX facilities at Hanford in 2007 under Alternative 4A, an estimated 720 new workers would be required to operate them (SAIC 1999c; UC 1998e, 1999a, 1999b). This level of employment would be expected to generate another 1,823 related jobs in the region. The total employment requirement of 2,543 direct and indirect jobs represents 0.6 percent of the projected REA workforce, and thus should have no major impact on the REA. Some of the new jobs created under this alternative could be filled from the ranks of unemployed, currently 11 percent of the REA's population.

This employment requirement could have minor impacts on community services in the ROI, as it should coincide with an expected increase in overall site employment for construction of the tank waste remediation system. Assuming that 91 percent of the new employees associated with this alternative resided in the ROI, an increase of 2,314 new jobs within the workforce would result in an overall population increase of approximately 4,294 persons. This population increase, in conjunction with the normal population growth forecast by the State of Washington, would engender increased construction of local housing units. Given the current population-to-student ratio in the ROI, a population of this size would be expected to include 888 students, and local school districts would increase the number of classrooms to accommodate them.

Community services in the ROI would be expected to change to accommodate the population growth as follows: 55 teachers would be added to maintain the current student-to-teacher ratio of 16:1; 7 police officers would be added to maintain the current officer-to-population ratio of 1.5:1,000; 14 firefighters would be added to maintain the current firefighter-to-population ratio of 3.4:1,000; and 6 physicians would be added to maintain the current physician-to-population ratio of 1.4:1,000. Thus, an additional 82 positions would have to be created to maintain community services at current levels. Hospitals in the ROI would experience a change from the 2.1 beds to 2.0 beds per 1,000 persons unless additional beds were provided. Moreover, average school enrollment would increase to 94.3 percent from the current 92.5 percent unless additional classrooms were built. None of these projected changes should have a major impact on the level of community services currently offered in the ROI.

4.6.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment, and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Aalternative 4A would be as follows.

Radiological Impacts. Table 4–58 reflects the potential radiological impacts on three individual receptor groups at Pantex and Hanford: the population living within 80 km (50 mi) in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts the projected aggregate LCF risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Table 4–58. Potential Radiological Impacts on the Public of Operations Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Impact	Pit Conversion	Immobilization		MOX[a]	Hanford Total
		Ceramic	Glass		
Population within 80 km for year 2010					
Dose (person-rem)	0.58	7.8×10^{-3}	7.1×10^{-3}	0.29	0.30
Percent of natural background[b]	5.8×10^{-4}	6.7×10^{-6}	6.1×10^{-6}	2.5×10^{-4}	2.6×10^{-4}
10-year latent fatal cancers	2.9×10^{-3}	3.9×10^{-5}	3.6×10^{-5}	1.5×10^{-3}	1.5×10^{-3}
Maximally exposed individual					
Annual dose (mrem)	0.062	1.1×10^{-4}	9.7×10^{-5}	4.8×10^{-3}	4.9×10^{-3}
Percent of natural background[b]	0.019	3.7×10^{-5}	3.2×10^{-5}	1.6×10^{-3}	1.6×10^{-3}
10-year latent fatal cancer risk	3.1×10^{-7}	5.5×10^{-10}	4.9×10^{-10}	2.4×10^{-8}	2.5×10^{-8}
Average exposed individual within 80 km[c]					
Annual dose (mrem)	1.9×10^{-3}	2.0×10^{-5}	1.8×10^{-5}	7.5×10^{-4}	7.7×10^{-4}
10-year latent fatal cancer risk	9.5×10^{-9}	1.0×10^{-10}	9.0×10^{-11}	3.8×10^{-9}	3.9×10^{-9}

a As described in Section 4.26.1.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

b The annual natural background radiation level at Pantex is 332 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 99,300 person-rem. The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.

c Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Pantex (299,000) and Hanford (387,800) in 2010.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Source: Appendix J.

Given incident-free operation of all three facilities, the projected total population dose in the year 2010 would be 0.58 person-rem at Pantex and 0.30 person-rem at Hanford. The corresponding number of LCFs in the population from 10 years of operation would be 2.9×10^{-3} around Pantex and 1.5×10^{-3} around Hanford. The dose to the maximally exposed member of the public from annual operation of the pit conversion facility at Pantex would be 0.062 mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 3.1×10^{-7}. The impacts on the average individual would be lower. The total dose to the maximally exposed member of the public from annual operation of the immobilization and MOX facilities at Hanford would be 4.9×10^{-3} mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 2.5×10^{-8}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with the operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–59; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose would be 500 mrem to pit conversion facility workers, 750 mrem to immobilization facility workers, and 65 mrem to MOX facility

workers. The annual dose received by the total site workforce for each of these facilities would be an estimated 192, 242, and 22 person-rem, respectively. The risks and numbers of LCFs among the different workers from 10 years of operation are included in Table 4–59. Doses to individual workers would be kept to minimal levels

Table 4–59. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

Impact	Pit Conversion	Immobilization (Ceramic or Glass)	MOX	Hanford Total
Number of badged workers	383	323	331	654
Total dose (person-rem/yr)	192	242	22	264
10-year latent fatal cancers	0.77	0.97	0.088	1.1
Average worker dose (mrem/yr)	500	750	65	404[a]
10-year latent fatal cancer risk	2.0×10^{-3}	3.0×10^{-3}	2.6×10^{-4}	1.6×10^{-3}

[a] Represents an average of the doses for both facilities.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998b, 1998e, 1999a, 1999b.

by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at Hanford under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released as a result of operations.

No hazardous chemicals would be released as a result of operations at Pantex under this alternative; thus, no cancer or adverse, noncancer health effects would occur.

4.6.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion facility at Pantex are presented in Table 4–60. The potential consequences of such accidents from operation of the immobilization and MOX facilities at Hanford are equivalent to those included in Alternative 2 (see Tables 4–31 through 4–33). More details on the method of analysis, assumptions, and specific accident scenarios are presented in the discussion of Alternative 2 in Section 4.3.2.5.

Public. The most severe consequences of a design basis accident for this alternative would be associated with a tritium release from the pit conversion facility. Bounding radiological consequences for the MEI are from the tritium release at Pantex, which would result in a dose of 0.087 rem, corresponding to an LCF probability of 4.4×10^{-5}. Among the general population in the environs of Pantex, the tritium release accident would result in an estimated 0.018 LCF. The frequency of such an accident is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year. At Hanford, the design basis accidents for the immobilization and MOX facilities would be equivalent to those presented in Alternative 2, see Section 4.3.2.5.

A beyond-design-basis earthquake at Pantex could result in collapse of the pit conversion facility and an estimated 1.5 LCFs among the general population. A similar earthquake at Hanford could result in total collapse of FMEF

and the new MOX facility, with an estimated 35 LCFs (as described in Section 4.3.2.5). It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause widespread failure of homes, office buildings, and other structures in the surrounding area. The overall impact of such an event must therefore be seen in the context not only of the potential radiological impacts of these other facilities, but of

Table 4–60. Accident Impacts of Pit Conversion Under Alternative 4A: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in New Construction at Hanford

		Impacts on Noninvolved Worker		Impact at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Fire	Unlikely	5.2×10^{-6}	2.1×10^{-9}	2.1×10^{-6}	1.0×10^{-9}	8.6×10^{-4}	4.3×10^{-7}
Explosion	Unlikely	1.4×10^{-3}	5.4×10^{-7}	5.4×10^{-4}	2.7×10^{-7}	2.2×10^{-1}	1.1×10^{-4}
Leaks/spills of nuclear material	Extremely unlikely	1.9×10^{-6}	7.6×10^{-10}	7.6×10^{-7}	3.8×10^{-10}	3.1×10^{-4}	1.6×10^{-7}
Tritium release	Extremely unlikely	2.2×10^{-1}	8.7×10^{-5}	8.7×10^{-2}	4.4×10^{-5}	3.6×10^{1}	1.8×10^{-2}
Criticality	Extremely unlikely	1.5×10^{-2}	6.0×10^{-6}	6.0×10^{-3}	3.0×10^{-6}	1.6	7.9×10^{-4}
Design basis earthquake	Unlikely	1.7×10^{-4}	6.7×10^{-8}	6.7×10^{-5}	3.3×10^{-8}	2.8×10^{-2}	1.4×10^{-5}
Beyond-design-basis fire	Beyond extremely unlikely	2.8×10^{-2}	1.1×10^{-5}	4.4×10^{-3}	2.2×10^{-6}	1.3	6.3×10^{-4}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	6.4×10^{1}	2.6×10^{-2}	1.0×10^{1}	5.1×10^{-3}	3.0×10^{3}	1.5
Aircraft crash[d]	Beyond extremely unlikely	2.0×10^{2}	7.9×10^{-2}	3.1×10^{1}	1.6×10^{-2}	9.2×10^{3}	4.5

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality and tritium exposure, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

[d] For the aircraft crash accident, the dose at 1,000 m (3,281 ft) is beyond the range of applicability of the standard probability coefficient for determining the likelihood of fatal cancer (i.e., 4×10^{-4} LCF per rem). The standard coefficient would tend to overstate the cancer fatality risk at the stated dose. Also, the dose may be in the range where subacute injury is an additional concern.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Source: Calculated using the source terms in Table K–12 and the MACCS2 computer code.

hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of such an earthquake is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

A beyond-design-basis aircraft crash at Pantex, involving a large commercial or military jet aircraft, was also evaluated based on public interest. This crash could result in penetration of the pit conversion facility by a crash-induced missile such as a jet turbine shaft, causing a release of plutonium and an estimated 4.5 LCFs among the general population. Other possible consequences of such a crash include immediate fatality to the aircraft occupants, as well as serious injuries and fatalities to persons in the pit conversion facility and the surrounding area who are impacted by the aircraft or building debris. The frequency of such an airplane crash is estimated to be less than 1 in 1,000,000 per year.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. For design basis accidents, the radiological consequences for this worker were estimated to be the highest for the criticality at the MOX facility. The consequences of such an accident would include an LCF probability of 2.5×10^{-4}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers either would be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at Pantex and Hanford could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated employment of 11,885 person-years of labor and the standard DOE occupational accident rates, approximately 430 cases of nonfatal occupational injury or illness and 0.32 fatality could be expected for the duration of operations.

4.6.2.6 Transportation

Operational transportation impacts may be divided into two parts: impacts due to incident-free transportation and those due to transportation accidents. They may be further divided into nonradiological and radiological impacts. Nonradiological impacts are specifically vehicular, such as vehicular emissions and traffic accidents. Radiological impacts are those related to the dose received by transportation workers and the public during normal operations and in the case of accidents in which the radioactive materials being shipped may be released. For more detailed information on the transportation analysis performed for this SPD EIS, see Appendix L.

Under Alternative 4A, transportation to and from Pantex would include the shipment of plutonium pits and clean plutonium metal via SST/SGT from sites throughout the DOE complex to the pit conversion facility.[14] During dismantlement of the pits, some HEU would be recovered. The pit conversion facility would ship HEU via SST/SGT to ORR for storage.[15] After conversion, the plutonium in the pit conversion facility would be in the form of plutonium dioxide. This material would be transported to the MOX facility at Hanford for fabrication into MOX fuel pellets.

MOX fuel fabrication also requires uranium dioxide. Quantifying the uranium dioxide transportation requirements for this SPD EIS involved selecting representative sites for the source of the depleted uranium hexafluoride and the conversion facility. A DOE enrichment facility near Portsmouth, Ohio, was chosen as a representative site for the source of the depleted uranium hexafluoride, and the nuclear fuel fabrication facility in Wilmington, North Carolina, as representative of a uranium conversion facility. These sites were also used as representative sites in the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996e). It is assumed that depleted uranium hexafluoride needed for MOX fuel would be shipped via commercial truck to the uranium conversion facility, where it would be converted into uranium dioxide (see Section 4.3.2.6). After conversion, the depleted uranium dioxide would be shipped via commercial truck from the conversion facility to the MOX facility at Hanford. This material would be blended with plutonium dioxide at the MOX facility, fabricated into MOX fuel pellets, and placed in MOX fuel rods. After fabrication, the MOX fuel rods would be shipped to a domestic reactor site, where they would be placed in fuel assemblies and irradiated. Shipments of unirradiated MOX fuel rods would be made in an SST/SGT because unirradiated MOX fuel in large enough quantities is subject to the same security concerns as pure weapons-grade plutonium. It is assumed in this transportation analysis that all MOX fuel is shipped from the MOX facility to the most distant reactor site, North Anna.

Immobilization at Hanford under this alternative would require that surplus nonpit plutonium in various forms be shipped from current storage locations (i.e., SRS, Hanford, INEEL, LLNL, LANL, and RFETS) to the immobilization facility at Hanford. Even though these materials are not clean plutonium metal or pits, the quantity of the plutonium contained in them would require that they be treated as materials that could be used in nuclear weapons, and thus that shipments be made in SST/SGTs.

Under the preferred technology alternative for immobilization, the surplus plutonium would be immobilized in a ceramic matrix in small cans at the immobilization facility, placed in HLW canisters, and transported via specially designed trucks to HLWVF in 200 Area. This intrasite transportation—from 400 Area to 200 Area—could require the temporary shutdown of roads on the Hanford site. It would, however, provide for all the necessary security and for reduced risk to the public; SST/SGTs would not be required.

Use of the preferred ceramic (versus glass) matrix for immobilization would also require a small amount of depleted uranium dioxide (i.e., less than 10 t [11 tons] per year). It is assumed that this depleted uranium dioxide would be produced and shipped in the same manner as the depleted uranium dioxide needed by the MOX facility.

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[14] Work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 SI container for long-term storage. This effort would be completed over 10 years, and the estimated dose to involved workers received from this repackaging activity would be about 104 person-rem. The SPD Draft EIS analyzed repackaging of the pits in an AT–400A container. The change to the AL–R8 SI changes the long-term storage period for pits from 50 to 30 years because of the need to replace a seal in the container after 30 years; the AT–400A does not require that activity. After seal replacement, the pits could continue to be stored for another 30 years.

[15] Classified nuclear material parts would also result from pit disassembly. Although current plans are to store these parts at the pit conversion facility, this SPD EIS analyzes the possible transport of these nuclear material parts to LANL. Therefore, the transportation impacts are slightly overstated.

After the immobilized plutonium was encased by HLW at HLWVF, it would be shipped to a potential geologic repository for ultimate disposition. Because HLW would be displaced by the cans of immobilized plutonium suspended in the HLW canister, additional canisters—to accommodate the displaced HLW—would be required over the life of the immobilization program. According to estimates, up to 145 additional canisters of HLW would be needed to meet the demands of surplus plutonium disposition under Alternative 4A. The *Yucca Mountain Draft EIS* evaluates different options for the shipment of these canisters to a potential geologic repository using either trucks or trains. The analysis revealed that shipment by train would pose the lower risk. However, no ROD has yet been issued regarding these shipments. To bound the risks associated with these additional shipments, this SPD EIS conservatively assumes that all of these shipments would be made by truck, one canister per truck.

Under all of the alternatives being considered in this SPD EIS, some transportation would be required to support routine shipments of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities on the sites. This transportation would be handled in the same manner as other site waste shipments, and as shown in Sections 4.6.1.2 and 4.6.2.2, would involve no major increase in the amounts of waste already being managed at these sites. The shipments would pose no greater risks than the ordinary waste shipments at these sites as analyzed in the WM PEIS.

TRU waste generated at Pantex, however, was not covered by the WM PEIS ROD, as there was no such waste at Pantex at the time the ROD was issued, and none was likely to be generated in ongoing site operations. Location of the pit conversion facility at Pantex would result in the generation of TRU waste, as described in Section 4.6.2.2. Moreover, a fairly large increase in the amount of LLW at Pantex (i.e., 25 percent of the site's current storage capacity) could be expected under this alternative. Currently, this type of waste is shipped to the NTS for disposal. In order to account for the transportation of TRU waste from Pantex to WIPP, and LLW from Pantex to NTS, additional shipments are analyzed in this SPD EIS.

In all, approximately 2,200 shipments of radioactive materials would be carried out by DOE under this alternative. The total distance traveled on public roads by trucks carrying radioactive materials would be 6.3 million km (3.9 million mi).

Impacts of Incident-Free Transportation. The dose to transportation workers from all transportation activities entailed at this alternative has been estimated at 30 person-rem; the dose to the public, 41 person-rem. Accordingly, the incident-free transportation of radioactive material associated with this alternative would to result in 0.012 LCF among transportation workers and 0.020 LCF in the total affected population over the duration of the transportation activities. The estimated number of nonradiological fatalities from vehicular emissions associated with this alternative is 0.021.

Impacts of Accidents During Transportation (Consequences). The maximum foreseeable offsite transportation accident under this alternative (probability of occurrence: greater than 1 in 10 million per year) is a shipment of plutonium oxide from the pit conversion facility at Pantex to Hanford with a severity category VIII accident in a rural population zone under neutral (average) weather conditions. If this accident were to occur, it could result in a dose of 624 person-rem to the public for an LCF risk of 0.3 and 684 rem to the hypothetical MEI for an LCF risk of 0.68. (The MEI receives a larger dose than the population because it is unlikely that a person would be in position, and remain in position, to receive this hypothetical maximum dose.) No fatalities would be expected to occur. The probability of more severe accidents, different weather conditions at the time of accident, or occurrence in a more densely populated area were also evaluated, and estimated to have a probability lower than 1 chance in 10 million per year. (See Appendix L.6.)

Impacts of Accidents During Transportation (Risks). The total transportation accident risks were estimated by summing the risks to the affected population from all hypothetical accidents. For Alternative 4A, those risks

are as follows: a radiological dose to the population of 8 person-rem, resulting in a total population risk of 0.004 LCF; and traffic accidents resulting in 0.065 fatality.

4.6.2.7 Environmental Justice

As discussed in other parts of Section 4.6.2, routine operations conducted under Alternative 4A would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near Pantex would be approximately 1 in 3 million, and would be approximately 1 in 40 million for the MEI residing near Hanford (see Table 4–58). The number of LCFs expected among the general populations residing near Pantex and Hanford from accident-free operations would be approximately 2.9×10^{-3} and 1.5×10^{-3}, respectively.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public. A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Table 4–60). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the sites pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.6.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 4A would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.7 ALTERNATIVE 4B

Alternative 4B would involve constructing and operating the pit conversion facility in Zone 4 West at Pantex, and the immobilization and MOX facilities in the existing FMEF building in the 400 Area at Hanford. Activities at Pantex would be the same as under Alternative 4A.

4.7.1 Construction

4.7.1.1 Air Quality and Noise

Potential air quality and noise impacts of construction under Alternative 4B at Pantex are the same as those for Alternative 4A (see Section 4.6.1.1).

Sources of potential air quality impacts of construction under Alternative 4B at Hanford include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from construction activities at Hanford, with standards and guidelines is presented as Table 4–61. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards as a result of activities at Hanford. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe. Noise impacts would be similar to those for Alternative 4A at Hanford (see Section 4.6.1.1).

4.7.1.2 Waste Management

At Pantex, construction impacts of this alternative would be the same as for Alternative 4A. See Section 4.6.1.2 for a description of the impacts of this alternative on the waste management infrastructure at Pantex.

Table 4–62 compares the wastes generated during modification of the FMEF building at Hanford with the existing treatment, storage, and disposal capacity for the various waste types. It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during the 3-year modification period. In addition, no soil contaminated with hazardous or radioactive constituents should be generated during modification. However, if any were generated, the waste should be managed in accordance with site practice and applicable Federal and State regulations. Waste generated during modification would be the same for the ceramic and glass immobilization technologies because the same size facility would be built under either scenario. For this SPD EIS, it is assumed that hazardous waste and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

Hazardous wastes generated during modification of the FMEF building would be typical of those generated during the construction of an industrial facility. Any hazardous wastes generated during modification would

Table 4–61. Evaluation of Hanford Air Pollutant Concentrations Associated With Construction Under Alternative 4B: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	SPD Increment (Fg/m^3)	Total Site Concentration (Fg/m^3)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	1.29	35.4	0.35
	1 hour	40,000	8.8	57.1	0.14
Nitrogen dioxide	Annual	100	0.1	0.35	0.35
PM_{10}	Annual	50	0.112	0.13	0.26
	24 hours	150	5.17	5.94	4
Sulfur dioxide	Annual	50	0.0102	1.64	3.2
	24 hours	260	0.113	9.02	3.4
	3 hours	1,300	0.768	30.4	2.3
	1 hour	660	2.3	35.2	5.3
Other regulated pollutants					
Total suspended particulates	Annual	60	0.204	0.222	0.37
	24 hours	150	9.45	10.2	6.8
Hazardous and other toxic compounds					
Other toxics[b]	Annual	0.12	0.000008	0.000014	0.012

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; WDEC 1994.

Table 4–62. Potential Waste Management Impacts of Construction at Hanford Under Alternative 4B: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in FMEF at Hanford

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	30	NA	NA	NA
Nonhazardous				
Liquid	30,000	13[c]	NA	13[d]
Solid	8,000	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year modification period.

[c] Percent of capacity of the 400 Area sanitary sewer.

[d] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during the modification period should not have a major impact on the Hanford hazardous waste management system.

Nonhazardous solid wastes generated during modification of the FMEF building would be packaged in conformance with standard industrial practice and shipped to offsite commercial facilities for recycling or disposal. The additional waste load generated during the modification period should not have a major impact on the nonhazardous solid waste management system at Hanford.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during modification of the FMEF building at Hanford would be managed on the site at the Energy Northwest (formerly WPPSS) Sewage Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during modification is estimated to be 13 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 13 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd^3/yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of these wastes at Hanford should not have a major impact on the nonhazardou liquid waste treatment system during the modification period.

4.7.1.3 Socioeconomics

Construction-related employment requirements for Alternative 4B would be as indicated in Table 4–63.

Table 4–63. Construction Employment Requirements for Alternative 4B: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in FMEF at Hanford

Year	Pit Conversion	Immobilization	MOX	Total
2001	297	0	0	297
2002	451	341	441	1,233
2003	276	481	583	1,340
2004	0	421	451	872
2005	0	281	221	502
2006	0	0	208	208

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.
Source: DOE 1999c; UC 1998e, 1999a, 1999b.

Employment requirements for the construction of a new pit conversion facility at Pantex under this alternative would be the same as those for Alternative 4A (see Section 4.6.1.3).

At its peak in 2003, construction of the immobilization and MOX facilities at Hanford would require 1,064 construction workers and generate another 1,092 indirect jobs in the region. As this total employment requirement of 2,156 direct and indirect jobs in 2003 represents less than 0.6 percent of the projected REA workforce, it should have no major impact on the REA. This requirement should also have little impact on community services currently offered in the ROI. In fact, it should help offset the approximately 15 percent reduction in Hanford employment (i.e., from 12,882 to approximately 11,000 workers) projected for the years 1997–2005.

4.7.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. According to recent radiation surveys (DOE 1997f; Antonio 1998) conducted in the Zone 4 area at Pantex and the 400 Area at Hanford, construction workers would not be expected to receive any additional radiation exposure above natural background levels in those areas. Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at Hanford under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

No hazardous chemicals would be released as a result of construction activities at Pantex under this alternative; therefore, no cancer or adverse, noncancer health effects would occur.

4.7.1.5 Facility Accidents

The construction of new plutonium conversion facilities at Pantex and Hanford could result in worker injuries or fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 4,452 person-years of construction labor and standard industrial accident rates, approximately 440 cases of nonfatal occupational injury or illness and 0.62 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.7.1.6 Environmental Justice

As discussed in the other parts of Section 4.7.1, construction under Alternative 4B would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, construction activities under Alternative 4B at Pantex and Hanford would have no significant impacts on minority or low-income populations.

4.7.2 Operations

4.7.2.1 Air Quality and Noise

Potential air quality and noise impacts of the operation of the new pit conversion facility under Alternative 4B at Pantex are the same as those for Alternative 4A (see Section 4.6.2.1).

Potential air quality impacts of the operation of facilities under 4B at Hanford were analyzed using ISCST3 as described in Appendix F.1. Operational impacts would result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from surplus plutonium disposition facilities, with standards and guidelines is presented as Table 4–64. Concentrations for immobilization in the ceramic and glass forms are the same. Concentrations of air pollutants would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards as a result of Hanford activities. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during operation would be mitigated; for example, HEPA filtration has been included in the design of these facilities.

Table 4–64. Evaluation of Hanford Air Pollutant Concentrations Associated With Operations Under Alternative 4B: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.507	34.6	0.35
	1 hour	40,000	3.45	51.8	0.13
Nitrogen dioxide	Annual	100	0.0707	0.321	0.32
PM_{10}	Annual	50	0.00499	0.023	0.046
	24 hours	150	0.0555	0.825	0.55
Sulfur dioxide	Annual	50	0.00468	1.64	3.1
	24 hours	260	0.0520	8.96	3.4
	3 hours	1,300	0.354	30	2.3
	1 hour	660	1.06	34	5.2
Other regulated pollutants					
Total suspended particulates	Annual	60	0.00499	0.0229	0.038
	24 hours	150	0.0555	0.825	0.55
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.

Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.

Source: EPA 1997a; WDEC 1994.

For a discussion of how the operation of the immobilization and MOX facilities at Hanford would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.1.4. There are no other NESHAPs limits applicable to operation of these facilities.

The increases in air pollutant concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from the operation of these facilities would be a small fraction of the PSD Class II area increments as summarized in Table 4–65.

Table 4–65. Evaluation of Hanford Air Pollutant Increases Associated With Operations Under Alternative 4B: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in FMEF at Hanford

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Increment
Nitrogen dioxide	Annual	0.0707	25	0.28
PM_{10}	Annual	0.00499	17	0.029
	24 hours	0.0555	30	0.19
Sulfur dioxide	Annual	0.00468	20	0.023
	24 hours	0.0520	91	0.057
	3 hours	0.354	512	0.069

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; PSD, prevention of significant deterioration.

Source: EPA 1997b.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat because of an expected decrease in overall site employment during this timeframe.

Noise impacts would be similar to those for Alternative 4A at Hanford (see Section 4.6.2.1).

The combustion of fossil fuels associated with Alternative 4B would result in the emission of carbon dioxide, which is one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative represent less than 6×10^{-5} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

4.7.2.2 Waste Management

Impacts of operations for this alternative would be the same as for Alternative 4A. See Section 4.6.2.2 for a description of the impacts of this alternative on the waste management infrastructure at Pantex and Hanford.

4.7.2.3 Socioeconomics

Employment requirements for operation of the new pit conversion facility at Pantex under Alternative 4B would be the same as those for Alternative 4A (see Section 4.6.2.3).

[Text deleted.] After construction, startup, and testing of the immobilization and MOX facilities at Hanford in 2007 under Alternative 4B, an estimated 765 new workers would be required to operate them (DOE 1999c; UC 1998e, 1999a, 1999b). This level of employment would be expected to generate another 1,937 related jobs in the region. The total employment requirement of 2,702 direct and indirect jobs represents 0.7 percent of the projected REA workforce, and thus should have no major impact on the REA. Some of the new jobs created under this alternative could be filled from the ranks of the unemployed, currently 11 percent of the REA's population.

This employment requirement could have minor impacts on community services in the ROI, as it should coincide with an expected increase in overall site employment for construction of the tank waste remediation system. Assuming that 91 percent of the new employees associated with this alternative resided in the ROI, an increase of 2,459 new jobs within the workforce would result in an overall population increase of approximately 4,562 persons. This population increase, in conjunction with the normal population growth forecast by the State of Washington, would engender increased construction of local housing units. Given the current population-to-student ratio in the ROI, a population of this size would be expected to include 944 students, and local school districts would increase the number of classrooms to accommodate them.

Community services in the ROI would be expected to change to accommodate the population growth as follows: 59 teachers would be added to maintain the current student-to-teacher ratio of 16:1; 7 police officers would be added to maintain the current officer-to-population ratio of 1.5:1,000; 15 firefighters would be added to maintain the current firefighter-to-population ratio of 3.4:1,000; and 6 physicians would be added to maintain the current physician-to-population ratio of 1.4:1,000. Thus, an additional 87 positions would have to be created to maintain community services at current levels. Hospitals in the ROI would experience a drop from the 2.1 beds to 2.0 beds per 1,000 persons unless additional beds were provided. Moreover, average school enrollment would increase to 94.4 percent from the current 92.5 percent unless additional classrooms were built. None of these projected changes should have a major impact on the level of community services currently offered in the ROI.

4.7.2.4 Human Health Risk

During normal operation of the surplus plutonium disposition facilities, there would be both radiological and hazardous chemical releases to the environment, and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 4B would be as follows.

Radiological Impacts. Table 4–66 reflects the potential radiological impacts on three individual receptor groups at Pantex and Hanford: the population living within 80 km (50 mi) in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts the projected aggregate LCF risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Table 4–66. Potential Radiological Impacts on the Public of Operations Under Alternative 4B: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in FMEF at Hanford

Impact	Pit Conversion	Immobilization Ceramic	Immobilization Glass	MOX[a]	Hanford Total
Population within 80 km for year 2010					
Dose (person-rem)	0.58	7.8×10^{-3}	7.1×10^{-3}	0.14	0.15
Percent of natural background[b]	5.8×10^{-4}	6.7×10^{-6}	6.1×10^{-6}	1.2×10^{-4}	1.3×10^{-4}
10-year latent fatal cancers	2.9×10^{-3}	3.9×10^{-5}	3.6×10^{-5}	6.9×10^{-4}	7.3×10^{-4}
Maximally exposed individual					
Annual dose (mrem)	0.062	1.1×10^{-4}	9.7×10^{-5}	1.8×10^{-3}	1.9×10^{-3}
Percent of natural background[b]	0.019	3.7×10^{-5}	3.2×10^{-5}	6.1×10^{-4}	6.5×10^{-4}
10-year latent fatal cancer risk	3.1×10^{-7}	5.5×10^{-10}	4.9×10^{-10}	9.3×10^{-9}	9.9×10^{-9}
Average exposed individual within 80 km[c]					
Annual dose (mrem)	1.9×10^{-3}	2.0×10^{-5}	1.8×10^{-5}	3.5×10^{-4}	3.7×10^{-4}
10-year latent fatal cancer risk	9.5×10^{-9}	1.0×10^{-10}	9.0×10^{-11}	1.7×10^{-9}	1.8×10^{-9}

[a] As described in Section 4.26.1.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] The annual natural background radiation level at Pantex is 332 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 99,300 person-rem. The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Pantex (299,000) and Hanford (387,800) in 2010.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Source: Appendix J.

Given incident-free operation of all three facilities, the projected total population dose in the year 2010 would be 0.58 person-rem at Pantex and 0.15 person-rem at Hanford. The corresponding number of LCFs in the population from 10 years of operation would be 2.9×10^{-3} around Pantex and 7.3×10^{-4} around Hanford. The dose to the maximally exposed member of the public from annual operation of the pit conversion facility at Pantex would be 0.062 mrem. From 10 years of operation, the corresponding LCF risk of to this individual would be 3.1×10^{-7}. The impacts on the average individual would be lower. The total dose to the maximally exposed member of the public from annual operation of the immobilization and MOX facilities at Hanford would be 1.9×10^{-3} mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 9.9×10^{-9}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with the operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–67; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose would be 500 mrem to pit conversion facility workers, 750 mrem to immobilization facility workers, and 65 mrem to MOX facility workers. The annual dose received by the total site workforce for each of these facilities would be an estimated 192, 274, and 22 person-rem, respectively. The risks and numbers of LCFs among the different workers from 10 years of operation are included in Table 4–67. Doses to individual workers would be kept to minimal levels by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Table 4–67. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 4B: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in FMEF at Hanford

Impact	Pit Conversion	Immobilization (Ceramic or Glass)	MOX	Hanford Total
Number of badged workers	383	365	331	696
Total dose (person-rem/yr)	192	274	22	296
10-year latent fatal cancers	0.77	1.1	0.088	1.2
Average worker dose (mrem/yr)	500	750	65	425[a]
10-year latent fatal cancer risk	2.0×10^{-3}	3.0×10^{-3}	2.6×10^{-4}	1.7×10^{-3}

[a] Represents an average of the doses for both facilities.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998b, 1998e, 1999a, 1999b.

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at Hanford under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released.

4.7.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion facility at Pantex are equivalent to those of Alternative 4A (see Table 4–60), and the potential consequences from operation of the immobilization facility at Hanford, equivalent to those included in Alternative 2 (see Tables 4–31 and 4–32). The potential impacts of such accidents from operation of the MOX facility in FMEF at Hanford are presented in Table 4–68. More details on the method of analysis, assumptions, and specific accident scenarios are presented in the discussion of Alternative 2 in Section 4.3.2.5.

Public. The most severe consequences of a design basis accident for the pit conversion and immobilization facilities under this alternative would be equivalent to the accidents discussed in Section 4.6.2.5 and Section 4.3.2.5, respectively. The most severe consequences of a design basis accident for the MOX facility

in FMEF would be a nuclear criticality. A nuclear criticality of 10^{19} fissions would result in an MEI dose of 0.019 rem for the MOX facility corresponding to an LCF probability of 9.4×10^{-6}. Among the general

Table 4–68. Accident Impacts of MOX Facility Under Alternative 4B: Pit Conversion in New Construction at Pantex, and Immobilization in FMEF and HLWVF and MOX in FMEF at Hanford

		Impacts on Noninvolved Worker		Impact at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Criticality	Extremely unlikely	1.5×10^{-1}	6.0×10^{-5}	1.9×10^{-2}	9.4×10^{-6}	3.9×10^{1}	1.9×10^{-2}
Explosion in sintering furnace	Extremely unlikely	4.9×10^{-4}	2.0×10^{-7}	7.4×10^{-5}	3.7×10^{-8}	2.4×10^{-1}	1.2×10^{-4}
Ion exchange exotherm	Unlikely	2.1×10^{-5}	8.6×10^{-9}	3.2×10^{-6}	1.6×10^{-9}	1.1×10^{-2}	5.2×10^{-6}
Fire	Unlikely	3.6×10^{-6}	1.4×10^{-9}	5.4×10^{-7}	2.7×10^{-10}	1.8×10^{-3}	8.7×10^{-7}
Spill	Extremely unlikely	4.5×10^{-6}	1.8×10^{-9}	6.7×10^{-7}	3.4×10^{-10}	2.2×10^{-3}	1.1×10^{-6}
Design basis earthquake	Unlikely	7.0×10^{-5}	2.8×10^{-8}	1.1×10^{-5}	5.3×10^{-9}	3.4×10^{-2}	1.7×10^{-5}
Beyond-design-basis fire	Beyond extremely unlikely	3.8×10^{-1}	1.5×10^{-4}	1.5×10^{-2}	7.3×10^{-6}	3.5×10^{1}	1.8×10^{-2}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	6.1×10^{2}	2.4×10^{-1}	2.3×10^{1}	1.2×10^{-2}	5.6×10^{4}	2.8×10^{1}

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Source: Calculated using the source terms in Table K–8 and the MACCS2 computer code.

population around Hanford, an estimated 0.019 LCF could occur as a result of the MOX criticality accident. The frequency of such an accident is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year.

A beyond-design-basis earthquake at Hanford could result in collapse of FMEF, including both immobilization (as described in Section 4.3.2.5) and MOX facilities (as described below), with an estimated 35 LCFs. It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause widespread failure of homes, office buildings, and other structures in the surrounding area.

The overall impact of such an event must therefore be seen in the context not only of the potential radiological impacts of these other facilities, but of hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of such an earthquake is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

The beyond-design-basis accidents at Pantex would be equivalent to those discussed in Section 4.6.2.5.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. For design basis accidents, the radiological consequences for this worker were estimated to be highest for the tritium release at the pit conversion facility. The consequences of such an accident would include an LCF probability of 8.7×10^{-5}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at Pantex and Hanford could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated employment of 12,030 person-years of labor and the standard DOE occupational accident rates, approximately 430 cases of nonfatal occupational injury or illness and 0.32 fatality could be expected for the duration of operations.

4.7.2.6 Transportation

Because the only difference between Alternative 4A and 4B is the location of the MOX facility within 400 Area at Hanford, the transportation required for Alternative 4B would be the same as that for Alternative 4A. Therefore, the transportation risks associated with Alternative 4B are equivalent to those discussed in Section 4.6.2.6.

4.7.2.7 Environmental Justice

As discussed in other parts of Section 4.7.2, routine operations conducted under Alternative 4B would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near Pantex would be approximately 1 in 3 million (see Table 4–66); the likelihood for the MEI residing near Hanford would be essentially zero. The number of LCFs expected among the general population residing near Pantex and Hanford from accident-free operations would increase by approximately 2.9×10^{-3} and 7.3×10^{-4}, respectively.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public (see Section 4.7.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–31, 4–32, 4–60, and 4–68). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the sites pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.7.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 4B would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.8 ALTERNATIVE 5

Alternative 5 would involve constructing and operating the pit conversion facility in Zone 4 West at Pantex and the immobilization and MOX facilities at SRS. The immobilization and MOX facilities would be located in new buildings in F-Area. Activities at Pantex would be the same as under Alternative 4A.

4.8.1 Construction

4.8.1.1 Air Quality and Noise

Potential air quality impacts of the construction of surplus plutonium disposition facilities under Alternative 5 at Pantex are the same as those for Alternative 4A (see Section 4.6.1.1).

Noise impacts are the same as those for Alternative 4A at Pantex (see Section 4.6.1.1).

Sources of potential air quality impacts of construction under Alternative 5 at SRS include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from construction activities at SRS, with standards and guidelines is presented as Table 4–69. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Total vehicle emissions associated with activities at SRS would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of these facilities at SRS relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with the construction of these facilities would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 8.7 km [5.4 mi]), noise emissions from construction equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur in F- or S-Area (see Section 4.26). Traffic associated with the construction of these facilities would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Construction workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of standard silencing packages on construction equipment, administrative controls, engineering controls, and personal hearing protection equipment.

Table 4–69. Evaluation of SRS Air Pollutant Concentrations Associated With Construction Under Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	3.44	675	6.7
	1 hour	40,000	15.6	5,110	13
Nitrogen dioxide	Annual	100	0.129	11.5	12
PM_{10}	Annual	50	0.0551	5	10
	24 hours	150	5.36	91.1	61
Sulfur dioxide	Annual	80	0.0523	16.7	21
	24 hours	365	1.29	223	61
	3 hours	1,300	7.73	733	56
Other regulated pollutants					
Total suspended particulates	Annual	75	0.0901	45.5	61
Hazardous and other toxic compounds					
Other toxics[b]	24 hours	150	0.000224	20.7	14

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: DWPF, Defense Waste Processing Facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; SCDHEC 1996a.

4.8.1.2 Waste Management

At Pantex, construction impacts of this alternative would be the same as for Alternative 4A. See Section 4.6.1.2 for a description of the impacts of this alternative on the waste management infrastructure at Pantex.

Table 4–70 compares the wastes generated during the construction of surplus plutonium disposition facilities at SRS with the existing treatment, storage, and disposal capacity for the various waste types. It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during the 3-year construction period. In addition, no soil contaminated with hazardous or radioactive constituents should be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and applicable Federal and State regulations. Construction waste generation would be the same for the ceramic and glass immobilization technologies because the same size facility would be built under either scenario. For this SPD EIS, it is assumed that hazardous waste and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

Hazardous wastes generated during the construction of surplus plutonium disposition facilities would be typical of those generated during the construction of an industrial facility. Any hazardous wastes generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during construction should not have a major impact on the SRS hazardous waste management system.

Table 4–70. Potential Waste Management Impacts of Construction at SRS Under Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	54	NA	NA	NA
Nonhazardous				
Liquid	41,000	15[c]	NA	3[d]
Solid	11,000	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of F-Area sanitary sewer.

[d] Percent of capacity of the Central Sanitary Wastewater Treatment Facility.

Key: DWPF, Defense Waste Processing Facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

Nonhazardous solid wastes generated during the construction of surplus plutonium disposition facilities would be packaged in conformance with standard industrial practice and shipped to commercial or municipal facilities for recycling or disposal. The additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at SRS.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during the construction of the immobilization and MOX facilities would be managed on the site at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during the construction of these facilities is estimated to be 15 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 3 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, management of these wastes at SRS should not have a major impact on the nonhazardous liquid waste treatment system during construction.

4.8.1.3 Socioeconomics

Construction-related employment requirements for Alternative 5 would be as indicated in Table 4–71.

At its peak in 2002, construction of the new pit conversion facility at Pantex under this alternative would require 451 construction workers and generate another 381 indirect jobs in the region. As the total employment requirement of 832 direct and indirect jobs represents only 0.3 percent of the projected REA workforce, it should have no major impact on the REA. It should also have little impact on community services within the ROI. In fact, it should help offset the nearly 40 percent reduction in the total Pantex workforce from—i.e., from 2,944 to 1,750 workers—projected for the years 1997–2005.

At its peak in 2003, construction of the immobilization and MOX facilities at SRS would require 1,692 construction workers and generate another 1,358 indirect jobs in the region. The total employment requirement of 3,050 direct and indirect jobs represents 1.1 percent of the projected REA workforce, and thus should have no major impact on the REA. This requirement should also have little impact on community services

within the ROI. In fact, it should help offset the nearly 20 percent reduction in SRS' overall labor force—i.e., from 15,032 to 12,000 workers—projected for the years 1997–2005.

Table 4–71. Construction Employment Requirements for Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS

Year	Pit Conversion	Immobilization	MOX	Total
2001	297	0	0	297
2002	451	506	441	1,398
2003	276	920	772	1,968
2004	0	1,014	508	1,522
2005	0	552	221	773
2006	0	0	208	208

Key: DWPF, Defense Waste Processing Facility.
Source: DOE 1999c; UC 1998e, 1999c, 1999d.

4.8.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. A summary of radiological impacts of construction activities on workers at risk is presented in Table 4–72. According to a recent radiation survey (DOE 1997f) conducted in the Zone 4 area at Pantex, construction workers would not be expected to receive any additional radiation exposure above natural background levels in the area. Data indicate, at SRS however, that a construction worker could be exposed to radiation deriving from other activities, past or present, at the site. Regardless of location, construction worker exposures would be limited to ensure that doses are kept as low as is reasonably achievable, and workers would be monitored (badged) as appropriate.

Table 4–72. Potential Radiological Impacts on Construction Workers of Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS

Impact	Pit Conversion[a]	Immobilization[b]	MOX[c]	SRS Total
Total dose (person-rem/yr)	0	1.5	1.2	2.7
Annual latent fatal cancers[d]	0	6.0×10^{-4}	4.8×10^{-4}	1.1×10^{-3}
Average worker dose (mrem/yr)	0	4	4	4[e]
Annual latent fatal cancer risk	0	1.6×10^{-6}	1.6×10^{-6}	1.6×10^{-6}

[a] An estimated average of 342 workers would be associated with annual construction operations.
[b] An estimated average of 374 workers would be associated with annual construction operations at the new facility location adjacent to APSF, if built. The number would be the same for immobilization in either ceramic or glass.
[c] An estimated average of 292 workers would be associated with annual construction operations.
[d] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations, per ICRP 1991.
[e] Represents an average of the doses for both facilities.
Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility.
Note: The radiological limit for construction workers is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1997f; ICRP 1991; NAS 1990; UC 1998d, 1998e, 1999c, 1999d.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at SRS under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

No hazardous chemicals would be released as a result of construction activities at Pantex under this alternative; thus, no cancer or adverse, noncancer health effects would occur.

4.8.1.5 Facility Accidents

The construction of surplus plutonium disposition facilities at Pantex and SRS could result in worker injuries or fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 6,166 person-years of construction labor and standard industrial accident rates, approximately 610 cases of nonfatal occupational injury or illness and 0.86 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.8.1.6 Environmental Justice

As discussed in the other parts of Section 4.8.1, construction under Alternative 5 would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, construction activities conducted under Alternative 5 at SRS would have no significant impacts on minority or low-income populations.

4.8.2 Operations

4.8.2.1 Air Quality and Noise

Potential air quality impacts of the operation of the new pit conversion facility under Alternative 5 at Pantex are the same as those for Alternative 4A (see Section 4.6.2.1). Noise impacts are the same as those for Alternative 4A at Pantex (see Section 4.6.2.1).

Source of potential air quality impacts of the operation of facilities under Alternative 5 at SRS were analyzed using ISCST3. Operational impacts would result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from surplus plutonium disposition facilities, with standards and guidelines is presented as Table 4–73. Concentrations of air pollutant concentrations would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards. Air pollution impacts during operation would be mitigated; for example, HEPA filtration has been included in the design of these facilities.

For a discussion of how the operation of the immobilization and MOX facilities at SRS would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.4.4. There are no other NESHAPs limits applicable to operation of these facilities.

The increases in concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide are a small fraction of the PSD Class II area increments, as summarized in Table 4–74.

Total vehicle emissions associated with activities at SRS would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of these facilities at SRS relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operations would include new or existing sources (e.g., cooling systems, vents, motors, material-handling equipment), employee vehicles,

Table 4–73. Evaluation of SRS Air Pollutant Concentrations Associated With Operations Under Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.275	671	6.7
	1 hour	40,000	1.03	5,100	13
Nitrogen dioxide	Annual	100	0.0347	11.4	11
PM_{10}	Annual	50	0.0024	4.94	9.9
	24 hours	150	0.0428	85.8	57
Sulfur dioxide	Annual	80	0.0829	16.8	21
	24 hours	365	1.14	223	61
	3 hours	1,300	3.03	728	56
Other regulated pollutants					
Total suspended particulates	Annual	75	0.0024	45.4	61
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Key: DWPF, Defense Waste Processing Facility; SPD, surplus plutonium disposition.
Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.
Source: EPA 1997a; SCDHEC 1996a.

Table 4–74. Evaluation of SRS Air Pollutant Increases Associated With Operations Under Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Increment
Nitrogen dioxide	Annual	0.0347	25	14
PM_{10}	Annual	0.0024	17	0.014
	24 hours	0.0428	30	0.14
Sulfur dioxide	Annual	0.0829	20	0.42
	24 hours	1.14	91	1.3
	3 hours	3.03	512	0.59

Key: DWPF, Defense Waste Processing Facility; PSD, prevention of significant deterioration.
Source: EPA 1997b.

and truck traffic. Traffic noise associated with operation of these facilities would occur on the site and along offsite local and regional transportation routes used to bring materials and workers to the site. Given the distance to the site boundary (about 8.7 km [5.4 mi]), noise emissions from equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife.

However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur in F- or S-Area (see Section 4.26). Traffic associated with operation of these facilities would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Operations workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

The combustion of fossil fuels associated with Alternative 5 would result in the emission of carbon dioxide, one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative would represent less than 2×10^{-4} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

4.8.2.2 Waste Management

At Pantex, operation impacts of this alternative would be the same as for Alternative 4A. Therefore, see Section 4.6.2.2 for a description of the impacts of this alternative on the waste management infrastructure at Pantex.

Table 4–75 compares the existing site treatment, storage, and disposal capacities with the expected waste generation rates from operating surplus plutonium disposition facilities at SRS. Although HLW would be used in the immobilization process, no HLW would be generated by surplus plutonium disposition facilities. Waste generation at SRS should be the same for the ceramic and glass immobilization technologies.

Table 4–75. Potential Waste Management Impacts of Operations at SRS Under Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[c]	160	9	5	1 of WIPP
LLW	180	1	NA	6
Mixed LLW	4	<1	2	NA
Hazardous	92	1	18	NA
Nonhazardous				
Liquid	81,000	29[d]	NA	6[e]
Solid	1,300	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[c] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[d] Percent of capacity of F-Area sanitary sewer.

[e] Percent of capacity of Central Sanitary Wastewater Treatment Facility.

Key: DWPF, Defense Waste Processing Facility; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Current schedules for shipment of TRU waste to WIPP would accommodate shipment of contact-handled TRU waste from surplus plutonium disposition facilities beginning in 2016 (DOE 1997c:17). Therefore, in order to be conservative, it is assumed the TRU waste would be stored on the site until 2016. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995c).

TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU Waste Characterization and Certification Facility at SRS.

TRU wastes generated at the immobilization and MOX facilities at SRS are estimated to be 9 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 1,600 m^3 (2,090 yd^3) of TRU waste would be generated over the 10-year operation period. If all the TRU waste were stored on the site, this would be 5 percent of the 34,400-m^3 (45,000-yd^3) storage capacity available at the TRU Waste Storage Pads. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of about 0.23 ha (0.57 acre) would be required. Therefore, impacts of the management of additional quantities of TRU waste at SRS should not be major. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997d).

The 1,780 m^3 (2,328 yd^3) of additional TRU wastes generated at Pantex and SRS would be 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and 1 percent of the current 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997e:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997e).

At SRS, LLW would be packaged, certified, and accumulated at the immobilization and MOX facilities before transfer for additional treatment and disposal in existing onsite facilities. A total of 1,800 m^3 (2,350 yd^3) of LLW would be generated over the operations period. LLW generated at surplus plutonium disposition facilities is estimated to be 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility and 6 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687 m^3/ha disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 1,800 m^3 (2,350 yd^3) of waste would require 0.20 ha (0.49 acre) of disposal space at SRS. Therefore, impacts of the management of this additional LLW at SRS should not be major.

At SRS, mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan. Mixed LLW generated at the immobilization and MOX facilities is estimated to be less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 2 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

At SRS, any hazardous wastes generated during operation of the immobilization and MOX facilities would be packaged for treatment and disposal at a combination of onsite and offsite facilities. Assuming that all hazardous waste is managed on the site, hazardous waste generated for this combination of facilities is estimated to be

1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 18 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage buildings. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system. If all LLW, mixed LLW, and hazardous wastes generated at the immobilization and MOX facilities at SRS were treated in the Consolidated Incineration Facility, this additional waste would be 2 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of that facility.

Nonhazardous solid waste would be packaged and transported in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent to the Three Rivers Landfill for disposal (DOE 1998c:3-42). It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at SRS.

At SRS, nonhazardous wastewater generated by the immobilization and MOX facilities would be treated if necessary before being discharged to the F-Area sanitary sewer system, which connects to the Central Sanitary Wastewater Treatment Facility. Nonhazardous liquid waste generated by surplus plutonium disposition facilities at SRS is estimated to be 29 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 6 percent of the 1,449,050-m^3/yr (1,890,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, management of nonhazardous liquid waste at SRS should not have a major impact on the treatment system.

4.8.2.3 Socioeconomics

Under Alternative 5, operation of the pit conversion facility at Pantex would begin in 2004 and should require 400 new workers (UC 1998e). This level of employment should generate another 1,355 indirect jobs within the region. The total employment requirement of 1,755 direct and indirect jobs represents 0.7 percent of the projected REA workforce, and thus should have no major impact on the REA. It should also have little impact on community services within the Pantex ROI. In fact, it should help offset the nearly 40 percent reduction in the total Pantex workforce (i.e., from 2,944 to 1,750 workers) projected for the years 1997–2010.

After construction, startup, and testing of the immobilization and MOX facilities at SRS in 2007 under Alternative 5, an estimated 720 new workers would be required to operate them (DOE 1999c; UC 1999c, 1999d). This level of employment would be expected to generate another 1,287 indirect jobs within the region. The total employment requirement of 2,007 direct and indirect jobs represents less than 0.7 percent of the projected REA workforce, and thus should have no major impact on the REA. The additional required workers should also have little impact on community services within the ROI. In fact, they should help offset the 33 percent reduction in the total SRS workforce (i.e., 15,032 to 10,000 workers) projected for the years 1997–2010.

4.8.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 5 would be as follows.

Radiological Impacts. Table 4–76 reflects the potential radiological impacts on three individual receptor groups at Pantex and SRS: the population living within 80 km (50 mi) in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts the projected aggregate LCF risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Given incident-free operation of all three facilities, the total population dose in the year 2010 would be 0.58 person-rem at Pantex and 0.18 person-rem at SRS. The corresponding number of LCFs in the population

Table 4–76. Potential Radiological Impacts on the Public of Operations Under Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS

Impact	Pit Conversion	Immobilization Ceramic	Immobilization Glass	MOX[a]	SRS Total (Ceramic or Glass)
Population within 80 km for year 2010					
Dose (person-rem)	0.58	2.8×10^{-3}	2.6×10^{-3}	0.18	0.018
Percent of natural background[b]	5.8×10^{-4}	1.2×10^{-6}	1.1×10^{-6}	7.8×10^{-5}	7.9×10^{-5}
10-year latent fatal cancers	2.9×10^{-3}	1.4×10^{-5}	1.3×10^{-5}	9.1×10^{-4}	9.2×10^{-4}
Maximally exposed individual					
Annual dose (mrem)	0.062	2.8×10^{-5}	2.6×10^{-5}	3.7×10^{-3}	3.7×10^{-3}
Percent of natural background[b]	0.019	9.5×10^{-6}	8.8×10^{-6}	1.3×10^{-3}	1.3×10^{-3}
10-year latent fatal cancer risk	3.1×10^{-7}	1.4×10^{-10}	1.3×10^{-10}	1.9×10^{-8}	1.9×10^{-8}
Average exposed individual within 80 km[c]					
Annual dose (mrem)	1.9×10^{-3}	3.6×10^{-6}	3.3×10^{-6}	2.3×10^{-4}	2.3×10^{-4}
10-year latent fatal cancer risk	9.5×10^{-9}	1.8×10^{-11}	1.6×10^{-11}	1.2×10^{-9}	1.2×10^{-9}

[a] Includes a component from liquid pathways because it is possible that liquid releases could reach these pathways at SRS.

[b] The annual natural background radiation level at Pantex is 332 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 99,300 person-rem. The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive approximately 232,000 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Pantex (299,000) and the SRS APSF (approximately 790,000), if built, in 2010.

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility.

Source: Appendix J.

from 10 years of operation would be 2.9×10^{-3} around Pantex and 9.2×10^{-4} around SRS. The dose to the maximally exposed member of the public from annual operation of the pit conversion facility at Pantex would be 0.062 mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 3.1×10^{-7}. The impacts on the average individual would be lower. The total dose to the maximally exposed member of the public from annual operation of the immobilization and MOX facilities at SRS would be 3.7×10^{-3} mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 1.9×10^{-8}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–77; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose would be 500 mrem

to pit conversion facility workers, 750 mrem to immobilization facility workers, and 65 mrem to MOX facility workers. The annual dose received by the total site workforce for each of these facilities has been estimated at 192, 242, and 22 person-rem, respectively. The risks and numbers of LCFs among the different workers from 10 years of operation are included in Table 4–77. Doses to individual workers would be kept to minimal levels by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Table 4–77. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 5: Pit Conversion in New Construction at Pantex, and Immobilization in New Construction and DWPF and MOX in New Construction at SRS

Impact	Pit Conversion	Immobilization (Ceramic or Glass)	MOX	SRS Total
Number of badged workers	383	323	331	654
Total dose (person-rem/yr)	192	242	22	264
10-year latent fatal cancers	0.77	0.97	0.088	1.1
Average worker dose (mrem/yr)	500	750	65	404[a]
10-year latent fatal cancer risk	2.0×10^{-3}	3.0×10^{-3}	2.6×10^{-4}	1.6×10^{-3}

[a] Represents an average of the doses for both facilities.

Key: DWPF, Defense Waste Processing Facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998d, 1998e, 1999c, 1999d.

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at SRS under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released.

No hazardous chemicals would be released as a result of operations at Pantex under this alternative; thus, no cancer or adverse, noncancer health effects would occur.

4.8.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion facility at Pantex would be equivalent to those of Alternative 4A (see Table 4–60), and the potential consequences from operation of the immobilization and MOX facilities at SRS, equivalent to those included in Alternative 3 (see Tables 4–44 through 4–46). More details on the method of analysis, assumptions, and specific accident scenarios are presented for Alternative 2 in Section 4.3.2.5.

Public. The most severe consequences of a design basis accident for the pit conversion facility are shown in Section 4.6.2.5; the most severe consequences for the immobilization and MOX facilities, in Section 4.4.2.5.

A beyond-design-basis earthquake at SRS could result in total collapse of the immobilization and MOX facilities, with an estimated 14 LCFs (as described in Section 4.4.2.5). It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause widespread failure of homes, office buildings, and other structures in the surrounding area. The overall impact of such an event must therefore be seen in the context not only of the potential radiological impacts of these other facilities, but of hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of such an earthquake is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

The beyond-design-basis accidents at Pantex would be equivalent to those discussed in Section 4.6.2.5.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. For design basis accidents, the radiological consequences for this worker were estimated to be highest for the criticality at the MOX facility. The consequences of such an accident would include an LCF probability of 1.2×10^{-4}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at Pantex and SRS could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated employment of 11,535 person-years of labor and the standard DOE occupational accident rates, approximately 420 cases of nonfatal occupational injury or illness and 0.31 fatality could be expected for the duration of operations.

4.8.2.6 Transportation

Operational transportation impacts may be divided into two parts: impacts due to incident-free transportation and those due to transportation accidents. They may be further divided into nonradiological and radiological impacts. Nonradiological impacts are specifically vehicular, such as vehicular emissions and traffic accidents. Radiological impacts are those related to the dose received by transportation workers and the public during normal operations and in the case of accidents in which the radioactive materials being shipped may be released. For more detailed information on the transportation analysis performed for this SPD EIS, see Appendix L.

Under Alternative 5, transportation to and from Pantex would include the shipment of plutonium pits and clean plutonium metal via SST/SGT from sites throughout the DOE complex to the pit conversion facility.[16] During dismantlement of the pits, some HEU would be recovered. The pit conversion facility would ship HEU via

[16] Work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 SI container for long-term storage. This effort would be completed over 10 years, and the estimated dose to involved workers received from this repackaging activity would be about 104 person-rem. The SPD Draft EIS analyzed repackaging of the pits in an AT–400A container. The change to the AL–R8 SI changes the long-term storage period for pits from 50 to 30 years because of the need to replace a seal in the container after 30 years; the AT–400A does not require that activity. After seal replacement, the pits could continue to be stored for another 30 years

SST/SGT to ORR for storage.[17] After conversion, the plutonium in the pit conversion facility would be in the form of plutonium dioxide. This material would be transported to the to the MOX facility at SRS for fabrication into MOX fuel pellets.

MOX fuel fabrication also requires uranium dioxide. Quantifying the uranium dioxide transportation requirements for this SPD EIS involved selecting representative sites for the source of the depleted uranium hexafluoride and the conversion facility. A DOE enrichment facility near Portsmouth, Ohio, was chosen as a representative site for the source of the depleted uranium hexafluoride, and the nuclear fuel fabrication facility in Wilmington, North Carolina, as representative of a uranium conversion facility. These sites were also used as representative sites in the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996e). It is assumed that depleted uranium hexafluoride needed for MOX fuel would be shipped via commercial truck to the uranium conversion facility, where it would be converted into uranium dioxide (see Section 4.3.2.6). After conversion, the depleted uranium dioxide would be shipped via commercial truck from the conversion facility to the MOX facility at SRS. This material would be blended with plutonium dioxide at the MOX facility, fabricated into MOX fuel pellets, and placed in MOX fuel rods. After fabrication, the MOX fuel rods would be shipped to a domestic reactor site, where they would be placed in fuel assemblies and irradiated. Shipments of unirradiated MOX fuel rods would be made in an SST/SGT because unirradiated MOX fuel in large enough quantities is subject to the same security concerns as pure weapons-grade plutonium. It is assumed in this transportation analysis that all MOX fuel is shipped from the MOX facility to the most distant reactor site, North Anna.

Immobilization at SRS under this alternative would require that surplus nonpit plutonium in various forms be shipped from current storage locations (i.e., SRS, Hanford, INEEL, LLNL, LANL, and RFETS) to the immobilization facility at SRS. Even though these materials are not clean plutonium metal or pits, the quantity of the plutonium contained in them would require that they be treated as materials that could be used in nuclear weapons, and thus that shipments be made in SST/SGTs.

Under the preferred technology alternative for immobilization, the surplus plutonium would be immobilized in a ceramic matrix in small cans at the immobilization facility, placed in HLW canisters, and transported via specially designed trucks to DWPF in S-Area. This intrasite transportation—from F-Area to S-Area—could require the temporary shutdown of roads on SRS. It would, however, provide for all the necessary security and for reduced risk to the public; SST/SGTs would not be required.

Use of the preferred ceramic (versus glass) matrix for immobilization would also require a small amount of depleted uranium dioxide (i.e., less than 10 t [11 tons] per year). It is assumed that this depleted uranium dioxide would be produced and shipped in the same manner as the depleted uranium dioxide needed by the MOX facility.

After the immobilized plutonium was encased by HLW at DWPF, it would be shipped to a potential geologic repository for ultimate disposition. Because HLW would be displaced by the cans of immobilized plutonium suspended in the HLW canister, additional canisters would be required over the life of the immobilization program. According to estimates, up to 145 additional canisters of HLW would be needed to meet the demands of surplus plutonium disposition under Alternative 5. The *Yucca Mountain Draft EIS* evaluates different options for the shipment of these canisters to a potential geologic repository using either trucks or trains. The analysis revealed that shipment by train would pose the lower risk. However, no ROD has yet been issued regarding these shipments. To bound the risks associated with these additional shipments, this SPD EIS conservatively assumes that all of these shipments would be made by truck, one canister per truck.

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[17] Classified nuclear material parts would also result from pit disassembly. Although current plans are to store these parts at the pit conversion facility, this SPD EIS analyzes the possible transport of these nuclear material parts to LANL. Therefore, the transportation impacts are slightly overstated.

Every alternative considered in this SPD EIS would require routine transportation of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities on the sites. This transportation would be handled in the same manner as other site waste shipments, and as shown in Sections 4.8.1.2 and 4.8.2.2, would involve no major increase in the amounts of waste already being managed at these sites. The shipments would pose no greater risks than the ordinary waste shipments at these sites, as analyzed in the WM PEIS.

However, TRU waste generated at Pantex was not covered by the WM PEIS ROD, as there was no such waste at Pantex at the time the ROD was issued, and none was likely to be generated in ongoing site operations. Location of the pit conversion facility at Pantex would result in the generation of TRU waste, as described in Section 4.8.2.2. Moreover, a fairly large increase in the amount of LLW at Pantex (i.e., 25 percent of the site's current storage capacity) could be expected under this alternative. Currently, this type of waste is shipped to the NTS for disposal. In order to account for the transportation of TRU waste from Pantex to WIPP and LLW from Pantex to NTS, additional shipments are analyzed in this SPD EIS.

In all, approximately 2,300 shipments of radioactive materials would be carried out by DOE under this alternative. The total distance traveled on public roads by trucks carrying radioactive materials would be 3.8 million km (2.4 million mi).

Impacts of Incident-Free Transportation. The dose to transportation workers from all transportation activities entailed by this alternative has been estimated at 60 person-rem; the dose to the public, 67 person-rem. Accordingly, the incident-free transportation of radioactive material associated with this alternative would result in 0.024 LCF among transportation workers and 0.033 LCF in the total affected population over the duration of the transportation activities. The estimated number of nonradiological fatalities from vehicular emissions associated with this alternative is 0.016.

Impacts of Accidents During Transportation (Consequences). The maximum foreseeable offsite transportation accident under this alternative (probability of occurrence: greater than 1 in 10 million per year) is a shipment of plutonium oxide from the pit conversion facility at Pantex to Savannah River with a severity category VIII accident in a rural population zone under neutral (average) weather conditions. If this accident were to occur, it could result in a dose of 624 person-rem to the public for an LCF risk of 0.3 and 684 rem to the hypothetical MEI for an LCF risk of 0.68. (The MEI receives a larger dose than the population because it is unlikely that a person would be in position, and remain in position, to receive this hypothetical maximum dose.) No fatalities would be expected to occur. The probability of more severe accidents, different weather conditions at the time of accident, or occurrence in a more densely populated area were also evaluated, and estimated to have a probability lower than 1 chance in 10 million per year. (See Appendix L.6.)

Impacts of Accidents During Transportation (Risks). The total transportation accident risks were estimated by summing the risks to the affected population from all hypothetical accidents. For Alternative 5 those risks are as follows: a radiological dose to the population of 9 person-rem, resulting in a total population risk of 0.004 LCF; and traffic accidents resulting in 0.050 fatality.

4.8.2.7 Environmental Justice

As discussed in other parts of Section 4.8.2, routine operations conducted under Alternative 5 would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near Pantex would be approximately 1 in 3 million (see Table 4–76); the likelihood for the MEI residing near SRS would be essentially zero. The number of LCFs expected among the general population residing near Pantex and SRS from accident-free operations would increase by approximately 2.9×10^{-3} and 9.2×10^{-4}, respectively.

Design basis accidents at the site would not be expected to cause cancer fatalities among the public (see Section 4.8.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–60 and 4–43 through 4–46). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the sites pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.8.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 5 would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.9 [Section deleted because alternative deleted.]

4.10 ALTERNATIVE 6A

Alternative 6A would involve constructing and operating the pit conversion and MOX facilities at Hanford and the immobilization facility at SRS. The pit conversion facility would be located in the existing FMEF building with the MOX facility located in a new building near FMEF. The immobilization facility would be located in a new facility in F-Area.

4.10.1 Construction

4.10.1.1 Air Quality and Noise

Sources of potential air quality impacts of Hanford construction under Alternative 6A include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from Hanford construction activities, with standards and guidelines is presented as Table 4–78. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards as a result of Hanford activities. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat from current emissions during the planned construction period because of an expected decrease in overall site employment.

The location of these facilities at Hanford relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with the construction of these facilities would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 7.1 km [4.4 mi]), noise emissions from construction equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Traffic associated with the construction of these facilities would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Sources of potential air quality impacts of construction under Alternative 6A at SRS include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from construction activities at SRS, with standards and guidelines is presented as Table 4–79. Concentrations of air pollutants, especially

Table 4–78. Evaluation of Hanford Air Pollutant Concentrations Associated With Construction Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	1.34	35.4	0.35
	1 hour	40,000	9.1	57.4	0.14
Nitrogen dioxide	Annual	100	0.104	0.354	0.35
PM_{10}	Annual	50	0.103	0.121	0.24
	24 hours	150	3.59	4.36	2.9
Sulfur dioxide	Annual	50	0.00979	1.64	3.2
	24 hours	260	0.109	9.02	3.4
	3 hours	1,300	0.74	30.4	2.3
	1 hour	660	2.22	35.1	5.3
Other regulated pollutants					
Total suspended particulates	Annual	60	0.209	0.23	0.38
	24 hours	150	6.74	7.5	5.0
Hazardous and other toxic compounds					
Other toxics[b]	Annual	0.12	0.000008	0.000014	0.012

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; WDEC 1994.

PM_{10} and total suspended particulates, would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Total vehicle emissions associated with activities at SRS would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of these facilities at SRS relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with the construction of these facilities would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 8.7 km [5.4 mi]), noise emissions from construction equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife. Noise should not affect threatened and endangered species because there are no threatened and endangered species habitats near the facility site (see Section 4.26). Noise from traffic associated with the construction of these facilities would

likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Table 4–79. Evaluation of SRS Air Pollutant Concentrations Associated With Construction Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	2.89	674	6.7
	1 hour	40,000	13.1	5,110	13
Nitrogen dioxide	Annual	100	0.108	11.5	11
PM_{10}	Annual	50	0.0366	4.98	10
	24 hours	150	3.56	89.3	60
Sulfur dioxide	Annual	80	0.0502	16.7	21
	24 hours	365	1.24	223	61
	3 hours	1,300	7.42	732	56
Other regulated pollutants					
Total suspended particulates	Annual	75	0.0581	45.4	61
Hazardous and other toxic compounds					
[Text deleted.]					
Other toxics[b]	24 hours	150	0	20.7	14

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Processing Facility, SPD, surplus plutonium disposition.

Source: EPA 1997a; SCDHEC 1996a.

Construction workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of standard silencing packages on construction equipment, administrative controls, engineering controls, and personal hearing protection equipment.

4.10.1.2 Waste Management

Tables 4–80 and 4–81 compare the wastes generated during the construction of surplus plutonium disposition facilities at Hanford and SRS with the existing treatment, storage, and disposal capacity for the various waste types at each site. It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during the 3-year construction period. In addition, no soil contaminated with hazardous or radioactive constituents should be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and applicable Federal and State regulations. Construction waste generation would be the same for the ceramic and glass immobilization technologies because the same size facility would be built under either scenario. For this SPD EIS, it is assumed that hazardous waste and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

Hazardous wastes generated during the construction of surplus plutonium disposition facilities at Hanford and SRS would be typical of those generated during the construction of an industrial facility. Any hazardous wastes generated during construction would be packaged in DOT-approved containers and shipped off the site

Table 4–80. Potential Waste Management Impacts of Construction at Hanford Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	32	NA	NA	NA
Nonhazardous				
Liquid	21,000	9[c]	NA	9[d]
Solid	8,600	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of the 400 Area sanitary sewer.

[d] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

Table 4–81. Potential Waste Management Impacts of Construction at SRS Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	35	NA	NA	NA
Nonhazardous				
Liquid	21,000	8[c]	NA	1[d]
Solid	2,200	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of F-Area sanitary sewer.

[d] Percent of capacity of the Central Sanitary Wastewater Treatment Facility.

Key: DWPF, Defense Waste Processing Facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during construction should not have a major impact on Hanford or SRS hazardous waste management systems.

Nonhazardous solid wastes generated during the construction of surplus plutonium disposition facilities at Hanford and SRS would be packaged in conformance with standard industrial practice and shipped to commercial or municipal facilities for recycling or disposal. The additional waste load generated during

construction should not have a major impact on the nonhazardous solid waste management systems at Hanford or SRS.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during construction of the pit conversion and MOX facilities at Hanford would be managed on the site at the Energy Northwest (formerly WPPSS) Sewage Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during the construction of these facilities is estimated to be 9 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 9 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd^3/yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of these wastes at Hanford should not have a major impact on the nonhazardous liquid waste treatment system during construction.

To be conservative, it was also assumed that all nonhazardous liquid wastes generated during construction of the immobilization facility at SRS would be managed on the site at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during the construction of these facilities is estimated to be 8 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 1 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, management of these wastes at SRS should not have a major impact on the nonhazardous liquid waste treatment system during construction.

4.10.1.3 Socioeconomics

Construction-related employment requirements for Alternative 6A would be as indicated in Table 4–82.

Table 4–82. Construction Employment Requirements for Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Year	Pit Conversion	MOX	Immobilization	Total
2001	76	0	0	76
2002	116	441	506	1,063
2003	72	772	920	1,764
2004	0	508	1,014	1,522
2005	0	221	552	773
2006	0	208	0	208

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility.
Source: DOE 1999c; UC 1998a, 1999c, 1999d.

At its peak in 2003, construction of the pit conversion and MOX facilities at Hanford under this alternative would require 844 construction workers and generate another 866 indirect jobs in the region. The total employment requirement of 1,710 direct and indirect jobs represents less than 0.5 percent of the projected REA workforce, and thus should have no major impacts on the REA. That requirement should also have little impact on the community services currently offered in the ROI. In fact, it should help offset the nearly 15 percent reduction in Hanford employment (i.e., from 12,882 to approximately 11,000 workers) projected for the years 1997–2005.

At its peak in 2004, construction of the new immobilization facility at SRS would require 1,014 construction workers and generate another 814 indirect jobs in the region. As this total employment requirement of

1,828 direct and indirect jobs represents 0.6 percent of the total projected REA workforce, it should have no major impact on the REA. It should also have little impact on the community services currently offered in the SRS ROI. In fact, it should help offset the nearly 20 percent reduction in SRS's total workforce from its 1997 level (i.e., from 15,032 to 12,000 workers) projected for the years 1997–2005.

4.10.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. A summary of radiological impacts of construction activities on workers at risk is presented in Table 4–83. According to recent radiation surveys (Antonio 1998; UC 1998a, 1998b, 1999c, 1999d) conducted at the Hanford 400 Area and SRS F-Area, construction workers at Hanford would not be expected to receive doses above natural background levels. At SRS, however, construction workers could receive small doses above natural background levels. Regardless of location, construction workers may be monitored (badged) as a precautionary measure.

Table 4–83. Potential Radiological Impacts on Construction Workers of Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion[a]	MOX[b]	Hanford Total	Immobilization[c]
Total dose (person-rem/yr)	0	0	0	1.5
Annual latent fatal cancers[d]	0	0	0	6.0×10^{-4}
Average worker dose (mrem/yr)	0	0	0[e]	4
Annual latent fatal cancer risk	0	0	0	1.6×10^{-6}

[a] An estimated average of 88 workers would be associated with annual construction and modification operations.

[b] An estimated average of 292 workers would be associated with annual construction operations.

[c] An estimated average of 374 workers would be associated with annual construction operations at the new facility location adjacent to APSF, if built. The number would be the same for immobilization in either ceramic or glass.

[d] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations, per ICRP 1991.

[e] Represents an average of the doses for both facilities.

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility.

Note: The radiological limit for construction workers is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: Antonio 1998; ICRP 1991; NAS 1990; UC 1998a, 1998b, 1999c, 1999d.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at Hanford under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

4.10.1.5 Facility Accidents

Surplus plutonium disposition construction activities at Hanford and SRS could result in worker injuries or fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 5,406 person-years of construction labor and standard industrial accident rates, approximately 540 cases of nonfatal occupational injury or illness and 0.75 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.10.1.6 Environmental Justice

As discussed in the other parts of Section 4.10.1, construction under Alternative 6A would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of individuals the population. Therefore, construction activities under Alternative 6A at Hanford and SRS would have no significant impacts on minority or low-income populations.

4.10.2 Operations

4.10.2.1 Air Quality and Noise

Potential air quality impacts of the operation of facilities under Alternative 6A at Hanford were analyzed using ISCST3. Operational impacts would result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G, including those resulting from surplus plutonium disposition facilities.

A comparison of maximum air pollutant concentrations, including the contribution from surplus plutonium disposition facilities, with standards and guidelines is presented as Table 4–84. Concentrations of air pollutants would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards as a result of Hanford activities. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during operation would be mitigated; for example, HEPA filtration has been included in the design of these facilities.

Table 4–84. Evaluation of Hanford Air Pollutant Concentrations Associated With Operations Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.247	34.3	0.34
	1 hour	40,000	1.68	50	0.13
Nitrogen dioxide	Annual	100	0.031	0.281	0.28
PM_{10}	Annual	50	0.00143	0.0193	0.039
	24 hours	150	0.0159	0.786	0.52
Sulfur dioxide	Annual	50	0.00123	1.63	3.1
	24 hours	260	0.0136	8.92	3.4
	3 hours	1,300	0.0928	29.7	2.3
	1 hour	660	0.278	33.2	5.0
Other regulated pollutants					
Total suspended particulates	Annual	60	0.00143	0.0193	0.032
	24 hours	150	0.0159	0.786	0.52
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; SPD, surplus plutonium disposition.

Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.

Source: EPA 1997a; WDEC 1994.

For a discussion of how the operation of the pit conversion and MOX facilities at Hanford would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.1.4. There are no other NESHAPs limits applicable to operation of these facilities.

The increases in concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from operation of these facilities would be a small fraction of the PSD Class II area increments as summarized in Table 4–85.

Table 4–85. Evaluation of Hanford Air Pollutant Increases Associated With Operations Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Increment
Nitrogen dioxide	Annual	0.031	25	0.12
PM_{10}	Annual	0.00143	17	0.0084
	24 hours	0.0159	30	0.053
Sulfur dioxide	Annual	0.00123	20	0.0062
	24 hours	0.0136	91	0.015
	3 hours	0.0928	512	0.018

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; PSD, prevention of significant deterioration.

Source: EPA 1997b.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat because of an expected decrease in overall site employment during this timeframe.

The location of these facilities at Hanford relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operations would include new or existing sources (e.g., cooling systems, vents, motors, material-handling equipment), employee vehicles, and truck traffic. Traffic noise associated with operation of these facilities would occur on the site and along offsite local and regional transportation routes used to bring materials and workers to the site. Given the distance to the site boundary (about 7.1 km [4.4 mi]), noise emissions from equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could have onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Noise from traffic associated with operation of these facilities would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Potential air quality impacts of operation of the new immobilization facility under Alternative 6A at SRS were analyzed using ISCST3. Operation impacts result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including those resulting from the immobilization facility, with standards and guidelines is presented as Table 4–86. Concentrations for immobilization in the ceramic and glass forms are the same. Concentration of air pollutants would likely increase at the site boundary, but should not exceed the Federal or State ambient air quality standards. Air pollution impacts during operation would be mitigated; for example, HEPA filtration has been included in the design of the facility.

For a discussion of how the operation of the immobilization facility at SRS would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.4.4. There are no other NESHAPs limits applicable to operation of this facility.

The increases in concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from the operation of the facility would be a small fraction of the PSD Class II area increments as summarized in Table 4–87.

Table 4–86. Evaluation of SRS Air Pollutant Concentrations Associated With Operations Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.152	671	6.7
	1 hour	40,000	0.657	5,100	13
Nitrogen dioxide	Annual	100	0.0242	11.4	12
PM_{10}	Annual	50	0.00181	4.94	9.9
	24 hours	150	0.032	85.8	57
Sulfur dioxide	Annual	80	0.0442	16.7	21
	24 hours	365	0.61	223	61
	3 hours	1,300	1.63	727	56
Other regulated pollutants					
Total suspended particulates	Annual	75	0.00181	45.4	61
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging time.

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; SPD, surplus plutonium disposition.

Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.

Source: EPA 1997a; SCDHEC 1996a.

Table 4–87. Evaluation of SRS Air Pollutant Increases Associated With Operations Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Increment
Nitrogen dioxide	Annual	0.0242	25	0.097
PM_{10}	Annual	0.00181	17	0.011
	24 hours	0.032	30	0.11
Sulfur dioxide	Annual	0.0442	20	0.22
	24 hours	0.61	91	0.67
	3 hours	1.63	512	0.32

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; PSD, prevention of significant deterioration.

Source: EPA 1997b.

Total vehicle emissions associated with activities at SRS would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of the facility at SRS relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operation would include new or existing sources (e.g., cooling systems, vents, motors, and material-handling equipment), employee vehicles, and truck traffic. Traffic noise associated with operation of the facility would occur on the site and along offsite local and

regional transportation routes used to bring materials and workers to the site. Given the distance to the site boundary (about 8.7 km [5.4 mi]), noise emissions from equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could have onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur in F- or S-Area (see Section 4.26). Traffic associated with operation of the facility would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increase in annoyance to the public.

Operations workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

The combustion of fossil fuels associated with Alternative 6A would result in the emission of carbon dioxide, one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative would represent less than 7×10^{-5} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

4.10.2.2 Waste Management

Tables 4–88 and 4–89 compare the existing site treatment, storage, and disposal capacities with the expected waste generation rates from operating surplus plutonium disposition facilities at Hanford and SRS. Although HLW would be used in the immobilization process, no HLW would be generated by surplus plutonium disposition facilities. Waste generation at SRS should be the same for the ceramic and glass immobilization technologies.

Table 4–88. Potential Waste Management Impacts of Operations at Hanford Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[c]	86	5	5	<1 of WIPP
LLW	150	NA	NA	<1
Mixed LLW	4	<1	<1	<1
Hazardous	5	NA	NA	NA
Nonhazardous				
Liquid	66,000	28[d]	NA	28[e]
Solid	2,200	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[c] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[d] Percent of capacity of the 400 Area sanitary sewer.

[e] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

Table 4–89. Potential Waste Management Impacts of Operations at SRS Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[c]	95	6	3	1 of WIPP
LLW	81	<1	NA	3
Mixed LLW	1	<1	1	NA
Hazardous	89	<1	17	NA
Nonhazardous				
Liquid	55,000	20[d]	NA	4[e]
Solid	850	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[c] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[d] Percent of capacity of F-Area sanitary sewer.

[e] Percent of capacity of Central Sanitary Wastewater Treatment Facility.

Key: DWPF, Defense Waste Processing Facility; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Current schedules for shipment of TRU waste to WIPP would accommodate shipment of contact-handled TRU waste from surplus plutonium disposition facilities beginning in 2016 (DOE 1997c:17). Therefore, in order to be conservative, it is assumed the TRU waste would be stored on the site until 2016. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed waste at Hanford will be evaluated in the *Hanford Site Solid (Radioactive and Hazardous) Waste Program EIS* that will be prepared by the DOE Richland Operations Office (DOE 1997b). Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995c).

TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the Waste Receiving and Processing Facility at Hanford and the planned TRU Waste Characterization and Certification Facility at SRS.

TRU wastes generated by the pit conversion and MOX facilities at Hanford are estimated to be 5 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of the Waste Receiving and Processing Facility. A total of 860 m^3 (1,120 yd^3) of TRU waste would be generated over the 10-year operation period. If all the TRU waste were stored on the site, this would be 5 percent of the 17,000-m^3 (22,200-yd^3) storage capacity available at Hanford. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of less than 0.12 ha (0.30 acre) would be required. Therefore, impacts of the management of additional quantities of TRU waste at Hanford should not be major. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997d).

TRU waste generated at the immobilization facility at SRS is estimated to be 6 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 950 m^3 (1,240 yd^3) of TRU waste would be generated over the 10-year operation period. If all the TRU waste were stored on the site, this would be 3 percent of the 34,400-m^3 (45,000-yd^3) storage capacity available at the TRU Waste Storage Pads. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of about 0.14 ha (0.35 acre) would be required. Therefore, impacts of the management of additional quantities of TRU waste at SRS should not be major. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997d).

The 1,810 m^3 (2,367 yd^3) of TRU wastes generated by the surplus plutonium disposition facilities at Hanford and SRS would be 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and 1 percent of the current 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997e:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997e).

At Hanford, LLW would be packaged, certified, and accumulated at the pit conversion and MOX facilities before transfer for additional treatment and disposal in existing onsite facilities. A total of 1,500 m^3 (1,960 yd^3) of LLW would be generated over the operations period. LLW generated at surplus plutonium disposition facilities is estimated to be less than 1 percent of the 1.74 million-m^3 (2.28 million-yd^3) capacity of the LLW Burial Grounds and 1 percent of the 230,000-m^3 (301,000-yd^3) capacity of the Grout Vaults. Using the 3,480 m^3/ha disposal land usage factor for Hanford published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 1,500 m^3 (1,960 yd^3)

of waste would require 0.44 ha (1.1 acre) disposal space at Hanford. Therefore, impacts of the management of this additional LLW at Hanford should not be major.

At SRS, LLW would be packaged, certified, and accumulated at the new immobilization facility before transfer for additional treatment and disposal in existing onsite facilities. A total of 810 m^3 (1,060 yd^3) of LLW would be generated over the operations period. LLW generated at surplus plutonium disposition facilities is estimated to be less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility and 3 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687 m^3/ha disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 810 m^3 (1,060 yd^3) of waste would require 0.1-ha (0.25-acre) disposal space at SRS. Therefore, impacts of the management of this additional LLW at SRS should not be major.

At Hanford, mixed LLW would be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan. Mixed LLW generated at the pit conversion and MOX facilities is estimated to be less than 1 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of the Waste Receiving and Processing Facility, less than 1 percent of the 16,800-m^3 (22,000-yd^3) capacity of the Central Waste Complex, and less than 1 percent of the 14,200-m^3 (18,600-yd^3) planned disposal capacity of the Radioactive Mixed Waste Disposal Facility. Therefore, the management of this additional waste at Hanford should not have a major impact on the mixed LLW management system. If all TRU waste and mixed LLW generated at surplus plutonium disposition facilities at Hanford were processed in the Waste Receiving and Processing Facility, this additional waste would be 5 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of that facility.

At SRS, mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan. Mixed LLW generated at the immobilization facility is estimated to be less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, 1 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

At Hanford, any hazardous wastes generated during operation of the pit conversion and MOX facilities would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during the operations period should not have a major impact on Hanford hazardous waste management system.

At SRS, any hazardous wastes generated during operation of the immobilization facility would be packaged for treatment and disposal at a combination of onsite and offsite facilities. Assuming that all hazardous waste is managed on the site, hazardous waste generation for this combination of facilities is estimated to be less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 17 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage buildings. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system. If all LLW, mixed LLW, and hazardous wastes generated at the immobilization facility at SRS were treated in the Consolidated Incineration Facility, this additional waste would be 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of that facility.

Nonhazardous solid waste would be packaged and transported in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent to commercial or municipal facilities for disposal. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management systems at Hanford and SRS.

At Hanford, nonhazardous wastewater generated by the pit conversion and MOX facilities would be treated if necessary before being discharged to the 400 Area sanitary sewer system, which connects to the Energy Northwest (formerly WPPSS) Sewage Treatment Facility. Nonhazardous liquid wastes generated by the pit conversion and MOX facilities at Hanford is estimated to be 28 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 28 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd^3/yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of nonhazardous liquid waste at Hanford should not have a major impact on the treatment system.

At SRS, nonhazardous wastewater would be treated if necessary before being discharged to the F-Area sanitary sewer system, which connects to the Central Sanitary Wastewater Treatment Facility. Nonhazardous liquid waste generated by the immobilization facility at SRS is estimated to be 20 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 4 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, management of nonhazardous liquid waste at SRS should not have a major impact on the treatment system.

4.10.2.3 Socioeconomics

After construction, startup, and testing of the pit conversion and MOX facilities at Hanford in 2007 under Alternative 6A, an estimated 785 new workers would be required to operate them (DOE 1999c; UC 1998a). This level of employment would be expected to generate another 1,988 related jobs in the region. The total employment requirement of 2,773 direct and indirect jobs represents less than 0.7 percent of the projected REA workforce, and thus should have no major impact on the REA. Some of the new jobs created under this alternative could be filled from the ranks of the unemployed, currently 11 percent of the REA's population.

This employment requirement could have minor impacts on community services in the ROI, as it should coincide with an increase in overall site employment in connection with construction of the tank waste remediation system. Assuming that 91 percent of the new employees associated with this alternative resided in the ROI, an increase of 2,523 jobs in the workforce would result in an overall population increase of approximately 4,681 persons. This population increase, in conjunction with the normal population growth forecast by the State of Washington State, would engender increased construction of local housing units. Given the current population-to-student ratio in the ROI, a population of this size should include 969 students, and local school districts would be expected to increase the number of classrooms to accommodate them.

Community services in the ROI would change to reflect the growth in population as follows: 60 teachers would be added to maintain the current student-to-teacher ratio of 16:1; 7 police officers would be added to maintain the current officer-to-population ratio of 1.5:1,000; 16 firefighters would be added to maintain the current firefighter-to-population ratio of 3.4:1,000; and 6 physicians would be added to maintain the current physician-to-population ratio of 1.4:1,000. In total, it is estimated that an additional 90 positions would have to be created to maintain community services at current levels. In addition, hospitals in the ROI would experience a drop from 2.1 to 2.0 beds per 1,000 persons unless additional beds were provided. Similarly, the average school enrollment would increase to 94.4 percent from the current rate of 92.5 percent unless additional classrooms were built. None of these projected changes should have a major impact on the level of community services currently offered in the ROI.

After construction, startup, and testing of the immobilization facility at SRS in 2006 under Alternative 6A, an estimated 335 new workers would be required to operate it. This level of employment would generate another 599 indirect jobs within the region. As the total employment requirement of 934 direct and indirect jobs

represents 0.3 percent of the total projected REA workforce, it should have no major impact on the REA. In fact, it should help to decrease slightly the 33 percent reduction in SRS employment (i.e., from 15,032 to 10,000 workers) projected for the years 1997–2010.

4.10.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment, and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 6A would be as follows.

Radiological Impacts. Table 4–90 reflects the potential radiological impacts on three individual receptor groups at Hanford and SRS: the population living within 80 km (50 mi) in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts the projected aggregate LCF risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Given incident-free operation of all three facilities, the total population dose in the year 2010 would be 7.2 person-rem at Hanford and 2.8×10^{-3} person-rem at SRS. The corresponding number of LCFs in the population from 10 years of operation would be 0.036 around Hanford and 1.4×10^{-5} around SRS. The total dose to the maximally exposed member of the public from annual operation of the pit conversion and MOX facilities at Hanford would be 0.022 mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 1.1×10^{-7}. The impacts on the average individual would be lower. The dose to the maximally exposed member of the public from annual operation of the immobilization facility at SRS would

Table 4–90. Potential Radiological Impacts on the Public of Operations Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	MOX[a]	Hanford Total	Immobilization Ceramic	Immobilization Glass
Population within 80 km for year 2010					
Dose (person-rem)	6.9	0.29	7.2	2.8×10^{-3}	2.6×10^{-3}
Percent of natural background[b]	5.9×10^{-3}	2.5×10^{-4}	6.2×10^{-3}	1.2×10^{-6}	1.1×10^{-6}
10-year latent fatal cancers	0.034	1.5×10^{-3}	0.036	1.4×10^{-5}	1.3×10^{-5}
Maximally exposed individual					
Annual dose (mrem)	0.017	4.8×10^{-3}	0.022	2.8×10^{-5}	2.6×10^{-5}
Percent of natural background[b]	5.7×10^{-3}	1.6×10^{-3}	7.3×10^{-3}	9.5×10^{-6}	8.8×10^{-6}
10-year latent fatal cancer risk	8.5×10^{-8}	2.4×10^{-8}	1.1×10^{-7}	1.4×10^{-10}	1.3×10^{-10}
Average exposed individual within 80 km[c]					
Annual dose (mrem)	0.017	7.5×10^{-4}	0.018	3.6×10^{-6}	3.3×10^{-6}
10-year latent fatal cancer risk	8.5×10^{-8}	3.8×10^{-9}	8.9×10^{-8}	1.8×10^{-11}	1.6×10^{-11}

[a] As described in Section 4.26.1.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem. The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive approximately 232,000 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford (387,800) and the SRS APSF (approximately 790,000), if built, in 2010.

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility.

Source: Appendix J.

be 2.8×10^{-5} mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 1.4×10^{-10}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with the operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–91; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose to pit conversion and MOX facility workers would be 500 mrem and 65 mrem, respectively; to immobilization facility workers, 750 mrem. The annual dose received by the total site workforce for each of these facilities has been estimated at 192, 22, and 242 person-rem, respectively. The risks and numbers of LCFs among the different workers from 10 years of operation are included in Table 4–91. Doses to individual workers would be kept to minimal levels by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at Hanford under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released as a result of operations.

Table 4–91. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 6A: Pit Conversion in FMEF and MOX in New Construction at Hanford, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	MOX	Hanford Total	Immobilization (Ceramic or Glass)
Number of badged workers	383	331	714	323
Total dose (person-rem/yr)	192	22	214	242
10-year latent fatal cancers	0.77	0.088	0.86	0.97
Average worker dose (mrem/yr)	500	65	300[a]	750
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	1.2×10^{-3}	3.0×10^{-3}

[a] Represents an average of the doses for both facilities.

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998a, 1998b, 1999c, 1999d.

4.10.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion and MOX facilities at Hanford are equivalent to those included in Alternative 2 (see Tables 4–30 and 4–33) and the potential consequences from operation of the immobilization facility at SRS, equivalent to those included in Alternative 3 (see Tables 4–44 and 4–45). More details on the method of analysis, assumptions, and specific accident scenarios are presented in the discussion of Alternative 2 in Section 4.3.2.5.

Public. The most severe consequences of the design basis accident for the pit conversion and MOX facilities are shown in Section 4.3.2.5; and the most severe consequences for the immobilization facility, in Section 4.4.2.5.

A beyond-design-basis earthquake at Hanford could result in the collapse of the pit conversion facility in FMEF and the MOX facility, and an estimated 39 LCFs among the general population. A similar earthquake at SRS could result in the collapse of the immobilization facility and an estimated 2.7 LCFs among the general population (as described in Section 4.3.2.5). It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause widespread failure of homes, office buildings, and other structures in the surrounding area. The overall impact of such an event must therefore be seen in the context not only of the potential radiological impacts of these other facilities, but of hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of such an earthquake is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. For design basis accidents, the radiological consequences for this worker were estimated to be highest for the criticality at the MOX facility. The consequences of such an accident would include an LCF probability of 2.5×10^{-4}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at Hanford and SRS could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated employment of 11,535 person-years of labor and the standard DOE occupational accident rates, approximately 420 cases of nonfatal occupational injury or illness and 0.31 fatality could be expected for the duration of operations.

4.10.2.6 Transportation

Operational transportation impacts may be divided into two parts: impacts due to incident-free transportation and those due to transportation accidents. They may be further divided into nonradiological and radiological impacts. Nonradiological impacts are specifically vehicular, such as vehicular emissions and traffic accidents. Radiological impacts are those related to the dose received by transportation workers and the public during normal operations and in the case of accidents in which the radioactive materials being shipped may be released. For more detailed information on the transportation analysis performed for this SPD EIS, see Appendix L.

Under Alternative 6A, transportation to and from Hanford would include the shipment of plutonium pits and clean plutonium metal via SST/SGT from sites throughout the DOE complex to the pit conversion facility.[18] During dismantlement of the pits, some HEU would be recovered. The pit conversion facility would ship HEU via SST/SGT to ORR for storage.[19] After conversion, the plutonium in the pit conversion facility would be in the form of plutonium dioxide. This material would be transferred through a secure tunnel to the MOX facility at Hanford for fabrication into MOX fuel pellets.

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[18] Work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 SI container for long-term storage. The AL–R8 is not an offsite shipping container as was the AT–400A analyzed in the SPD Draft EIS. Therefore, if the decision were made to site the pit conversion facility at a site other than Pantex, the surplus pits would have to be taken out of the AL–R8 SI and placed in a yet-to-be-developed shipping container. This operation would also require the replacement of some pit-holding fixtures to meet transportation requirements. Under such alternatives, this change would result in a total repackaging exposure of 208 person-rem to Pantex personnel. An increase in worker doses of this magnitude could result in an increase in the expected number of LCFs of 8.3×10^{-2} over the life of the program.

[19] Classified nuclear material parts would also result from pit disassembly. Although current plans are to store these parts at the pit conversion facility, this SPD EIS analyzes the possible transport of these nuclear material parts to LANL. Therefore, the transportation impacts are slightly overstated.

MOX fuel fabrication also requires uranium dioxide. Quantifying the uranium dioxide transportation requirements for this SPD EIS involved selecting representative sites for the source of the depleted uranium hexafluoride and the conversion facility. A DOE enrichment facility near Portsmouth, Ohio, was chosen as a representative site for the source of the depleted uranium hexafluoride, and the nuclear fuel fabrication facility in Wilmington, North Carolina, as representative of a uranium conversion facility. These sites were also used as representative sites in the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996e). It is assumed that depleted uranium hexafluoride needed for MOX fuel would be shipped via commercial truck to the uranium conversion facility, where it would be converted into uranium dioxide (see Section 4.3.2.6). After conversion, the depleted uranium dioxide would be shipped via commercial truck from the conversion facility to the MOX facility at Hanford. This material would be blended with plutonium dioxide at the MOX facility, fabricated into MOX fuel pellets, and placed in MOX fuel rods. After fabrication, the MOX fuel rods would be shipped to a domestic reactor site, where they would be placed in fuel assemblies and irradiated. Shipments of unirradiated MOX fuel rods would be made in an SST/SGT because unirradiated MOX fuel in large enough quantities is subject to the same security concerns as pure weapons-grade plutonium. It is assumed in this transportation analysis that all MOX fuel is shipped from the MOX facility to the most distant reactor site, North Anna.

Immobilization at SRS under this alternative would require that surplus nonpit plutonium in various forms be shipped from current storage locations (i.e., SRS, Hanford, INEEL, LLNL, LANL, and RFETS) to the immobilization facility at SRS. Even though these materials are not clean plutonium metal or pits, the quantity of the plutonium contained in them would require that they be treated as materials that could be used in nuclear weapons, and thus that shipments be made in SST/SGTs.

Under the preferred technology alternative for immobilization, the surplus plutonium would be immobilized in a ceramic matrix in small cans at the immobilization facility, placed in HLW canisters, and transported via specially designed trucks to DWPF in S-Area. This intrasite transportation—from F-Area to S-Area—could require the temporary shutdown of roads on the Hanford site. It would, however, provide for all the necessary security and for reduced risk to the public; SST/SGTs would not be required.

Use of the preferred ceramic (versus glass) matrix for immobilization would also require a small amount of depleted uranium dioxide (i.e., less than 10 t [11 tons] per year). It is assumed that this depleted uranium dioxide would be produced and shipped in the same manner as the depleted uranium dioxide needed by the MOX facility.

After the immobilized plutonium was encased by HLW at DWPF, it would eventually be shipped to a potential geologic repository for ultimate disposition. Because HLW would be displaced by the cans of immobilized plutonium suspended in the HLW canister, additional canisters—to accommodate the displaced HLW—would be required over the life of the immobilization program. According to estimates, up to 145 additional canisters of HLW would be needed to meet the demands of surplus plutonium disposition under Alternative 6A. The *Yucca Mountain Draft EIS* evalutes different options for the shipment of these canisters to a potential geologic repository using either trucks or trains. The analysis revealed that shipment by train would pose the lower risk. However, no ROD has yet been issued regarding these shipments. To bound the risks associated with these additional shipments, this SPD EIS conservatively assumes that all of these shipments would be made by truck, one canister per truck.

Every alternative considered in this SPD EIS would require routine transportation of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities on the sites. This transportation would be handled in the same manner as other site waste shipments, and as shown in Sections 4.3.1.2 and 4.3.2.2, would involve no major increase in the amounts of waste already being managed at these sites. The shipments would pose no greater risks than the ordinary waste shipments at these sites as analyzed in the WM PEIS.

In total, approximately 2,500 shipments of radioactive materials would be carried out by DOE under this alternative. The total distance traveled on public roads by trucks carrying radioactive materials would be 8.7 million km (5.4 million mi).

Impacts of Incident-Free Transportation. The dose to transportation workers from all transportation activities entailed by this alternative has been estimated at 61 person-rem; the dose to the public, 71 person-rem. Accordingly, incident-free transportation of radioactive material associated with this alternative would result in 0.024 LCF among transportation workers and 0.035 LCF in the total affected population over the duration of the transportation activities. The estimated number of nonradiological fatalities from vehicular emissions associated with this alternative is 0.033.

Impacts of Accidents During Transportation (Consequences). The maximum foreseeable offsite transportation accident under this alternative (probability of occurrence: greater than 1 in 10 million per year) is a shipment of plutonium pits from one of DOE's storage locations to the pit conversion facility with a severity category VIII accident in a rural population zone under neutral (average) weather conditions. If this accident were to occur, it could result in a dose of 87 person-rem to the public for an LCF risk of 0.044 and 96 rem to the hypothetical MEI for an LCF risk of 0.096. (The MEI receives a larger dose than the population because it is unlikely that a person would be in position, and remain in position, to receive this hypothetical maximum dose.) No fatalities would be expected to occur. The probability of more severe accidents, different weather conditions at the time of accident, or occurrence in a more densely populated area were also evaluated, and estimated to have a probability lower than 1 chance in 10 million per year. (See Appendix L.6.)

Impacts of Accidents During Transportation (Risks). The total transportation accident risks were estimated by summing the risk to the affected population from all hypothetical accidents. For Alternative 6A, those risks are as follows: a radiological dose to the population of 8 person-rem, resulting in a total population risk of 0.004 LCF; and traffic accidents resulting in 0.091 fatality.

4.10.2.7 Environmental Justice

As discussed in other parts of Section 4.10.2, routine operations conducted under Alternative 6A would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near Hanford would be approximately 1 in 10 million (see Table 4–90); the likelihood for the MEI residing near SRS would be essentially zero. The number of LCFs expected among the general population residing near Hanford and SRS from accident-free operations would increase by approximately 0.034 and 1.3×10^{-5}, respectively.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public (see Section 4.10.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–30, 4–33, 4–44, and 4–45). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the sites pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.10.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 6A would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.11 ALTERNATIVE 6B

Alternative 6B would involve constructing and operating the pit conversion and MOX facilities at Hanford and the immobilization facility at SRS. The pit conversion and MOX facilities would be located in the existing FMEF building. The immobilization facility would be located in a new facility in F-Area. Activities at SRS would be the same as under Alternative 6A.

4.11.1 Construction

4.11.1.1 Air Quality and Noise

Sources of potential air quality impacts of construction under Alternative 6B at Hanford include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from construction activities at Hanford, with standards and guidelines is presented as Table 4–92. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards as a result of Hanford Activities. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat from current emissions during the planned construction period because of an expected decrease in overall site employment.

Noise impacts would be the same or less than those for Alternative 6A at Hanford (see Section 4.10.1.1).

Potential air quality impacts of construction under Alternative 6B at SRS are the same as those for Alternative 6A (see Section 4.10.1.1). Noise impacts are the same as those for Alternative 6A at SRS (see Section 4.10.1.1).

4.11.1.2 Waste Management

At SRS, construction impacts of this alternative would be the same as for Alternative 6A. Therefore, see Section 4.10.1.2 for a description of the impacts of this alternative on the waste management infrastructure at SRS.

Table 4–93 compares the wastes generated during the construction of surplus plutonium disposition facilities at Hanford with the existing treatment, storage, and disposal capacity for the various waste types. It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during the 3-year construction period. In addition, no soil contaminated with hazardous or radioactive constituents should be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and applicable Federal and State regulations. For this SPD EIS, it is assumed that hazardous waste and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

[Table deleted.]

Table 4–92. Evaluation of Hanford Air Pollutant Concentrations Associated With Construction Under Alternative 6B: Pit Conversion and MOX Collocated in FMEF at Hanford, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline(Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.491	34.6	0.35
	1 hour	40,000	3.34	51.6	0.13
Nitrogen dioxide	Annual	100	0.0366	0.287	0.29
PM_{10}	Annual	50	0.0565	0.0744	0.15
	24 hours	150	1.65	2.42	1.6
Sulfur dioxide	Annual	50	0.00302	1.63	3.1
	24 hours	260	0.0336	8.94	3.4
	3 hours	1,300	0.228	29.8	2.3
	1 hour	660	0.685	33.6	5.1
Other regulated pollutants					
Total suspended particulates	Annual	60	0.128	0.146	0.24
	24 hours	150	3.26	4.03	2.7
Hazardous and other toxic compounds					
Other toxics[b]	Annual	0.12	0.00000785	0.000014	0.012

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; WDEC 1994.

Table 4–93. Potential Waste Management Impacts of Construction at Hanford Under Alternative 6B: Pit Conversion and MOX Collocated in FMEF at Hanford, and Immobilization in New Construction and DWPF at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	22	NA	NA	NA
Nonhazardous				
Liquid	20,000	9[c]	NA	9[d]
Solid	6,800	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of the 400 Area sanitary sewer.

[d] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

Hazardous wastes generated during the construction of surplus plutonium disposition facilities at Hanford would be typical of those generated during construction of an industrial facility. Any hazardous wastes generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during construction should not have a major impact on the Hanford hazardous waste management system.

Nonhazardous solid wastes generated during the construction of surplus plutonium disposition facilities at Hanford would be packaged in conformance with standard industrial practice and shipped to offsite commercial or municipal facilities for recycling or disposal. The additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at Hanford.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during modification of the FMEF building at Hanford would be managed on the site at the Energy Northwest (formerly WPPSS) Sewage Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during modification is estimated to be 9 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 9 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd /yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of these wastes at Hanford should not have a major impact on the nonhazardous liquid waste treatment system during the modification period.

[Text deleted.]

4.11.1.3 Socioeconomics

Construction-related employment requirements for Alternative 6B would be as indicated in Table 4–94.

Table 4–94. Construction Employment Requirements for Alternative 6B: Pit Conversion and MOX Collocated in FMEF at Hanford, and Immobilization in New Construction and DWPF at SRS

Year	Pit Conversion	MOX	Immobilization	Total
2001	76	0	0	76
2002	116	441	506	1,063
2003	72	583	920	1,575
2004	0	451	1,014	1,465
2005	0	221	552	773
2006	0	208	0	208

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility.

Source: DOE 1999c; UC 1998a, 1999c, 1999d.

At its peak in 2003, construction of the pit conversion and MOX facilities at Hanford under this alternative would require 655 construction workers and generate another 672 indirect jobs in the region. The total employment requirement of 1,327 direct and indirect jobs represents less than 0.4 percent of the projected REA workforce, and thus should have no major impact on the REA. It should also have little effect on the community services currently offered in the ROI. In fact, it should help offset the nearly 15 percent reduction in Hanford employment (i.e., from 12,882 to approximately 11,000 workers) projected for the years 1997–2005.

Employment requirements for construction of the immobilization facility at SRS would be the same as those for Alternative 6A (see Section 4.10.1.3).

4.11.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. A summary of radiological impacts of construction activities on workers at risk is presented as Table 4–95. According to recent radiation surveys (Antonio 1998; UC 1998a, 1998b, 1999c, 1999d) conducted at the Hanford 400 Area and SRS F-Area, construction workers at Hanford would not be expected to receive doses above natural background levels as a result of other ongoing or past activities. At SRS, however, construction workers may receive small doses above natural background levels. Regardless of location, construction workers may be monitored (badged) as a precautionary measure.

Table 4–95. Potential Radiological Impacts on Construction Workers of Alternative 6B: Pit Conversion and MOX Collocated in FMEF at Hanford, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion[a]	MOX[b]	Hanford Total	Immobilization[c]
Total dose (person-rem/yr)	0	0	0	1.5
Annual latent fatal cancers[d]	0	0	0	6.0×10^{-4}
Average worker dose (mrem/yr)	0	0	0[e]	4
Annual latent fatal cancer risk	0	0	0	1.6×10^{-6}

[a] An estimated average of 88 workers would be associated with annual construction and modification operations.
[b] An estimated average of 254 workers would be associated with annual construction and modification operations.
[c] An estimated average of 374 workers would be associated with annual construction operations at the new facility location adjacent to APSF, if built. The number would be the same for immobilization in either ceramic or glass.
[d] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations, per ICRP 1991.
[e] Represents an average of the doses for both facilities.

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility.

Note: The radiological limit for construction workers is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are be reduced to levels that are as low as is reasonably achievable.

Source: Antonio 1998; ICRP 1991; NAS 1990; UC 1998a, 1998b, 1999c, 1999d.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at Hanford under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

4.11.1.5 Facility Accidents

Surplus plutonium disposition construction activities at Hanford and SRS could result in worker injuries or fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 5,160 person-years of construction labor and standard industrial accident rates, approximately 510 cases of nonfatal occupational injury or illness and 0.72 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.11.1.6 Environmental Justice

As discussed in the other parts of Section 4.11.1, construction under Alternative 6B would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, construction activities under Alternative 6B at Hanford and SRS would have no significant impacts on minority or low-income populations.

4.11.2 Operations

4.11.2.1 Air Quality and Noise

Potential air quality impacts of the operation of facilities under Alternative 6B at Hanford were analyzed using ISCST3. Operational impacts would result from process emissions, emergency diesel generator testing, trucks

moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including those resulting from surplus plutonium disposition facilities, with standards and guidelines is presented as Table 4–96. Concentrations of air pollutants would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards as a result of Hanford activities. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during operation would be mitigated; for example, HEPA filtration has been included in the design of these facilities.

Table 4–96. Evaluation of Hanford Air Pollutant Concentrations Associated With Operations Under Alternative 6B: Pit Conversion and MOX Collocated in FMEF at Hanford, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.247	34.3	0.34
	1 hour	40,000	1.68	50	0.13
Nitrogen dioxide	Annual	100	0.031	0.281	0.28
PM_{10}	Annual	50	0.00143	0.0193	0.039
	24 hours	150	0.0159	0.786	0.52
Sulfur dioxide	Annual	50	0.00123	1.63	3.1
	24 hours	260	0.0136	8.92	3.4
	3 hours	1,300	0.0928	29.7	2.3
	1 hour	660	0.278	33.2	5.0
Other regulated pollutants					
Total suspended particulates	Annual	60	0.00143	0.0193	0.032
	24 hours	150	0.0159	0.786	0.52
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; SPD, surplus plutonium disposition.

Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.

Source: EPA 1997a; WDEC 1994.

For a discussion of how the operation of the pit conversion and MOX facilities at Hanford would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.1.4. There are no other NESHAPs limits applicable to operation of these facilities.

The increases in concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from the operation of these facilities would be a small fraction of the PSD Class II area increments as summarized in Table 4–97. Noise impacts would be similar to those for Alternative 6A at Hanford (see Section 4.10.2.1).

Table 4–97. Evaluation of Hanford Air Pollutant Increases Associated With Operations Under Alternative 6B: Pit Conversion and MOX Collocated in FMEF at Hanford, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Increase in Concentration (Fg/m^3)	PSD Class II Area Allowable Increment (Fg/m^3)	Percent of Increment
Nitrogen dioxide	Annual	0.031	25	0.12
PM_{10}	Annual	0.00143	17	0.0084
	24 hours	0.0159	30	0.053
Sulfur dioxide	Annual	0.00123	20	0.0062
	24 hours	0.0136	91	0.015
	3 hours	0.0928	512	0.018

Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility; PSD, prevention of significant deterioration.
Source: EPA 1997b.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat because of an expected decrease in overall site employment during this timeframe.

Potential air quality impacts of operation of the immobilization facility under Alternative 6B at SRS are the same as those for Alternative 6A (see Section 4.10.2.1). Noise impacts are the same as those for Alternative 6A at SRS (see Section 4.10.2.1).

The combustion of fossil fuels associated with Alternative 6B would result in the emission of carbon dioxide, one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative would represent less than 7×10^{-5} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

4.11.2.2 Waste Management

Impacts of operations for this alternative would be the same as for Alternative 6A. Therefore, see Section 4.10.2.2 for a description of the impacts of this alternative on the waste management infrastructure at Hanford and SRS.

4.11.2.3 Socioeconomics

Employment requirements for operation of the pit conversion and MOX facilities at Hanford under Alternative 6B would be the same as those for Alternative 6A (see Section 4.10.2.3).

Employment requirements for operation of the immobilization facility at SRS under Alternative 6B would be the same as those for Alternative 6A (see Section 4.10.2.3).

4.11.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment, and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 6B would be as follows.

Radiological Impacts. Table 4–98 reflects the potential radiological impacts on three individual receptor groups at Hanford and SRS: the population living within 80 km (50 mi) in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts the projected aggregate LCF risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Table 4–98. Potential Radiological Impacts on the Public of Operations Under Alternative 6B: Pit Conversion and MOX Collocated in FMEF at Hanford, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	MOX[a]	Hanford Total	Immobilization	
				Ceramic	Glass
Population within 80 km for year 2010					
Dose (person-rem)	6.9	0.14	7.0	2.8×10^{-3}	2.6×10^{-3}
Percent of natural background[b]	5.9×10^{-3}	1.2×10^{-4}	6.0×10^{-3}	1.2×10^{-6}	1.1×10^{-6}
10-year latent fatal cancers	0.034	7.0×10^{-4}	0.035	1.4×10^{-5}	1.3×10^{-5}
Maximally exposed individual					
Annual dose (mrem)	0.017	1.8×10^{-3}	0.019	2.8×10^{-5}	2.6×10^{-5}
Percent of natural background[b]	5.7×10^{-3}	6.1×10^{-4}	6.3×10^{-3}	9.5×10^{-6}	8.8×10^{-6}
10-year latent fatal cancer risk	8.5×10^{-8}	9.3×10^{-9}	9.5×10^{-8}	1.4×10^{-10}	1.3×10^{-10}
Average exposed individual within 80 km[c]					
Annual dose (mrem)	0.017	3.5×10^{-4}	0.017	3.6×10^{-6}	3.3×10^{-6}
10-year latent fatal cancer risk	8.5×10^{-8}	1.7×10^{-9}	8.7×10^{-8}	1.8×10^{-11}	1.6×10^{-11}

[a] As described in Section 4.26.1.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem. The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive approximately 232,000 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford (387,800) and the SRS APSF (approximately 790,000), if built, in 2010.

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility.

Source: Appendix J.

Given incident-free operation of all three facilities, the total population dose in the year 2010 would be 7.0 person-rem at Hanford and 2.8×10^{-3} person-rem at SRS. The corresponding number of LCFs in the population from 10 years of operation would be 0.035 around Hanford and 1.4×10^{-5} around SRS. The total dose to the maximally exposed member of the public from annual operation of the pit conversion and MOX facilities at Hanford would be 0.019 mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 9.5×10^{-8}. The impacts on the average individual would be lower. The dose to the maximally exposed member of the public from annual operation of the immobilization facility at SRS would be 2.8×10^{-5} mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 1.4×10^{-10}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with the operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against

applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–99; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose to pit conversion and MOX facility workers would be 500 mrem and 65 mrem, respectively; to immobilization facility workers, 750 mrem. The annual dose received by the total site workforce for each of these facilities has been estimated at 192, 22, and 242 person-rem, respectively. The risks and numbers of LCFs among the different workers from 10 years of operation are included in Table 4–99. Doses to individual workers would be kept to minimal levels by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Table 4–99. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 6B: Pit Conversion and MOX Collocated in FMEF at Hanford, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	MOX	Hanford Total	Immobilization (Ceramic or Glass)
Number of badged workers	383	331	714	323
Total dose (person-rem/yr)	192	22	214	242
10-year latent fatal cancers	0.77	0.088	0.86	0.97
Average worker dose (mrem/yr)	500	65	300[a]	750
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	1.2×10^{-3}	3.0×10^{-3}

[a] Represents an average of the doses for both facilities.
Key: DWPF, Defense Waste Processing Facility; FMEF, Fuels and Materials Examination Facility.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1999c; UC 1998a, 1998b, 1999c, 1999d.

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at Hanford under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released as a result of operations.

4.11.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion facility at Hanford are equivalent to those included in Alternative 2 (see Table 4–30); potential consequences from operation of the MOX facility in FMEF at Hanford would be equivalent to those included in Alternative 4B (see Table 4–68); and potential consequences from operation of the immobilization facility at SRS, equivalent to those included in Alternative 3 (see Tables 4–44 and 4–45). More details on the method of analysis, assumptions, and specific accident scenarios are presented in the discussion of Alternative 2 in Section 4.3.2.5.

Public. For the most severe consequences of the design basis accident for the pit conversion, MOX, and immobilization facilities, see Sections 4.3.2.5, 4.7.2.5, and 4.4.2.5, respectively.

A beyond-design-basis earthquake at Hanford could result in the collapse of the pit conversion and MOX facilities in FMEF (as described in Sections 4.3.2.5 and 4.7.2.5, respectively) and an estimated 39 LCFs among the general population. It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause widespread failure of homes,

office buildings, and other structures in the surrounding area. The overall impact of such an event must therefore be seen in the context not only of the potential radiological impacts of these other facilities, but of hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of such an earthquake is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

The beyond-design-basis accident at SRS would be equivalent to that discussed in Section 4.10.2.5.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. For design basis accidents, the radiological consequences for this worker were estimated to be highest for the tritium release at the pit conversion facility. The consequences of such an accident would include an LCF probability of 1.8×10^{-4}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at Hanford and SRS could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated employment of 11,535 person-years of labor and the standard DOE occupational accident rates, approximately 420 cases of nonfatal occupational injury or illness and 0.31 fatality could be expected for the duration of operations.

4.11.2.6 Transportation

Because the only difference between Alternative 6A and 6B is the location of the MOX facility within 400 Area at Hanford, the transportation required for Alternative 6B would be the same as that for Alternative 6A. Therefore, the transportation risks associated with Alternative 6B are equivalent to those discussed in Section 4.10.2.6.

4.11.2.7 Environmental Justice

As discussed in other parts of Section 4.11.2, routine operations conducted under Alternative 6B would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near Hanford would be approximately 1 in 10 million (see Table 4–98); the likelihood for the MEI residing near SRS would be essentially zero. The number of LCFs expected among the general population residing near Hanford and SRS from accident-free operations would increase by approximately 0.035 and 1.4×10^{-5}, respectively.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public (see Section 4.11.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–30, 4–44, 4–45, and 4–68). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the sites pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.11.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 6B would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.12 [Section deleted because alternative deleted.]

4.13 [Section deleted because alternative deleted.]

4.14 ALTERNATIVE 7

Alternative 7 would involve constructing and operating the pit conversion and MOX facilities at INEEL and the immobilization facility at SRS. The pit conversion facility would be located in the existing Fuel Processing Facility (FPF) building, and the MOX facility would be located in a new building. The immobilization facility would be located in a new building in F-Area. Activities at SRS would be the same as under Alternative 6A.

4.14.1 Construction

4.14.1.1 Air Quality and Noise

Sources of potential air quality impacts of construction under Alternative 7 at INEEL include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from construction activities at INEEL, with standards and guidelines is presented as Table 4–100. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Table 4–100. Evaluation of INEEL Air Pollutant Concentrations Associated With Construction Under Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	2.07	304	3
	1 hour	40,000	5.6	1220	3.1
Nitrogen dioxide	Annual	100	0.184	11.2	11
PM_{10}	Annual	50	0.151	3.15	6.3
	24 hours	150	5.9	44.9	30
Sulfur dioxide	Annual	80	0.0163	6.02	7.5
	24 hours	365	0.208	137	38
	3 hours	1,300	0.837	592	46
Hazardous and other toxic compounds					
Other toxics[b]	Annual	0.12	0.00001	0.029	24

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: DWPF, Defense Waste Processing Facility; FPF, Fuel Processing Facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; ID DHW 1995.

Total vehicle emissions associated with activities at INEEL would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of these facilities at INEEL relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with the construction of these facilities would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 12 km [7.5 mi]), noise emissions from construction equipment would not be expected to annoy the public. These noise sources would be far enough away from offsite areas that the contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Traffic associated with the construction of these facilities would likely produce less than a 1-dB increase in noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Construction workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of standard silencing packages on construction equipment, administrative controls, engineering controls, and personal hearing protection equipment.

Potential air quality impacts of construction under Alternative 7 at SRS are the same as those for Alternative 6A at SRS (see Section 4.10.1.1). Noise impacts are the same as those for Alternative 6A at SRS (see Section 4.10.1.1).

4.14.1.2 Waste Management

At SRS, construction impacts of this alternative would be the same as for Alternative 6A. See Section 4.10.1.2 for a description of the impacts of this alternative on the waste management infrastructure at SRS.

Table 4–101 compares the wastes generated during the construction of surplus plutonium disposition facilities at INEEL with the existing treatment, storage, and disposal capacity for the various waste types. It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during the 3-year construction period. In addition, no soil contaminated with hazardous or radioactive constituents should be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and applicable Federal and State regulations. For this SPD EIS, it is assumed that hazardous waste and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

Hazardous wastes generated during the construction of surplus plutonium disposition facilities at INEEL would be typical of those generated during the construction of an industrial facility. Any hazardous wastes generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during construction should not have a major impact on the INEEL hazardous waste management system.

Nonhazardous solid wastes generated during the construction of surplus plutonium disposition facilities at INEEL would be packaged in conformance with standard industrial practice and shipped to offsite commercial facilities for recycling or disposal. The additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at INEEL.

Table 4–101. Potential Waste Management Impacts of Construction Under Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	35	NA	NA	NA
Nonhazardous				
Liquid	22,000	13[c]	NA	1[d]
Solid	8,600	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of the FPF sanitary sewer.

[d] Percent of capacity of the INTEC Sewage Treatment Plant.

Key: FPF, Fuel Processing Facility; INTEC, Idaho Nuclear Technology and Engineering Center; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

To be conservative, it was assumed that all nonhazardous liquid wastes generated during construction of the pit conversion and MOX facilities at INEEL would be managed on the site at the Idaho Nuclear Technology and Engineering Center (INTEC) Sewage Treatment Plant, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during the construction of these facilities is estimated to be 13 percent of the 166,000-m^3/yr (217,000-yd^3/yr) capacity of the FPF sanitary sewer, 1 percent of the 3.2 million-m^3/yr (4.2 million-yd^3/yr) capacity of the INTEC Sewage Treatment Plant, and within the 3,117,000-m^3/yr (4,077,000-yd^3/yr excess capacity of the INTEC Sewage Treatment Plant (Abbott et al. 1997:20). Therefore, management of these wastes at INEEL should not have a major impact on the nonhazardous liquid waste treatment system during construction.

4.14.1.3 Socioeconomics

Construction-related employment requirements for Alternative 7 would be as indicated in Table 4–102.

Table 4–102. Construction Employment Requirements for Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS

Year	Pit Conversion	MOX	Immobilization	Total
2001	100	0	0	100
2002	154	441	506	1,101
2003	94	772	920	1,786
2004	0	508	1,014	1,522
2005	0	221	552	773
2006	0	208	0	208

Key: DWPF, Defense Waste Processing Facility; FPF, Fuel Processing Facility.

Source: DOE 1999c; UC 1998f, 1999c, 1999d.

At its peak in 2003, construction of the pit conversion and MOX facilities at INEEL under this alternative would require 866 construction workers and generate another 884 indirect jobs in the region. As the total employment

requirement of 1,750 direct and indirect jobs represents 1.0 percent of the total projected REA workforce, it should have no major impact on the REA. It should also have a minimal impact on community services provided within the INEEL ROI. In fact, it should help offset the approximately 13 percent reduction in INEEL's total labor force (i.e., from 8,291 to 7,250 workers) projected for the years 1997–2005.

Employment requirements for construction of a new immobilization facility at SRS under Alternative 7 would be the same as those for Alternative 6A (see Section 4.10.1.3).

4.14.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. A summary of radiological impacts of construction activities on workers at risk is presented in Table 4–103. According to recent radiation surveys (Mitchell et al. 1997; UC 1998f, 1998g, 1999c, 1999d) conducted at the INEEL INTEC area and the SRS F-Area, construction workers at either site could receive doses above natural background radiation levels as a result of exposure to radiation deriving from other activities, past or present, at the site. Regardless of location, construction worker exposures would be limited to ensure that doses are kept as low as is reasonably achievable, and workers would be monitored (badged) as appropriate.

Table 4–103. Potential Radiological Impacts on Construction Workers of Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion[a]	MOX[b]	INEEL Total	Immobilization[c]
Total dose (person-rem/yr)	0.55	1.4	2.0	1.5
Annual latent fatal cancers[d]	2.2×10^{-4}	5.5×10^{-4}	7.7×10^{-4}	6.0×10^{-4}
Average worker dose (mrem/yr)	4.7[e]	4.7[e]	4.7[f]	4
Annual latent fatal cancer risk	1.9×10^{-6}	1.9×10^{-6}	1.9×10^{-6}	1.6×10^{-6}

[a] An estimated average of 116 workers would be associated with annual construction and modification operations.
[b] An estimated average of 292 workers would be associated with annual construction operations.
[c] An estimated average of 374 workers would be associated with annual construction operations at the new facility location adjacent to APSF, if built. The number would be the same for immobilization in either ceramic or glass.
[d] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations, per ICRP 1991.
[e] Value is based on the number of expected construction workdays per year and an 8-hr workday.
[f] Represents an average of the doses for both facilities.

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility; FPF, Fuel Processing Facility.

Note: The radiological limit for construction workers is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: Mitchell et al. 1997; ICRP 1991; NAS 1990; UC 1998f, 1998g, 1999c, 1999d.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at INEEL under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

4.14.1.5 Facility Accidents

The construction of surplus plutonium disposition facilities at INEEL and SRS could result in worker injuries or fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 5,490 person-years of construction labor and standard industrial accident rates, approximately 540 cases of

nonfatal occupational injury or illness and 0.76 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.14.1.6 Environmental Justice

As discussed in the other parts of Section 4.14.1, construction under Alternative 7 would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, construction activities under Alternative 7 at INEEL and SRS would have no significant impacts on minority or low-income populations.

4.14.2 Operations

4.14.2.1 Air Quality and Noise

Potential air quality impacts of the operation of facilities under Alternative 7 at INEEL were analyzed using ISCST3. Operational impacts would result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from surplus plutonium disposition facilities, with standards and guidelines is presented as Table 4–104. Concentrations of air pollutants would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards. Air pollution impacts during operation would be mitigated, for example, HEPA filtration has been included in the design of these facilities.

Table 4–104. Evaluation of INEEL Air Pollutant Concentrations Associated With Operations Under Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m^3)[a]	SPD Increment (Fg/m^3)	Total Site Concentration (Fg/m^3)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.762	303	3.0
	1 hour	40,000	3.14	1,220	3.1
Nitrogen dioxide	Annual	100	0.144	11.1	11
PM_{10}	Annual	50	0.00833	3.01	6
	24 hours	150	0.089	39.1	26
Sulfur dioxide	Annual	80	0.345	6.35	7.9
	24 hours	365	3.46	140	38
	3 hours	1,300	18.6	610	47
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Key: DWPF, Defense Waste Processing Facility; FPF, Fuel Processing Facility; SPD, surplus plutonium disposition.
Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.
Source: EPA 1997a; ID DHW 1995.

For a discussion of how the operation of the pit conversion and MOX facilities at INEEL would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.2.4. There are no other NESHAPs limits applicable to operation of these facilities.

The increases in concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from the operation of these facilities would be a small fraction of the PSD Class II area increments as summarized in Table 4–105. INEEL is near a PSD Class I area, Craters of the Moon National Monument. The contribution to air pollutant

Table 4–105. Evaluation of INEEL Air Pollutant Increases Associated With Operations Under Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)[a]	PSD Class I Area Allowable Increment (Fg/m³)	Percent of Class I Increment[a]	Increase in Concentration[b]	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Class II Increment
Nitrogen dioxide	Annual	0.00661	2.5	0.26	0.144	25	0.58
PM_{10}	Annual	0.000387	4	0.0097	0.00833	17	0.049
	24 hours	0.00492	8	0.061	0.089	30	0.30
Sulfur dioxide	Annual	0.0169	2	0.84	0.345	20	1.7
	24 hours	0.178	5	3.6	3.46	91	3.8
	3 hours	0.786	25	3.1	18.6	512	3.6

[a] At nearest Class I area.

[b] At nearest public access area.

Key: DWPF, Defense Waste Processing Facility; FPF, Fuel Processing Facility; PSD, prevention of significant deterioration.

Source: EPA 1997b.

concentrations for this area are estimated to be 0.01 Fg/m³ or less for nitrogen dioxide and PM_{10}. For sulfur dioxide the annual value is 0.015 Fg/m³, the 24-hr value is 0.16 Fg/m³ and the 3-hr value is 0.69 Fg/m³. These values are all well under the Class I PSD increments.

Total vehicle emissions associated with activities at INEEL would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of these facilities at INEEL relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operations would include new or existing sources (e.g., cooling systems, vents, motors, material-handling equipment), employee vehicles, and truck traffic. Traffic noise associated with operation of these facilities would occur on the site and along offsite local and regional transportation routes used to bring materials and workers to the site. Given the distance to the site boundary (about 12 km [7.5 mi]), noise emissions from equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could have onsite impacts, such the as disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Noise from traffic associated with operation of these facilities would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Operations workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

Potential air quality impacts of operation of the new immobilization facility under Alternative 7 at SRS are the same as those for Alternative 6A (see Section 4.10.2.1). Noise impacts are the same as those for Alternative 6A at SRS (see Section 4.10.2.1).

The combustion of fossil fuels associated with Alternative 7 would result in the emission of carbon dioxide, one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative would represent less than 3×10^{-4} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

4.14.2.2 Waste Management

At SRS, impacts of operations for this alternative would be the same as for Alternative 6A. See Section 4.10.2.2 for a description of the impacts of this alternative on the waste management infrastructure at SRS.

Table 4–106 compares the existing site treatment, storage, and disposal capacities with the expected waste generation rates from operating surplus plutonium disposition facilities at INEEL. No HLW would be generated by the facilities. Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Current schedules for shipment of TRU waste to WIPP would accommodate shipment of contact-handled TRU waste from surplus plutonium disposition facilities beginning in 2016 (DOE 1997c:17). Therefore, in order to be conservative, it is assumed the TRU waste would be stored on the site until 2016. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at INEEL are described in the *DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Programs Final EIS* (DOE 1995a).

Table 4–106. Potential Waste Management Impacts of Operations Under Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[c]	86	1	<1	1 of WIPP
LLW	150	<1	1	<1
Mixed LLW	4	<1	<1	NA
Hazardous	5	NA	1	NA
Nonhazardous				
Liquid	67,000	40[d]	NA	2[e]
Solid	2,200	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[c] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[d] Percent of capacity of the FPF sanitary sewer.

[e] Percent of capacity of the INTEC Sewage Treatment Plant.

Key: FPF, Fuel Processing Facility; INTEC, Idaho Nuclear Technology and Engineering Center; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned Waste Characterization Facility at INEEL.

TRU wastes generated by the pit conversion and MOX facilities at INEEL is estimated to be 1 percent of the 6,500-m^3/yr (8,500-yd^3/yr) planned capacity of the Advanced Mixed Waste Treatment Project. A total of 860 m^3 (1,120 yd^3) of TRU waste would be generated over the 10-year operation period. If all the TRU waste were stored on the site, this would be less than 1 percent of the 177,300-m^3 (231,900-yd^3) storage capacity available at the Radioactive Waste Management Complex (RWMC). Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of 0.12 ha (0.30 acre) would be required. Therefore, impacts of the management of additional quantities of TRU waste at INEEL should not be major. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997d).

The 1,810 m^3 (2,367 yd^3) of TRU wastes generated at INEEL and SRS would be 1 percent of the 143,000-m^3 (187,000-yd^3) contact-handled TRU waste that DOE plans to dispose of at WIPP and 1 percent of the current 168,500-m^3 (220,400-yd^3) (DOE 1997e:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997e).

At INEEL, LLW would be packaged, certified, and accumulated at the pit and MOX facilities before transfer for additional treatment and disposal in existing onsite facilities. A total of 1,500 m^3 (1,960 yd^3) of LLW would be generated over the operations period. LLW generated at surplus plutonium disposition facilities is estimated to be less than 1 percent of the 49,610-m^3/yr (64,890-yd^3/yr) treatment capacity of the Waste Experimental Reduction Facility (WERF), 1 percent of the 177,300-m^3 (231,900-yd^3) storage capacity of RWMC, and less than 1 percent of the 37,700-m^3/yr (49,300-yd^3/yr) disposal capacity of RWMC. Using the 6,264 m^3/ha disposal land usage factor for INEEL published in the *Storage and Disposition Final PEIS* (DOE 1996a:E-9), 1,500 m^3

(1,960 yd^3) of waste would require 0.25-ha (0.62-acre) disposal space at INEEL. Therefore, impacts of the management of this additional LLW at INEEL should not be major.

At INEEL, mixed LLW would be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan. Mixed LLW is currently treated on the site with some waste shipped to Envirocare of Utah for disposal. Mixed LLW generated at the pit conversion and MOX facilities is estimated to be less than 1 percent of the 6,500-m^3/yr (8,500-yd^3/yr) planned capacity of the Advanced Mixed Waste Treatment Project, and less than 1 percent of the 177,300-m^3 (231,900-yd^3) storage capacity of RWMC. Therefore, the management of this additional waste at INEEL should not have a major impact on the mixed LLW management system.

Any hazardous wastes generated during operation of the pit conversion and MOX facilities at INEEL would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. Hazardous waste generation for this combination of facilities is estimated to be 1 percent of the 9,848-m^3 (12,881-yd^3) capacity of the hazardous waste storage buildings. Therefore, the management of these additional hazardous wastes at INEEL should not have a major impact on the hazardous waste management system.

If all TRU waste and mixed LLW generated at surplus plutonium disposition facilities at INEEL were processed in the Advanced Mixed Waste Treatment Project, this additional waste would be 1 percent of the 6,500-m^3/yr (8,500-yd^3/yr) planned capacity of that facility. If all TRU waste, LLW, and mixed LLW generated at surplus plutonium disposition facilities at INEEL were stored at RWMC, this additional waste would be 1 percent of the 177,300-m^3 (231,900-yd^3) capacity of that facility. If all LLW and hazardous wastes generated at surplus plutonium disposition facilities at INEEL were treated at WERF, this additional waste would be less than 1 percent of the 49,610-m^3 (64,890-yd^3) capacity of that facility.

Nonhazardous solid waste would be packaged and transported in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent for offsite disposal. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at INEEL.

At INEEL, nonhazardous wastewater generated by the pit conversion and MOX facilities would be treated if necessary before being discharged to the FPF sanitary sewer system, which connects to the INTEC Sewage Treatment Plant. Nonhazardous liquid waste generated by the pit conversion and MOX facilities at INEEL is estimated to be 40 percent of the 166,000-m^3/yr (217,000-yd^3/yr) capacity of the FPF sanitary sewer, 2 percent of the 3.2 million-m^3/yr (4.2 million-yd^3/yr) capacity of the INTEC Sewage Treatment Plant, and within the 3,117,000-m^3/yr (4,077,000-yd /yr) excess capacity of the INTEC Sewage Treatment Plant (Abbott et al. 1997:20). Therefore, management of nonhazardous liquid waste at INEEL should not have a major impact on the treatment system.

4.14.2.3 Socioeconomics

After construction, startup, and testing of the pit conversion and MOX facilities at INEEL in 2007 under Alternative 7, an estimated 743 new workers would be required to operate them (DOE 1999c; UC 1998f). This level of employment would be expected to generate another 1,990 indirect jobs within the region. As this total employment requirement of 2,733 new direct and indirect jobs represents about 1.6 percent of the total projected REA workforce, it should have no major impact on the REA. This increase in total employment will have a minimal effect on community services provided within the ROI, in fact, it should help to offset the nearly 13 percent decline in INEEL employment (i.e., from 8,291 to 7,250 workers) projected for the years 1997–2010.

Employment requirements for operation of the immobilization facility at SRS under Alternative 7 would be the same as those for Alternative 6A (see Section 4.10.2.3).

4.14.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment, and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 7 would be as follows.

Radiological Impacts. Table 4–107 reflects the potential radiological impacts on three individual receptor groups at INEEL and SRS: the population living within 80 km (50 mi) in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts the projected aggregate LCF risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Given incident-free operation of all three facilities, the total population dose in the year 2010 would be 2.2 person-rem at INEEL and 2.8×10^{-3} person-rem at SRS. The corresponding number of LCFs in the population from 10 years of operation would be 0.011 around INEEL and 1.4×10^{-5} around SRS. The total dose to the maximally exposed member of the public from annual operation of the pit conversion and MOX facilities at INEEL would be 0.018 mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 9.1×10^{-8}. The impacts on the average individual would be lower. The dose to the

Table 4–107. Potential Radiological Impacts on the Public of Operations Under Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	MOX[a]	INEEL Total	Immobilization Ceramic	Immobilization Glass
Population within 80 km for year 2010					
Dose (person-rem)	2.2	0.037	2.2	2.8×10^{-3}	2.6×10^{-3}
Percent of natural background[b]	3.3×10^{-3}	5.6×10^{-5}	3.3×10^{-3}	1.2×10^{-6}	1.1×10^{-6}
10-year latent fatal cancers	0.011	1.9×10^{-4}	0.011	1.4×10^{-5}	1.3×10^{-5}
Maximally exposed individual					
Annual dose (mrem)	0.015	3.2×10^{-3}	0.018	2.8×10^{-5}	2.6×10^{-5}
Percent of natural background[b]	4.2×10^{-3}	8.8×10^{-4}	5.1×10^{-3}	9.5×10^{-6}	8.8×10^{-6}
10-year latent fatal cancer risk	7.5×10^{-8}	1.6×10^{-8}	9.1×10^{-8}	1.4×10^{-10}	1.3×10^{-10}
Average exposed individual within 80 km[c]					
Annual dose (mrem)	0.012	2.1×10^{-4}	0.012	3.6×10^{-6}	3.3×10^{-6}
10-year latent fatal cancer risk	6.0×10^{-8}	1.1×10^{-9}	6.1×10^{-8}	1.8×10^{-11}	1.6×10^{-11}

[a] As described in Section 4.26.2.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] The annual natural background radiation level at INEEL is 361 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 66,000 person-rem. The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive approximately 232,000 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of INEEL (182,800) and the SRS APSF (approximately 790,000), if built, in 2010.

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility; FPF, Fuel Processing Facility.

Source: Appendix J.

maximally exposed member of the public from annual operation of the immobilization facility at SRS would be 2.8×10^{-5} mrem.

From 10 years of operation, the corresponding LCF risk to this individual would be 1.4×10^{-10}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with the operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–108; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose to pit conversion and MOX facility workers would be 500 mrem and 65 mrem, respectively; to immobilization facility workers, 750 mrem. The annual dose received by the total site workforce for each of these facilities has been estimated at 170, 22, and 242 person-rem, respectively. The risks and numbers of LCFs among the different workers from 10 years of operation are included in Table 4–108. Doses to individual workers would be kept to minimal levels by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Table 4–108. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	MOX	INEEL Total	Immobilization (Ceramic or Glass)
Number of badged workers	341	331	672	323
Total dose (person-rem/yr)	170	22	192	242
10-year latent fatal cancers	0.68	0.088	0.77	0.97
Average worker dose (mrem/yr)	500	65	286[a]	750
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	1.1×10^{-3}	3.0×10^{-3}

[a] Represents an average of the doses for both facilities.

Key: DWPF, Defense Waste Processing Facility; FPF, Fuel Processing Facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998f, 1998g, 1999c, 1999d.

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at INEEL under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released as a result of operations.

4.14.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion facility in FPF and the MOX facility at INEEL are presented in Tables 4–109 and 4–110. The potential consequences

from operation of the immobilization facility at SRS would be equivalent to those included in Alternative 3 (see Tables 4–44 and 4–45). More details on the method of analysis, assumptions, and specific accident scenarios are presented in the discussion of Alternative 2 in Section 4.3.2.5.

Public. The most severe consequences of a design basis accident for the pit conversion facility would be associated with a tritium release and for the MOX facility, a nuclear criticality. Bounding radiological consequences for the MEI are from the tritium release at INEEL, which would result in a dose of 0.045 rem, corresponding to an LCF probability of 2.2×10^{-5}. A nuclear criticality of 10^{19} fissions would result in an MEI dose of 0.016 rem at the MOX facility at INEEL. Among the general population in the environs of INEEL, an estimated 4.4×10^{-3} LCF could occur as a result of the bounding tritium release accident. The frequency of such an accident is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year. For a discussion of the most severe consequences of a design basis accident for the immobilization facility, see Section 4.4.2.5.

A beyond-design-basis earthquake at INEEL could result in the collapse of the pit conversion facility in FPF and the MOX facility, and an estimated 1.4 LCFs among the general population. It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause widespread failure of homes, office buildings, and other structures in the surrounding area. The overall impact of such an event must therefore be seen in the context not only of the potential radiological impacts of these other facilities, but of hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of such an earthquake is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

The beyond-design-basis accident at SRS would be equivalent to that discussed in Section 4.10.2.5.

Table 4–109. Accident Impacts of Pit Conversion Under Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS

		Impacts on Noninvolved Worker		Impact at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatilities[c]
Fire	Unlikely	6.4×10^{-6}	2.5×10^{-9}	1.1×10^{-6}	5.3×10^{-10}	2.1×10^{-4}	1.0×10^{-7}
Explosion	Unlikely	1.7×10^{-3}	6.7×10^{-7}	2.8×10^{-4}	1.4×10^{-7}	5.5×10^{-2}	2.7×10^{-5}
Leaks/spills of nuclear material	Extremely unlikely	2.3×10^{-6}	9.3×10^{-10}	3.9×10^{-7}	1.9×10^{-10}	7.7×10^{-5}	3.8×10^{-8}
Tritium release	Extremely unlikely	2.7×10^{-1}	1.1×10^{-4}	4.5×10^{-2}	2.2×10^{-5}	8.8	4.4×10^{-3}
Criticality	Extremely unlikely	3.3×10^{-2}	1.3×10^{-5}	1.6×10^{-3}	7.9×10^{-7}	8.5×10^{-2}	4.2×10^{-5}
Design basis earthquake	Unlikely	2.1×10^{-4}	8.2×10^{-8}	3.4×10^{-5}	1.7×10^{-8}	6.8×10^{-3}	3.4×10^{-6}
Beyond-design-basis fire	Beyond extremely unlikely	1.1×10^{-1}	4.5×10^{-5}	2.9×10^{-3}	1.5×10^{-6}	3.6×10^{-1}	1.8×10^{-4}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	2.6×10^{2}	1.0×10^{-1}	6.7	3.3×10^{-3}	8.4×10^{2}	4.2×10^{-1}

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality and tritium exposure , the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value that assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility; FPF, Fuel Processing Facility.

Source: Calculated using the source terms in Table K–9 and the MACCS2 computer code.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition Final PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. For design basis accidents, the radiological consequences for this worker were estimated to be highest for the criticality at the MOX facility. The consequences of such an accident would include an LCF probability of 3.0×10^{-4}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would either be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number

of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established

Table 4–110. Accident Impacts of MOX Facility Under Alternative 7: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in New Construction and DWPF at SRS

		Impacts on Noninvolved Worker		Impact at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Criticality	Extremely unlikely	7.5×10^{-1}	3.0×10^{-4}	1.6×10^{-2}	8.2×10^{-6}	1.0	5.2×10^{-4}
Explosion in sintering furnace	Extremely unlikely	3.6×10^{-3}	1.4×10^{-6}	8.4×10^{-5}	4.2×10^{-8}	1.2×10^{-2}	5.8×10^{-6}
Ion exchange exotherm	Unlikely	1.6×10^{-4}	6.3×10^{-8}	3.7×10^{-6}	1.8×10^{-9}	5.1×10^{-4}	2.5×10^{-7}
Fire	Unlikely	2.6×10^{-5}	1.0×10^{-8}	6.1×10^{-7}	3.1×10^{-10}	8.5×10^{-5}	4.2×10^{-8}
Spill	Extremely unlikely	3.3×10^{-5}	1.3×10^{-8}	7.7×10^{-7}	3.8×10^{-10}	1.1×10^{-4}	5.3×10^{-8}
Design basis earthquake	Unlikely	5.1×10^{-4}	2.1×10^{-7}	1.2×10^{-5}	6.0×10^{-9}	1.7×10^{-3}	8.3×10^{-7}
Beyond-design-basis fire	Beyond extremely unlikely	4.1×10^{-1}	1.6×10^{-4}	1.0×10^{-2}	5.2×10^{-6}	1.3	6.5×10^{-4}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	6.5×10^{2}	2.6×10^{-1}	1.6×10^{1}	8.2×10^{-3}	2.1×10^{3}	1.0

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value that assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) on exposure to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility; FPF, Fuel Processing Facility.

Source: Calculated using the source terms in Table K–9 and the MACCS2 computer code.

emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at INEEL and SRS could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the

estimated employment of 11,115 person-years of labor and the standard DOE occupational accident rates, approximately 400 cases of nonfatal occupational injury or illness and 0.30 fatality could be expected for the duration of operations.

4.14.2.6 Transportation

Operational transportation impacts may be divided into two parts: impacts due to incident-free transportation and those due to transportation accidents. They may be further divided into nonradiological and radiological impacts. Nonradiological impacts are specifically vehicular, such as vehicular emissions and traffic accidents. Radiological impacts are those related to the dose received by transportation workers and the public during normal operations and in the case of accidents in which the radioactive materials being shipped may be released. For more detailed information on the transportation analysis performed for this SPD EIS, see Appendix L.

Under Alternative 7, transportation to and from INEEL would include the shipment of plutonium pits and clean plutonium metal via SST/SGT from sites throughout the DOE complex to the pit conversion facility.[20] During dismantlement of the pits, some HEU would be recovered. The pit conversion facility would ship HEU via SST/SGT to the Oak Ridge Reservation (ORR) for storage.[21] After conversion, the plutonium in the pit conversion facility would be in the form of plutonium dioxide. This material would be transferred through a secure tunnel to the MOX facility at INEEL for fabrication into MOX fuel pellets.

MOX fuel fabrication also requires uranium dioxide. Quantifying the uranium dioxide transportation requirements for this SPD EIS involved selecting representative sites for the source of the depleted uranium hexafluoride and the conversion facility. A DOE enrichment facility near Portsmouth, Ohio, was chosen as a representative site for the source of the depleted uranium hexafluoride, and the nuclear fuel fabrication facility in Wilmington, North Carolina, as representative of a uranium conversion facility. These sites were also used as representative sites in the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996e). It is assumed that depleted uranium hexafluoride needed for MOX fuel would be shipped via commercial truck to the uranium conversion facility, where it would be converted into uranium dioxide (see Section 4.3.2.6). After conversion, the depleted uranium dioxide would be shipped via commercial truck from the conversion facility to the MOX facility at INEEL. This material would be blended with plutonium dioxide at the MOX facility, fabricated into MOX fuel pellets, and placed in MOX fuel rods. After fabrication, the MOX fuel rods would be shipped to a domestic reactor site, where they would be placed in fuel assemblies and irradiated. Shipments of unirradiated MOX fuel rods would be made in an SST/SGT because unirradiated MOX fuel in large enough quantities is subject to the same security concerns as pure weapons-grade plutonium. It is assumed in this transportation analysis that all MOX fuel is shipped from the MOX facility to the most distant reactor site, North Anna.

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[20] Work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 SI container for long-term storage. The AL–R8 is not an offsite shipping container as was the AT–400A analyzed in the SPD Draft EIS. Therefore, if the decision were made to site the pit conversion facility at a site other than Pantex, the surplus pits would have to be taken out of the AL–R8 SI and placed in a yet-to-be-developed shipping container. This operation would also require the replacement of some pit-holding fixtures to meet transportation requirements. Under such alternatives, this change would result in a total repackaging exposure of 208 person-rem to Pantex personnel. An increase in worker doses of this magnitude could result in an increase in the expected number of LCFs of 8.3×10^{-2} over the life of the program.

[21] Classified nuclear material parts would also result from pit disassembly. Although current plans are to store these parts at the pit conversion facility, this SPD EIS analyzes the possible transport of these nuclear material parts to LANL. Therefore, the transportation impacts are slightly overstated.

Immobilization at SRS under this alternative would require that surplus nonpit plutonium in various forms be shipped from current storage locations (i.e., SRS, Hanford, INEEL, LLNL, LANL, and RFETS) to the immobilization facility at SRS. Even though these materials are not clean plutonium metal or pits, the quantity of the plutonium contained in them would require that they be treated as materials that could be used in nuclear weapons, and thus that shipments be made in SST/SGTs.

Under the preferred technology alternative for immobilization, the surplus plutonium would be immobilized in a ceramic matrix in small cans at the immobilization facility, placed in HLW canisters, and transported via specially designed trucks to DWPF in S-Area. This intrasite transportation—from F-Area to S-Area—could require the temporary shutdown of roads on SRS. It would, however, provide for all the necessary security and for reduced risk to the public; SST/SGTs would not be required.

Use of the preferred ceramic (versus glass) matrix for immobilization would also require a small amount of depleted uranium dioxide (i.e., less than 10 t [11 tons] per year). It is assumed that this depleted uranium dioxide would be produced and shipped in the same manner as the depleted uranium dioxide needed by the MOX facility.

After the immobilized plutonium was encased by HLW at DWPF, it would be shipped to a potential geologic repository for ultimate disposition. Because HLW would be displaced by the cans of immobilized plutonium suspended in the HLW canister, additional canisters—to accommodate the displaced HLW—would be required over the life of the immobilization program. According to estimates, up to 145 additional canisters of HLW would be needed to meet the demands of surplus plutonium disposition under Alternative 7. The *Yucca Mountain Draft EIS* evaluates different options for the shipment of these canisters to a potential geologic repository using either trucks or trains. The analysis revealed that shipment by train would pose the lower risk. However, no ROD has yet been issued regarding these shipments. To bound the risks associated with these additional shipments, this SPD EIS conservatively assumes that all of these shipments would be made by truck, one canister per truck..

Every alternative considered in this SPD EIS would require routine transportation of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities on the sites. This transportation would be handled in the same manner as other site waste shipments, and as shown in Sections 4.14.1.2 and 4.14.2.2, would involve no major increase in the amounts of waste already being managed at these sites. The shipments would pose no greater risks than the ordinary waste shipments at these sites as analyzed in the WM PEIS.

In all, approximately 2,500 shipments of radioactive materials would be carried out by DOE under this alternative. The total distance traveled on public roads by trucks carrying radioactive materials would be 7.6 million km (4.7 million mi).

Impacts of Incident-Free Transportation. The dose to transportation workers from all transportation activities entailed by this alternative has been estimated at 60 person-rem; the dose to the public, 70 person-rem. Accordingly, incident-free transportation of radioactive material associated with this alternative would result in 0.024 LCF among transportation workers and 0.035 LCF in the total affected population over the duration of the transportation activities. The estimated number of nonradiological fatalities from vehicular emissions associated with this alternative is 0.032.

Impacts of Accidents During Transportation (Consequences). The maximum foreseeable offsite transportation accident under this alternative (probability of occurrence: greater than 1 in 10 million per year) is a shipment of plutonium pits from one of DOE's storage locations to the pit conversion facility with a severity category VIII accident in a rural population zone under neutral (average) weather conditions. If this accident were to occur, it could result in a dose of 87 person-rem to the public for an LCF risk of 0.044 and 96 rem to the hypothetical MEI for an LCF risk of 0.096. (The MEI receives a larger dose than the population because it is unlikely that a person would be in position, and remain in position, to receive this hypothetical maximum dose.)

No fatalities would be expected to occur. The probability of more severe accidents, different weather conditions at the time of accident, or occurrence in a more densely populated area were also evaluated, and estimated to have a probability lower than 1 chance in 10 million per year. (See Appendix L.6.)

Impacts of Accidents During Transportation (Risks). The total transportation accident risks were estimated by summing the risks to the affected population from all hypothetical accidents. For Alternative 7, those risks are as follows: a radiological dose to the population of 8 person-rem, resulting in a total population risk of 0.004 LCF; and traffic accidents resulting in 0.083 fatality.

4.14.2.7 Environmental Justice

As discussed in other parts of Section 4.14.2, routine operations conducted under Alternative 7 would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near INEEL would be approximately 1 in 10 million (see Table 4–107); the likelihood for the MEI residing near SRS would be essentially zero. The number of LCFs expected among the general population residing near INEEL and SRS from accident-free operations would increase by approximately 0.011 and 1.4×10^{-5}, respectively.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public (see Section 4.14.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–44, 4–45, 4–109, and 4–110). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the sites pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.14.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 7 would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.15 [Section deleted because alternative deleted.]

4.16 ALTERNATIVE 8

Alternative 8 would involve constructing and operating the pit conversion and MOX facilities at INEEL and the immobilization facility at Hanford. The pit conversion facility would be located in the existing FPF building, and the MOX facility would be located in a new building. The immobilization facility would be located in the existing FMEF building in the 400 Area. Activities at INEEL would be the same as under Alternative 7.

4.16.1 Construction

4.16.1.1 Air Quality and Noise

Potential air quality impacts of construction under Alternative 8 at INEEL are the same as those for Alternative 7 (see Section 4.14.1.1). Noise impacts are the same as those for Alternative 7 at INEEL (see Section 4.14.1.1).

Sources of potential air quality impacts of construction under Alternative 8 at Hanford include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations at Hanford, including the contribution from construction activities, with standards and guidelines is presented as Table 4–111. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat from current emissions during the planned construction period because of an expected decrease in overall site employment.

The location of these facilities at Hanford relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with the construction of these facilities would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 7.1 km [4.4 mi]), noise emissions from construction equipment would not be expected to annoy the public. These noise sources would be far enough away from offsite areas that the contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Traffic associated with the construction of these facilities would likely produce less than a 1-dB increase in noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Construction workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of standard silencing packages on

Table 4–111. Evaluation of Hanford Air Pollutant Concentrations Associated With Construction Under Alternative 8: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in FMEF and HLWVF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.324	34.4	0.34
	1 hour	40,000	2.2	50.5	0.13
Nitrogen dioxide	Annual	100	0.025	0.275	0.28
PM_{10}	Annual	50	0.00405	0.022	0.044
	24 hours	150	0.158	0.928	0.62
Sulfur dioxide	Annual	50	0.00257	1.63	3.1
	24 hours	260	0.0286	8.94	3.4
	3 hours	1,300	0.194	29.8	2.3
	1 hour	660	0.583	33.5	5.1
Other regulated pollutants					
Total suspended particulates	Annual	60	0.00405	0.022	0.037
	24 hours	150	0.158	0.928	0.62
Hazardous and other toxic compounds					
Other toxics[b]	Annual	0.12	0	0.000006	0.005

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

Key: FMEF, Fuels and Materials Examination Facility; FPF, Fuel Processing Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; WDEC 1994.

construction equipment, administrative controls, engineering controls, and personal hearing protection equipment.

4.16.1.2 Waste Management

At INEEL, construction impacts of this alternative would be the same as for Alternative 7. See Section 4.14.1.2 for a description of the impacts of this alternative on the waste management infrastructure at INEEL.

Table 4–112 compares the wastes generated during modification of the FMEF building at Hanford with the existing treatment, storage, and disposal capacity for the various waste types.

It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during the 3-year modification period. In addition, no soil contaminated with hazardous or radioactive constituents should be generated during modification. However, if any were generated, the waste would be managed in accordance with site practice and applicable Federal and State regulations. Waste generation would be the same for the ceramic and glass immobilization technologies because the same size facility would be built under either scenario. For this SPD EIS, it is assumed that hazardous waste and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

Table 4–112. Potential Waste Management Impacts of Construction Under Alternative 8: Immobilization in FMEF and HLWVF at Hanford

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	8	NA	NA	NA
Nonhazardous				
Liquid	5,200	2[c]	NA	2[d]
Solid	430	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year modification period.

[c] Percent of capacity of the 400 Area sanitary sewer.

[d] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

Hazardous wastes generated during modification of the FMEF building at Hanford would be typical of those generated during modification of an industrial facility. Any hazardous wastes generated during modification would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during the modification period should not have a major impact on the Hanford hazardous waste management system.

Nonhazardous solid wastes generated during modification of the FMEF building at Hanford would be packaged in conformance with standard industrial practice and shipped to offsite commercial facilities for recycling or disposal. The additional waste load generated during the modification period should not have a major impact on the nonhazardous solid waste management system at Hanford.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during modification of the FMEF building at Hanford would be managed on the site at the Energy Northwest (formerly WPPSS) Sewage Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during modification is estimated to be 2 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 2 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd^3/yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of these wastes at Hanford should not have a major impact on the nonhazardous liquid waste treatment system during the modification period.

4.16.1.3 Socioeconomics

Construction-related employment requirements for Alternative 8 would be as indicated in Table 4–113.

At its peak in 2003, construction of the pit conversion and MOX facilities at INEEL under this alternative would require 866 construction workers and generate another 884 indirect jobs in the region. The total employment requirement of 1,750 direct and indirect jobs represents only about 1.0 percent of the total projected INEEL workforce, and thus would have no major impact on the REA. It should also have little effect on community

services provided within the INEEL REA. In fact, it should help offset the approximately 13 percent reduction in INEEL's total workforce (i.e., from 8,291 to 7,250 workers) projected for the years 1997–2005.

Table 4–113. Construction Employment Requirements for Alternative 8: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in FMEF and HLWVF at Hanford

Year	Pit Conversion	MOX	Immobilization	Total
2001	100	0	0	100
2002	154	441	207	802
2003	94	772	376	1,242
2004	0	508	414	922
2005	0	221	226	447
2006	0	208	0	208

Key: FMEF, Fuels and Materials Examination Facility; FPF, Fuel Processing Facility; HLWVF, high-level-waste vitrification facility.
Source: DOE 1999c; UC 1998f, UC 1999a, 1999b.

At its peak in 2004, construction of the immobilization facility at Hanford would require 414 construction workers and generate another 425 indirect jobs in the region. The total employment requirement of 839 direct and indirect jobs represents 0.2 percent of the total projected REA workforce, and thus should have no major impacts on the REA. This requirement should also have little effect on community services currently offered in the ROI. In fact, it should help offset the roughly 15 percent reduction in Hanford employment (i.e., from 12,882 to 11,000 workers) projected for the years 1997–2005.

4.16.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. A summary of radiological impacts of construction activities on workers at risk is presented in Table 4–114. According to recent radiation surveys (Mitchell et al. 1997; Antonio 1998) conducted in the INEEL INTEC area and the Hanford 400 Area, construction workers at INEEL could receive small doses above natural background radiation levels as a result of other ongoing or past activities; no doses above natural background levels would be expected at Hanford. Construction worker exposures would be limited to ensure that doses are kept as low as is reasonably achievable, and workers may be monitored (badged) as appropriate.

Table 4–114. Potential Radiological Impacts on Construction Workers of Alternative 8: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in FMEF and HLWVF at Hanford

Impact	Pit Conversion[a]	MOX[b]	INEEL Total	Immobilization[c]
Total dose (person-rem/yr)	0.55	1.4	2.0	0
Annual latent fatal cancers[d]	2.2×10^{-4}	5.5×10^{-4}	7.7×10^{-4}	0
Average worker dose (mrem/yr)	4.7[e]	4.7[e]	4.7[f]	0
Annual latent fatal cancer risk	1.9×10^{-6}	1.9×10^{-6}	1.9×10^{-6}	0

[a] An estimated average of 116 workers would be associated with annual construction and modification operations.
[b] An estimated average of 292 workers would be associated with annual construction operations.
[c] An estimated average of 244 workers would be associated with annual construction and modification operations. The number would be the same for immobilization in either ceramic or glass.
[d] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations, per ICRP 1991.
[e] Value is based on the number of expected construction workdays per year and an 8-hr workday.
[f] Represents an average of doses for both facilities.
Key: FMEF, Fuels and Materials Examination Facility; FPF, Fuel Processing Facility; HLWVF, high-level-waste vitrification facility.
Note: The radiological limit for construction workers is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: Antonio 1998; ICRP 1991; Mitchell et al. 1997; NAS 1990.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at the INEEL under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.
The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at Hanford under this alternative has been estimated at 5 chances in 100 million (5×10^{-11}) over the lifetime of the maximally exposed member of the public.

4.16.1.5 Facility Accidents

The construction of surplus plutonium disposition facilities at INEEL and Hanford could result in worker injuries or fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 3,721 person-years of construction labor and standard industrial accident rates, approximately 370 cases of nonfatal occupational injury or illness and 0.52 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.16.1.6 Environmental Justice

As discussed in the other parts of Section 4.16.1, construction under Alternative 8 would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, construction activities under Alternative 8 at INEEL and Hanford would have no significant impacts on minority or low-income populations.

4.16.2 Operations

4.16.2.1 Air Quality and Noise

Potential air quality impacts of the operation of facilities under Alternative 8 at INEEL are the same as those for Alternative 7 (see Section 4.14.2.1). Noise impacts are the same as those for Alternative 7 at INEEL (see Section 4.14.2.1).

Potential air quality impacts of the operation of the immobilization facility under Alternative 8 at Hanford were analyzed using ISCST3. Operational impacts would result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from the immobilization facility, with standards and guidelines is presented as Table 4–115. Concentrations for immobilization in the ceramic and glass forms are the same. Concentrations of air pollutants would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards as a result of Hanford activities. Occasional exceedances of the PM_{10} and total suspended particulates standards attributable to natural sources would be expected to continue. Air pollution impacts during operation would be mitigated; for example, HEPA filtration has been included in the design of the facility.

For a discussion of how the operation of the immobilization facility at Hanford would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.1.4. There are no other NESHAPs limits applicable to operation of this facility.

Table 4–115. Evaluation of Hanford Air Pollutant Concentrations Associated With Operations Under Alternative 8: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in FMEF and HLWVF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.271	34.4	0.34
	1 hour	40,000	1.84	50.1	0.13
Nitrogen dioxide	Annual	100	0.0376	0.288	0.29
PM_{10}	Annual	50	0.00265	0.021	0.041
	24 hours	150	0.0295	0.799	0.53
Sulfur dioxide	Annual	50	0.00249	1.63	3.1
	24 hours	260	0.0277	8.94	3.4
	3 hours	1,300	0.188	29.8	2.3
	1 hour	660	0.564	33.5	5.1
Other regulated pollutants					
Total suspended particulates	Annual	60	0.00265	0.021	0.034
	24 hours	150	0.0295	0.799	0.53
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Key: FMEF, Fuels and Materials Examination Facility; FPF, Fuel Processing Facility; HLWVF, high-level-waste vitrification facility; SPD, surplus plutonium disposition.
Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.
Source: EPA 1997a; WDEC 1994.

The increases in concentrations of nitrogen dioxide, PM_{10}, and sulfur dioxide from the operation of the immobilization facility would be a small fraction of the PSD Class II area increments as summarized in Table 4–116.

Table 4–116. Evaluation of Hanford Air Pollutant Increases Associated With Operations Under Alternative 8: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in FMEF and HLWVF at Hanford

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Increment
Nitrogen dioxide	Annual	0.0376	25	0.15
PM_{10}	Annual	0.00265	17	0.016
	24 hours	0.0295	30	0.098
Sulfur dioxide	Annual	0.00249	20	0.012
	24 hours	0.0277	91	0.03
	3 hours	0.188	512	0.037

Key: FMEF, Fuels and Materials Examination Facility; FPF, Fuel Processing Facility; HLWVF, high-level-waste vitrification facility; PSD, prevention of significant deterioration.
Source: EPA 1997b.

Total vehicle emissions associated with activities at Hanford would likely decrease somewhat because of an expected decrease in overall site employment during this timeframe.

The location of the facility at Hanford relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operations would include new or existing sources (e.g., cooling systems, vents, motors, material-handling equipment), employee vehicles, and truck traffic. Traffic noise associated with operation of this facility would occur on the site and along offsite local and regional transportation routes used to bring materials and workers to the site. Given the distance to the site boundary (about 7.1 km [4.4 mi]), noise emissions from equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could have onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Noise from traffic associated with operation of this facility would likely produce less than a 1-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Operations workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

The combustion of fossil fuels associated with Alternative 8 would result in the emission of carbon dioxide, one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative would represent less than 2×10^{-4} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

4.16.2.2 Waste Management

At INEEL, impacts of operations for this alternative would be the same as for Alternative 7. See Section 4.14.2.2 for a description of the impacts of this alternative on the waste management infrastructure at INEEL.

Table 4–117 compares the existing site treatment, storage, and disposal capacities with the expected waste generation rates from operating surplus plutonium disposition facilities at Hanford. Although HLW would be used in the immobilization process, no HLW would be generated by surplus plutonium disposition facilities. Waste generation at Hanford should be the same for the ceramic and glass immobilization technologies.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Current schedules for shipment of TRU waste to WIPP would accommodate shipment of contact-handled TRU waste from surplus plutonium disposition facilities beginning in 2016 (DOE 1997c:17). Therefore, in order to be conservative, it is assumed the TRU waste would be stored on the site until 2016. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at Hanford will be evaluated in the *Hanford Site Solid (Radioactive and Hazardous) Waste Program EIS* that is being prepared by the DOE Richland Operations Office (DOE 1997b).

Table 4–117. Potential Waste Management Impacts of Operations Under Alternative 8: Immobilization in FMEF and HLWVF at Hanford

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[c]	95	5	6	1 of WIPP
LLW	80	NA	NA	<1
Mixed LLW	1	<1	<1	<1
Hazardous	75	NA	NA	NA
Nonhazardous				
Liquid	40,000	17[d]	NA	17[e]
Solid	340	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[c] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[d] Percent of capacity of the 400 Area sanitary sewer.

[e] Percent of capacity of the Energy Northwest (formerly Washington Public Power Supply System) Sewage Treatment Facility.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); TRU, transuranic.

TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the Waste Receiving and Processing Facility at Hanford.

TRU waste generated at the immobilization facility at Hanford is estimated to be 5 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of the Waste Receiving and Processing Facility. A total of 950-m^3 (1,240-yd^3) TRU waste would be generated over the 10-year operation period. If all the TRU waste were stored on the site, this would be 6 percent of the 17,000-m^3 (22,200-yd^3) storage capacity available at Hanford. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of about 0.14 ha (0.35 acre) would be required. Therefore, impacts of the management of additional quantities of TRU waste at Hanford should not be major. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997d).

The 1,810 m^3 (2,367 yd^3) of TRU wastes generated at INEEL and Hanford would be 1 percent of the 143,000-m^3 (187,000-yd^3) contact-handled TRU waste that DOE plans to dispose of at WIPP and 1 percent of the current 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997e:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997e).

At Hanford, LLW would be packaged, certified, and accumulated at the immobilization facility before transfer for additional treatment and disposal in existing onsite facilities. A total of 800-m^3 (1,050-yd^3) LLW would be generated over the operations period. LLW generated at surplus plutonium disposition facilities is estimated to be less than 1 percent of the 1.74 million-m^3 (2.28 million-yd^3) capacity of the LLW Burial Grounds and less than 1 percent of the 230,000-m^3 (301,000-yd^3) capacity of the Grout Vaults. Using the 3,480 m^3/ha disposal land usage factor for Hanford published in the *Storage and Disposition Final PEIS* (DOE 1996a:E-9), 600 m^3 (780 yd^3) of waste would require 0.23 ha (0.57 acre) of disposal space at Hanford. Therefore, impacts of the management of this additional LLW at Hanford should not be major.

At Hanford, mixed LLW would be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan. Mixed LLW generated at the immobilization facility is estimated to be less than 1 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of the Waste Receiving and Processing Facility, less than 1 percent of the 16,800-m^3 (22,000-yd^3) capacity of the Central Waste Complex, and less than 1 percent of the 14,200-m^3 (18,600-yd^3) planned disposal capacity of the Radioactive Mixed Waste Disposal Facility. Therefore, the management of this additional waste at Hanford should not have a major impact on the mixed LLW management system. If all TRU waste and mixed LLW generated at surplus plutonium disposition facilities at Hanford were processed in the Waste Receiving and Processing Facility, this additional waste would be 5 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of that facility.

At Hanford, any hazardous wastes generated during operation of the immobilization facility would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during the operations period should not have a major impact on Hanford hazardous waste management system.

Nonhazardous solid waste would be packaged and transported in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent for offsite disposal. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at Hanford.

At Hanford, nonhazardous wastewater generated by the immobilization facility would be treated if necessary before being discharged to the 400 Area sanitary sewer system, which connects to the Energy Northwest (formerly WPPSS) Sewage Treatment Facility. Nonhazardous liquid waste generated by the immobilization facility at Hanford is estimated to be 17 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, 17 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest Sewage Treatment Facility, and within the 138,000-m^3/yr (181,000-yd Å/yr) excess capacity of the Energy Northwest Sewage Treatment Facility (Mecca 1997). Therefore, management of nonhazardous liquid waste at Hanford should not have a major impact on the treatment system.

4.16.2.3 Socioeconomics

After construction, startup, and testing of the pit conversion and the MOX facilities at INEEL in 2007 under Alternative 8, an estimated 743 new workers would be required to operate them (DOE 1999c; UC 1998f). This employment level should generate another 1,990 indirect jobs within the region. As this total employment requirement of 2,733 direct and indirect jobs represents about 1.6 percent of the total projected REA workforce, it should have no major impact on the REA. It should also have a negligible effect on community services provided within the INEEL ROI. In fact, it should help to offset the 13 percent decline in INEEL's total workforce (i.e., from 8,291 to 7,250 workers) projected for the years 1997–2010.

After construction, startup, and testing of the immobilization facility at Hanford in 2006 under Alternative 8, an estimated 335 new workers would be required to operate it (UC 1999a, 1999b). This level of employment should generate another 848 related jobs in the region. The total employment requirement of 1,183 direct and indirect jobs represents less than 0.3 percent of the projected REA workforce, and should have no major impact on the REA. Some of the new jobs created under this alternative would be filled from the ranks of the unemployed, currently 11 percent of the REA's population.

In the ROI, however, this employment requirement could have minor impacts on community services, for it should coincide with an overall increase in site employment in connection with construction of the tank waste remediation system. Assuming that 91 percent of the new employees associated with this alternative resided in

the ROI, an increase of 1,077 new jobs in the projected workforce would precipitate an overall population increase of approximately 1,998 persons. This increase, in conjunction with the population growth forecast by the State of Washington, would engender increased construction of local housing units. Given the current population-to-student ratio in the ROI, a population increase of this size would be expected to include 413 new students, and local school districts would have to increase the number of classrooms to accommodate them.

Community services in the ROI would be expected to change to reflect the population growth as follows: 26 teachers would be added to maintain the current student-to-teacher ratio of 16:1; 3 police officers would be added to maintain the current officer-to-population ratio of 1.5:1,000; 7 firefighters would be added to maintain the current firefighter-to-population ratio of 3.4:1,000; and 3 physicians would be added to maintain the current physician-to-population ratio of 1.4:1,000. Thus, an additional 38 positions would have to be created to maintain community services at current levels. The ratio of hospital beds to population in the ROI would remain at 2.1 beds per 1,000 persons. However, average school enrollment would increase to 93.3 percent from the current rate of 92.5 percent unless additional classrooms were built. None of the projected changes should have a major impact on the level of community services currently being offered in the ROI.

4.16.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment, and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 8 would be as follows.

Radiological Impacts. Table 4–118 reflects the potential radiological impacts on three individual receptor groups at INEEL and Hanford: the population living within 80 km (50 mi) in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts the projected aggregate LCF risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Given incident-free operation of all three facilities, the total population dose in the year 2010 would be 2.2 person-rem at INEEL and 7.8×10^{-3} person-rem at Hanford. The corresponding number of LCFs in the population from 10 years of operation would be 0.011 around INEEL and 3.9×10^{-5} around Hanford. The total dose to the maximally exposed member of the public from annual operation of the pit conversion and MOX facilities at INEEL would be 0.018 mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 9.1×10^{-8}. The impacts on the average individual would be lower. The dose to the maximally exposed member of the public from annual operation of the immobilization facility at Hanford would be 1.1×10^{-4} mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 5.5×10^{-10}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with the operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–119; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose to pit conversion and MOX facility workers would be 500 mrem and 65 mrem, respectively; to immobilization facility workers;

750 mrem. The annual dose received by the total site workforce for each of these facilities has been estimated at 170, 22, and 242 person-rem, respectively. The risks and numbers of LCFs among the

Table 4–118. Potential Radiological Impacts on the Public of Operations Under Alternative 8: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in FMEF and HLWVF at Hanford

Impact	Pit Conversion	MOX[a]	INEEL Total	Immobilization	
				Ceramic	Glass
Population within 80 km for year 2010					
Dose (person-rem)	2.2	0.037	2.2	7.8×10^{-3}	7.1×10^{-3}
Percent of natural background[b]	3.3×10^{-3}	5.6×10^{-5}	3.3×10^{-3}	6.7×10^{-6}	6.1×10^{-6}
10-year latent fatal cancers	0.011	1.9×10^{-4}	0.011	3.9×10^{-5}	3.6×10^{-5}
Maximally exposed individual					
Annual dose (mrem)	0.015	3.2×10^{-3}	0.018	1.1×10^{-4}	9.7×10^{-5}
Percent of natural background[b]	4.2×10^{-3}	8.8×10^{-4}	5.1×10^{-3}	3.7×10^{-5}	3.2×10^{-5}
10-year latent fatal cancer risk	7.5×10^{-8}	1.6×10^{-8}	9.1×10^{-8}	5.5×10^{-10}	4.9×10^{-10}
Average exposed individual within 80 km[c]					
Annual dose (mrem)	0.012	2.1×10^{-4}	0.012	2.0×10^{-5}	1.8×10^{-5}
10-year latent fatal cancer risk	6.0×10^{-8}	1.0×10^{-9}	6.1×10^{-8}	1.0×10^{-10}	9.0×10^{-11}

[a] As described in Section 4.26.2.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] The annual natural background radiation level at INEEL is 361 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 66,000 person-rem. The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of INEEL (182,800) and Hanford (387,800) in 2010.

Key: FMEF, Fuels and Materials Examination Facility; FPF, Fuel Processing Facility; HLWVF, high-level-waste vitrification facility.

Source: Appendix J.

different workers from 10 years of operation are included in Table 4–119. Doses to individual workers would be kept to minimal levels by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Table 4–119. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 8: Pit Conversion in FPF and MOX in New Construction at INEEL, and Immobilization in FMEF and HLWVF at Hanford

Impact	Pit Conversion	MOX	INEEL Total	Immobilization (Ceramic or Glass)
Number of badged workers	341	331	672	323
Total dose (person-rem/yr)	170	22	192	242
10-year latent fatal cancers	0.68	0.088	0.77	0.97
Average worker dose (mrem/yr)	500	65	286[a]	750
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	1.1×10^{-3}	3.0×10^{-3}

[a] Represents an average of the doses for both facilities.

Key: FMEF, Fuels and Materials Examination Facility; FPF, Fuel Processing Facility; HLWVF, high-level-waste vitrification facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998f, 1998g, 1999a, 1999b.

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at INEEL under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released as a result of operations.

No hazardous chemicals would be released as a result of operations at Hanford under this alternative; thus, no cancer or adverse noncancer health effects would occur.

4.16.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion and MOX facilities at INEEL are equivalent to those included in Alternative 7 (see Tables 4–109 and 4–110), and the potential consequences from operation of the immobilization facility at Hanford, equivalent to those included in Alternative 2 (see Tables 4–31 and 4–32). More details on the method of analysis, assumptions, and specific accident scenarios are presented in the discussion of Alternative 2 in Section 4.3.2.5.

Public. The most severe consequences of a design basis accident for the pit conversion facility in FPF and the MOX facility at INEEL are discussed in Section 4.14.2.5. A nuclear criticality of 10^{19} fissions in the immobilization facility at Hanford would result in an MEI dose of 3.4×10^{-3} rem, corresponding to an LCF probability of 1.7×10^{-6}. Among the general population in the environs of Hanford, an estimated 2.7×10^{-3} LCF could occur as a result of this criticality accident. The frequency of such an accident at Hanford is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year.

A beyond-design-basis earthquake at Hanford could result in total collapse of the immobilization facility, with up to an estimated 7.1 LCFs (as described in Section 4.3.2.5). It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause widespread failure of homes, office buildings, and other structures in the surrounding area. The overall impact of such an event must therefore be seen in the context not only of the potential radiological impacts of these other facilities, but of hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of an earthquake of this magnitude at Hanford is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

The beyond-design-basis accident at INEEL would be equivalent to that discussed in Section 4.14.2.5.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition Final PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. The consequences for this worker were estimated to be highest for the criticality at the MOX facility. The consequences of such an accident would include an LCF probability of 3.0×10^{-4}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would either be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operation activities at INEEL and Hanford could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated employment of 11,115 person-years of labor and the standard DOE occupational accident rates, approximately 400 cases of nonfatal occupational injury or illness and 0.30 fatality could be expected for the duration of operations.

4.16.2.6 Transportation

Operational transportation impacts may be divided into two parts: impacts due to incident-free transportation and those due to transportation accidents. They may be further divided into nonradiological and radiological impacts. Nonradiological impacts are specifically vehicular, such as vehicular emissions and traffic accidents. Radiological impacts are those related to the dose received by transportation workers and the public during normal operations and in the case of accidents in which the radioactive materials being shipped may be released. For more detailed information on the transportation analysis performed for this SPD EIS, see Appendix L.

Under Alternative 8, transportation to and from INEEL would include the shipment of plutonium pits and clean plutonium metal via SST/SGT from sites throughout the DOE complex to the pit conversion facility.[22] During dismantlement of the pits, some HEU would be recovered. The pit conversion facility would ship HEU via

[22] Work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 SI container for long-term storage. The AL–R8 is not an offsite shipping container as was the AT–400A analyzed in the SPD Draft EIS. Therefore, if the decision were made to site the pit conversion facility at a site other than Pantex, the surplus pits would have to be taken out of the AL–R8 SI and placed in a yet-to-be-developed shipping container. This operation would also require the replacement of some pit-holding fixtures to meet transportation requirements. Under such alternatives, this change would result in a total repackaging exposure of 208 person-rem to Pantex personnel. An increase in worker doses of this magnitude could result in an increase in the expected number of LCFs of 8.3×10^{-2} over the life of the program.

SST/SGT to ORR for storage.[23] After conversion, the plutonium in the pit conversion facility would be in the form of plutonium dioxide. This material would be transferred through a secure tunnel to the MOX facility at INEEL for fabrication into MOX fuel pellets.

MOX fuel fabrication also requires uranium dioxide. Quantifying the uranium dioxide transportation requirements for this SPD EIS involved selecting representative sites for the source of the depleted uranium hexafluoride and the conversion facility. A DOE enrichment facility near Portsmouth, Ohio, was chosen as a representative site for the source of the depleted uranium hexafluoride, and the nuclear fuel fabrication facility in Wilmington, North Carolina, as representative of a uranium conversion facility. These sites were also used as representative sites in the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996e). It is assumed that depleted uranium hexafluoride needed for MOX fuel would be shipped via commercial truck to the uranium conversion facility, where it would be converted into uranium dioxide (see Section 4.3.2.6). After conversion, the depleted uranium dioxide would be shipped via commercial truck from the conversion facility to the MOX facility at INEEL. This material would be blended with plutonium dioxide at the MOX facility, fabricated into MOX fuel pellets, and placed in MOX fuel rods. After fabrication, the MOX fuel rods would be shipped to a domestic reactor site, where they would be placed in fuel assemblies and irradiated. Shipments of unirradiated MOX fuel rods would be made in an SST/SGT because unirradiated MOX fuel in large enough quantities is subject to the same security concerns as pure weapons-grade plutonium. It is assumed in this transportation analysis that all MOX fuel is shipped from the MOX facility to the most distant reactor site, North Anna.

Immobilization at Hanford under this alternative would require that surplus nonpit plutonium in various forms be shipped from current storage locations (i.e., SRS, Hanford, INEEL, LLNL, LANL, and RFETS) to the immobilization facility at Hanford. Even though these materials are not clean plutonium metal or pits, the quantity of the plutonium contained in them would require that they be treated as materials that could be used in nuclear weapons, and thus that shipments be made in SST/SGTs.

Under the preferred technology alternative for immobilization, the surplus plutonium would be immobilized in a ceramic matrix in small cans at the immobilization facility, placed in HLW canisters, and transported via specially designed trucks to HLWVF in 200 Area. This intrasite transportation—from 400 Area to 200 Area—could require the temporary shutdown of roads on Hanford. It would, however, provide for all the necessary security and for reduced risk to the public; SST/SGTs would not be required.

Use of the preferred ceramic (versus glass) matrix for immobilization would also require a small amount of depleted uranium dioxide (i.e., less than 10 t [11 tons] per year). It is assumed that this depleted uranium dioxide would be produced and shipped in the same manner as the depleted uranium dioxide needed by the MOX facility.

After the immobilized plutonium was encased by HLW at HLWVF, it would be shipped to a potential geologic repository for ultimate disposition. Because HLW would be displaced by the cans of immobilized plutonium suspended in the HLW canister, additional canisters—to accommodate the displaced HLW—would be required over the life of the immobilization program. According to estimates, up to 145 additional canisters of HLW would be needed to meet the demands of surplus plutonium disposition under Alternative 8. The *Yucca Mountain Draft EIS* evaluates different options for the shipment of these canisters to a potential geologic repository using either trucks or trains. The analysis revealed that shipment by train would pose the lower risk. However, no ROD has yet been issued regarding these shipments. To bound the risks associated with these additional shipments, this SPD EIS conservatively assumes that all of these shipments would be made by truck, one canister per truck.

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[23] Classified nuclear material parts would also result from pit disassembly. Although current plans are to store these parts at the pit conversion facility, this SPD EIS analyzes the possible transport of these nuclear material parts to LANL. Therefore, the transportation impacts are slightly overstated.

Every alternative considered in this SPD EIS would require routine transportation of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities on the sites. This transportation would be handled in the same manner as other site waste shipments, and as shown in Sections 4.16.1.2 and 4.16.2.2, would involve no major increase in the amounts of waste already being managed at these sites. The shipments would pose no greater risks than the ordinary waste shipments at these sites as analyzed in the WM PEIS.

In all, approximately 2,400 shipments of radioactive materials would be carried out by DOE under this alternative. The total distance traveled on public roads by trucks carrying radioactive materials would be 6.4 million km (3.9 million mi).

Impacts of Incident-Free Transportation. The dose to transportation workers from all transportation activities entailed by this alternative has been estimated at 30 person-rem; the dose to the public, 40 person-rem. Accordingly, incident-free transportation of radioactive material associated with this alternative would result in 0.012 LCF among transportation workers and 0.020 LCF in the total affected population over the duration of the transportation activities. The estimated number of nonradiological fatalities from vehicular emissions associated with this alternative is 0.024.

Impacts of Accidents During Transportation (Consequences). The maximum foreseeable offsite transportation accident under this alternative (probability of occurrence: greater than 1 in 10 million per year) is a shipment of plutonium pits from one of DOE's storage locations to the pit conversion facility with a severity category VIII accident in a rural population zone under neutral (average) weather conditions. If this accident were to occur, it could result in a dose of 87 person-rem to the public for an LCF risk of 0.044 and 96 rem to the hypothetical MEI for an LCF risk of 0.096. (The MEI receives a larger dose than the population because it is unlikely that a person would be in position, and remain in position, to receive this hypothetical maximum dose.) No fatalities would be expected to occur. The probability of more severe accidents, different weather conditions at the time of accident, or occurrence in a more densely populated area were also evaluated, and estimated to have a probability lower than 1 chance in 10 million per year. (See Appendix L.6.)

Impacts of Accidents During Transportation (Risks). The total transportation accident risks were estimated by summing the risks to the affected population from hypothetical accidents. For Alternative 8, those risks are as follows: a radiological dose to the population of 7 person-rem, resulting in a total population risk of 0.003 LCF; and traffic accidents resulting in 0.065 fatality.

4.16.2.7 Environmental Justice

As discussed in other parts of Section 4.16.2, routine operations conducted under Alternative 8 would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near INEEL would be approximately 1 in 10 million (see Table 4–118); the likelihood for the MEI residing near Hanford would be essentially zero. The number of LCFs expected among the general population residing near INEEL and Hanford from accident-free operations would increase by approximately 0.011 and 3.9×10^{-5}, respectively.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public (see Section 4.16.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–31, 4–32, 4–109, and 4–110). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the sites pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.16.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 8 would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.17 ALTERNATIVE 9

Alternative 9 would involve constructing and operating the pit conversion and MOX facilities in Zone 4 West at Pantex and the immobilization facility in a new building in F-Area at SRS. Activities at SRS would be the same as under Alternative 6A.

4.17.1 Construction

4.17.1.1 Air Quality and Noise

Sources of potential air quality impacts of construction under Alternative 9 at Pantex include emissions from fuel-burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from Pantex construction activities, with standards and guidelines is presented as Table 4–120. Concentrations of air pollutants, especially PM_{10} and total suspended particulates, would likely increase at the site boundary. The modeling results indicate that total suspended particulate matter concentrations could exceed the State 1-hr ambient air quality standard. Actual short-term concentrations of particulate matter are expected to be lower than those estimated because the concentrations were based on very conservative emission factors for heavy construction activities. Concentrations of other air pollutants would not exceed the Federal or State ambient air quality standards. The concentrations of toxic air pollutants such as benzene show little change from No Action (see the discussion of these concentrations in Section 4.2.1.3). Air pollution impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas.

Total vehicle emissions associated with activities at Pantex would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of these facilities at Pantex relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during construction would include heavy construction equipment, employee vehicles, and truck traffic. Traffic noise associated with the construction of these facilities would occur on the site and along offsite local and regional transportation routes used to bring construction materials and workers to the site. Given the distance to the site boundary (about 1.6 km [1.0 mi]), noise emissions from construction equipment would not be expected to annoy the public. These noise sources would be far enough away from offsite areas that the contribution to offsite noise levels would be small. Some noise sources could result in onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location (see Section 4.26). Traffic associated with the construction of these facilities would likely produce less than a 2-dB increase in traffic noise levels along roads used to access the site, and thus would not result in increased annoyance of the public.

Construction workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of standard silencing packages on construction equipment, administrative controls, engineering controls, and personal hearing protection equipment.

Table 4–120. Evaluation of Pantex Air Pollutant Concentrations Associated With Construction Under Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	6.03	626	6.3
	1 hour	40,000	37.6	3,030	7.6
Nitrogen dioxide	Annual	100	0.675	2.62	2.6
PM_{10}	Annual	50	0.503	9.29	19
	24 hours	150	11.5	101	67
Sulfur dioxide	Annual	80	0.0501	0.0501	0.063
	24 hours	365	0.602	0.602	0.17
	3 hours	1,300	2.63	2.63	0.2
	30 minutes	1,048	10.7	10.7	1
Other regulated pollutants					
Total suspended particulates	3 hours	200	100	100[b]	50
	1 hour	400	409	410[b]	102
Hazardous and other toxic compounds					
Other toxics[c]	Annual	3[d]	0.0000162	0.0547	1.8
	1 hour	75[d]	0.0162	19.4	26

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Three- and 1-hr concentrations for total suspended particulates are not listed for existing sources in the source document. Only the contribution from sources associated with the alternative are represented.

[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.

[Text deleted.]

[d] Texas Natural Resource Conservation Commission effects-screening levels are "tools" used by the Toxicology and Risk Assessment Staff to evaluate impacts of air pollutant emissions. They are not ambient air standards. If ambient levels of air contaminants exceed the screening levels, it does not necessarily indicate a problem, but would trigger a more in-depth review. The levels are set where no adverse effect is expected.

Key: DWPF, Defense Waste Processing Facility; SPD, surplus plutonium disposition.

Source: EPA 1997a; TNRCC 1997a, 1997b.

Potential air quality impacts of construction under Alternative 9 at SRS are the same as those for Alternative 6A (see Section 4.10.1.1). Noise impacts are the same as those for Alternative 6A at SRS (see Section 4.10.1.1).

4.17.1.2 Waste Management

At SRS, construction impacts of this alternative would be the same as for Alternative 6A. See Section 4.10.1.2 for a description of the impacts of this alternative on the waste management infrastructure at SRS.

Table 4–121 compares the wastes generated during the construction of surplus plutonium disposition facilities at Pantex with the existing treatment, storage, and disposal capacity for the various waste types. It is anticipated that no TRU waste, LLW, or mixed LLW would be generated during the 3-year construction period. In addition,

no soil contaminated with hazardous or radioactive constituents should be generated during construction. However, if any were generated, the waste would be managed in accordance with site

Table 4–121. Potential Waste Management Impacts of Construction at Pantex Under Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
Hazardous	69	NA	NA	NA
Nonhazardous				
Liquid	25,000	NA	NA	3[c]
Solid	8,700	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 3-year construction period.

[c] Percent of capacity of the Wastewater Treatment Facility.

Key: DWPF, Defense Waste Processing Facility; NA, not applicable (i.e., it is assumed that the majority of the hazardous waste and nonhazardous solid waste would be treated and disposed of off the site by the construction contractor).

practice and applicable Federal and State regulations. For this SPD EIS, it is assumed that hazardous waste and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

Hazardous wastes generated during the construction of surplus plutonium disposition facilities at Pantex would be typical of those generated during the construction of an industrial facility. Any hazardous wastes generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. The additional waste load generated during construction should not have a major impact on the Pantex hazardous waste management system.

Nonhazardous solid wastes generated during the construction of surplus plutonium disposition facilities at Pantex would be packaged in conformance with standard industrial practice and shipped to offsite commercial facilities for recycling or disposal. The additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at Pantex.

To be conservative, it was assumed that all nonhazardous liquid wastes generated during construction of the pit conversion and MOX facilities at Pantex would be managed on the site by the Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and would be managed at offsite facilities. Nonhazardous liquid waste generated during the construction of these facilities is estimated to be 3 percent of the 946,250-m^3/yr (1,237,700-yd^3/yr) capacity of the Wastewater Treatment Facility, and within the 473,125-m^3/yr (618,848-yd^3/yr) excess capacity of the Pantex Wastewater Treatment Plant (M&H 1997:29). Therefore, management of these wastes at Pantex should not have a major impact on the nonhazardous liquid waste treatment system during construction.

4.17.1.3 Socioeconomics

Construction-related employment requirements for Alternative 9 would be as indicated in Table 4–122.

At its peak in 2003, construction of the new pit conversion and MOX facilities at Pantex under this alternative would require 1,048 construction workers and generate another 884 indirect jobs in the region. As this total

employment requirement of 1,932 direct and indirect jobs represents only about 0.8 percent of the projected REA workforce, it should have no major impact on the REA. Moreover, it should have little effect on community services provided within the ROI. In fact, it should help offset the nearly 40 percent reduction in Pantex employment (i.e., from 2,944 to 1,750 workers) projected for the years 1997–2005.

Table 4–122. Construction Employment Requirements for Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

Year	Pit Conversion	MOX	Immobilization	Total
2001	297	0	0	297
2002	451	441	506	1,398
2003	276	772	920	1,968
2004	0	508	1,014	1,522
2005	0	221	552	773
2006	0	208	0	208

Key: DWPF, Defense Waste Processing Facility.
Source: DOE 1999c; UC 1998e, UC 1999c, 1999d.

Employment requirements for construction of a new immobilization facility at SRS under Alternative 9 would be the same as those for Alternative 6A (see Section 4.10.1.3).

4.17.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. A summary of radiological impacts of construction activities on workers at risk is presented in Table 4–123. According to a recent radiation survey (DOE 1997f) conducted in the Zone 4 area at Pantex, construction workers would not be expected to receive any additional radiation exposure above natural background levels in the area. Data indicate, however, that a construction worker in F-Area at SRS could be exposed to radiation deriving from other activities, past or present, at the site. Regardless of location, construction worker exposures would be limited to ensure that doses are kept as low as is reasonably achievable, and workers would be monitored (badged) as appropriate.

Table 4–123. Potential Radiological Impacts on Construction Workers of Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion[a]	MOX[b]	Pantex Total	Immobilization[c]
Total dose (person-rem/yr)	0	0	0	1.5
Annual latent fatal cancers[d]	0	0	0	6.0×10^{-4}
Average worker dose (mrem/yr)	0	0	0[e]	4
Annual latent fatal cancer risk	0	0	0	1.6×10^{-6}

[a] An estimated average of 342 workers would be associated with annual construction operations.
[b] An estimated average of 292 workers would be associated with annual construction operations.
[c] An estimated average of 374 workers would be associated with annual construction operations at the new facility location adjacent to APSF, if built. The number would be the same for immobilization in either ceramic or glass.
[d] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations, per ICRP 1991.
[e] Represents an average of the doses for both facilities.
Key: APSF, Actinide Processing and Storage Facility; DWPF, Defense Waste Processing Facility.
Note: The radiological limit for construction workers is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses will be reduced to levels that are as low as is reasonably achievable.
Source: DOE 1997f; ICRP 1991; NAS 1990; UC 1998e, 1998h, 1999c, 1999d.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at Pantex under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

4.17.1.5 Facility Accidents

The construction of surplus plutonium disposition facilities at Pantex and SRS could result in worker injuries or fatalities. DOE–required industrial safety programs would be in place to reduce the risks. Given the estimated 6,166 person-years of construction labor and standard industrial accident rates, approximately 610 cases of nonfatal occupational injury or illness and 0.86 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.17.1.6 Environmental Justice

As discussed in the other parts of Section 4.17.1, construction under Alternative 9 would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, construction activities under Alternative 9 at Pantex and SRS would have no significant impacts on minority or low-income populations.

4.17.2 Operations

4.17.2.1 Air Quality and Noise

Potential air quality impacts of the operation of facilities under Alternative 9 at Pantex were analyzed using ISCST3. Operational impacts would result from process emissions, emergency diesel generator testing, trucks moving materials and wastes, and employee vehicles. Emissions from these sources are summarized in Appendix G.

A comparison of maximum air pollutant concentrations, including the contribution from surplus plutonium disposition facilities, with standards and guidelines is presented as Table 4–124. Concentrations of air pollutants would likely increase at the site boundary, but would not exceed the Federal or State ambient air quality standards. Air pollution impacts during operation would be mitigated; for example, HEPA filtration has been included in the design of these facilities.

For a discussion of how the operation of the pit conversion and MOX facilities at Pantex would affect the ability to continue to meet NESHAPs limits regarding airborne radiological emissions, see Section 4.32.3.4. There are no other NESHAPs limits applicable to these facilities.

The increases in air pollutant concentrations from operation of these facilities for nitrogen dioxide, PM_{10}, and sulfur dioxide are a small fraction of the prevention of significant deterioration Class II area increments as summarized in Table 4–125.

Total vehicle emissions associated with activities at Pantex would likely decrease somewhat from current emissions because of an expected decrease in overall site employment during this timeframe.

The location of these facilities at Pantex relative to the site boundary and sensitive receptors was examined to evaluate the potential for onsite and offsite noise impacts. Noise sources during operations would include new or existing sources (e.g., cooling systems, vents, motors, material-handling equipment), employee vehicles, and truck traffic. Traffic noise associated with operation of these facilities would occur on the site and along offsite local and regional transportation routes used to bring materials and workers to the site. Given the

Table 4–124. Evaluation of Pantex Air Pollutant Concentrations Associated With Operations Under Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline (Fg/m³)[a]	SPD Increment (Fg/m³)	Total Site Concentration (Fg/m³)	Site as a Percent of Standard or Guideline
Criteria pollutants					
Carbon monoxide	8 hours	10,000	0.705	620	6.2
	1 hour	40,000	3.84	3,000	7.5
Nitrogen dioxide	Annual	100	0.0736	2.02	2
PM_{10}	Annual	50	0.00531	8.8	18
	24 hours	150	0.0577	89.5	60
Sulfur dioxide	Annual	80	0.00265	0.00265	0.0033
	24 hours	365	0.0315	0.0315	0.0086
	3 hours	1,300	0.137	0.137	0.011
	30 minutes	1,048	0.551	0.551	0.053
Other regulated pollutants					
Total suspended particulates	3 hours	200	0.244	0.244[b]	0.12
	1 hour	400	0.796	0.796[b]	0.20
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[b] Three- and 1-hr concentrations for total suspended particulates are not listed for existing sources in the source document. Only the contribution from sources associated with the alternative are represented.

[Text deleted.]

Key: DWPF, Defense Waste Processing Facility; SPD, surplus plutonium disposition.

Note: No nonradiological hazardous or other toxic compounds would be emitted from these processes.

Source: EPA 1997a; TNRCC 1997a, 1997b.

Table 4–125. Evaluation of Pantex Air Pollutant Increases Associated With Operations Under Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

Pollutant	Averaging Period	Increase in Concentration (Fg/m³)	PSD Class II Area Allowable Increment (Fg/m³)	Percent of Increment
Nitrogen dioxide	Annual	0.0736	25	0.29
PM_{10}	Annual	0.00531	17	0.031
	24 hours	0.0577	30	0.19
Sulfur dioxide	Annual	0.00265	20	0.013
	24 hours	0.0315	91	0.035
	3 hours	0.137	512	0.027

Key: DWPF, Defense Waste Processing Facility; PSD, prevention of significant deterioration.

Source: EPA 1997b.

distance to the site boundary (about 1.6 km [1.0 mi]), noise emissions from equipment would not likely annoy the public. These noise sources would be far enough away from offsite areas that their contribution to offsite noise levels would be small. Some noise sources could have onsite impacts, such as the disturbance of wildlife. However, noise would be unlikely to affect federally listed threatened or endangered species or their critical habitats, as none are known to occur on or in the immediate vicinity of the proposed site location

(see Section 4.26). Noise from traffic associated with operation of these facilities would likely produce less than a 2-dB increase in traffic noise levels along roads used to access the site, and thus would not result in any increased annoyance of the public.

Operations workers could be exposed to noise levels higher than the acceptable limits specified by OSHA in its noise regulations (OSHA 1997). However, DOE has implemented appropriate hearing protection programs to minimize noise impacts on workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

Potential air quality impacts of the operation of the new immobilization facility under Alternative 9 at SRS are the same as those for Alternative 6A (see Section 4.10.2.1). Noise impacts are the same as those for Alternative 6A at SRS (see Section 4.10.2.1).

The combustion of fossil fuels associated with Alternative 9 would result in the emission of carbon dioxide which is one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative represent less than 2×10^{-4} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes, and therefore would not appreciably affect global concentrations of this pollutant.

4.17.2.2 Waste Management

At SRS, impacts of operations for this alternative would be the same as for Alternative 6A. See Section 4.10.2.2 for a description of the impacts of this alternative on the waste management infrastructure at SRS.

Table 4–126 compares the existing site treatment, storage, and disposal capacities with the expected waste generation rates from operating surplus plutonium disposition facilities at Pantex. No HLW would be generated by the facilities.

Table 4–126. Potential Waste Management Impacts of Operations at Pantex Under Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

Waste Type[a]	Estimated Additional Waste Generation (m^3/yr)	Estimated Additional Waste Generation as a Percent of[b]		
		Characterization or Treatment Capacity	Storage Capacity	Disposal Capacity
TRU[c]	86	NA	NA	1 of WIPP
LLW	150	20	63	<1 of NTS
Mixed LLW	4	NA	NA	NA
Hazardous	5	1	NA	NA
Nonhazardous				
Liquid	51,000	NA	NA	5[d]
Solid	2,200	NA	NA	NA

[a] See definitions in Appendix F.8.

[b] Treatment capacities, and the disposal capacity for nonhazardous liquid waste, are compared with estimated additional annual waste generation. All other storage and disposal capacities are compared with total estimated additional waste generation assuming a 10-year operation period.

[c] Includes mixed TRU waste. Facilities are not expected to generate remotely handled TRU waste.

[d] Percent of capacity of the Wastewater Treatment Facility.

Key: DWPF, Defense Waste Processing Facility; LLW, low-level waste; NA, not applicable (i.e., the majority of this waste is not routinely treated, stored, or disposed of on the site); NTS, Nevada Test Site; TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated on the site or at other DOE sites or commercial facilities. According to the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Current schedules for shipment of TRU waste to WIPP would accommodate shipment of contact-handled TRU waste from surplus plutonium disposition facilities beginning in 2016 (DOE 1997c:17). Therefore, in order to be conservative, it is assumed the TRU waste would be stored on the site until 2016. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment and storage of radioactive, hazardous, mixed, and nonhazardous wastes at Pantex are described in the *Pantex Sitewide EIS* (DOE 1996c).

TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities. Drum-gas testing, real-time radiography, and loading the TRU Waste Package Transporter (TRUPACT) for shipment to WIPP would occur at new facilities at Pantex.

TRU waste generated at the pit conversion and MOX facilities at Pantex, is estimated to be a total of 860 m^3 (1,120 yd^3) over the 10-year operation period. Because TRU waste is not currently generated or stored at Pantex, storage space would be provided in the pit conversion and MOX facilities. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, storage areas of approximately 260 m^2 (2,800 ft^2) would be required in the pit conversion facility, and 960 m^2 (10,300 ft^2) would be required in the MOX facility. This would be 1.5 percent of the 17,345 m^2 (186,700 ft^2) of floor space available in the pit conversion facility, and 4.3 percent of the 22,350 m^2 (240,573 ft^2) of floor space in the MOX facility. Therefore, impacts of the management of TRU waste at Pantex should not be major.

The 1,810 m^3 (2,367 yd^3) of TRU wastes generated at Pantex and SRS would be 1 percent of the 143,000-m^3 (187,000-yd^3) contact-handled TRU waste that DOE plans to dispose of at WIPP and 1 percent of the current 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997e:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997e).

LLW generated at Pantex would be treated, packaged, certified, and accumulated at the pit conversion and MOX facilities before transfer for additional treatment and disposal in onsite and offsite facilities. LLW generated at the pit conversion facility is estimated to be 20 percent of the 750-m^3/yr (980-yd^3/yr) capacity of the planned Hazardous Waste Treatment and Processing Facility. Waste would be stored on the site on an interim basis before being shipped for offsite disposal. If the shipment of LLW to offsite disposal were delayed, about 1,500 m^3 (1,960 yd^3) of LLW may need to be stored at Pantex. This is about 63 percent of the approximately 2,400-m^3 (3,100-yd^3) of existing storage capacity at Pantex. Assuming that the waste were stored in 208-l (55-gal) drums that could be stacked two high, and allowing a 50 percent factor for aisle space, a storage area of about 0.22 ha (0.54 acre) is required. Therefore, impacts of the storage of additional quantities of LLW at Pantex should not be major.

LLW from Pantex is currently shipped to NTS for disposal. The 1,500 m^3 (1,960 yd^3) of additional LLW from operation of the pit conversion and MOX facilities at Pantex would be 8 percent of the 20,000-m^3 (26,000-yd^3) LLW disposed of at NTS in 1995 and less than 1 percent of the 500,000-m^3 (650,000-yd^3) disposal capacity at NTS. Using the 6,085 m^3/ha disposal land usage factor for NTS published in the *Storage and Disposition Final PEIS* (DOE 1996a:E-9), the additional LLW from Pantex would require 0.25 ha (0.62 acre) of disposal space at NTS or a similar facility. Therefore, impacts of the management of this additional LLW at NTS should not be major. Impacts of disposal of LLW at NTS are described in the *Final EIS for the NTS and Off-Site Locations in the State of Nevada* (DOE 1996d).

Mixed LLW would be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan for Pantex. Pantex currently ships mixed LLW to Envirocare of Utah and Diversified Scientific Services, Inc., of Tennessee. These facilities or other treatment or disposal facilities that meet DOE criteria would be used to manage the 40 m^3 (52 yd^3) of waste that would be generated. Therefore, the management of this additional waste at Pantex should not have a major impact on the mixed LLW management system.

Any hazardous wastes generated during operation at Pantex would be packaged in DOT-approved containers and shipped off the site to permitted commercial recycling, treatment, and disposal facilities. Because these wastes would be 1 percent of the 750-m^3/yr (980-yd^3/yr capacity of the planned Hazardous Waste Treatment and Processing Facility, the additional waste load generated during the operations period should not have a major impact on the Pantex hazardous waste management system. If all LLW and hazardous wastes generated at the pit conversion and MOX facilities at Pantex were processed in the planned Hazardous Waste Treatment and Processing Facility, this additional waste would be 21 percent of the 750-m^3/yr (980-yd^3/yr) capacity of that facility.

Nonhazardous solid waste would be packaged and transported in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent for offsite disposal. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at Pantex.

Nonhazardous wastewater generated by the pit conversion and MOX facilities would be treated if necessary before being discharged to the Pantex Wastewater Treatment Facility. Nonhazardous liquid waste generated by surplus plutonium disposition facilities at Pantex is estimated to be 5 percent of the 946,250-m^3/yr (1,237,700-yd^3/yr) capacity of the Wastewater Treatment Facility, and within the 473,125-m^3/yr (618,848-yd^3/yr)

excess capacity of the Wastewater Treatment Facility (M&H 1997:29). Therefore, management of nonhazardous liquid waste at Pantex should not have a major impact on the treatment system.

4.17.2.3 Socioeconomics

After construction, startup, and testing of the pit conversion and MOX facilities at Pantex in 2007 under Alternative 9, an estimated 785 new workers would be required to operate them (DOE 1999c; UC 1998e). This level of employment would be expected to generate another 2,659 indirect jobs within the region. The total employment requirement of 3,444 direct and indirect jobs in 2007 represents 1.3 percent of the projected workforce in the REA, and thus should have no major impact on the REA. It should also have little effect on community services within the Pantex ROI. In fact, it should help offset the 40 percent reduction in the Pantex labor force (i.e., from 2,944 to 1,750 workers) projected for the years 1997–2010.

Employment requirements for operation of the immobilization facility at SRS under Alternative 9 would be the same as those for Alternative 6A (see Section 4.10.2.3).

4.17.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment, and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 9 would be as follows.

Radiological Impacts. Table 4–127 reflects the potential radiological impacts on three individual receptor groups at Pantex and SRS: the population living within 80 km (50 mi) in the year 2010, the maximally exposed

Table 4–127. Potential Radiological Impacts on the Public of Operations Under Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	MOX[a]	Pantex Total	Immobilization Ceramic	Immobilization Glass
Population within 80 km for year 2010					
Dose (person-rem)	0.58	0.027	0.61	2.8×10^{-3}	2.6×10^{-3}
Percent of natural background[b]	5.8×10^{-4}	2.7×10^{-5}	6.1×10^{-4}	1.2×10^{-6}	1.1×10^{-6}
10-year latent fatal cancers	2.9×10^{-3}	1.3×10^{-4}	3.0×10^{-3}	1.4×10^{-5}	1.3×10^{-5}
Maximally exposed individual					
Annual dose (mrem)	0.062	0.015	0.077	2.8×10^{-5}	2.6×10^{-5}
Percent of natural background[b]	0.019	4.5×10^{-3}	0.024	9.5×10^{-6}	8.8×10^{-6}
10-year latent fatal cancer risk	3.1×10^{-7}	7.5×10^{-8}	3.9×10^{-7}	1.4×10^{-10}	1.3×10^{-10}
Average exposed individual within 80 km[c]					
Annual dose (mrem)	1.9×10^{-3}	8.8×10^{-5}	2.0×10^{-3}	3.6×10^{-6}	3.3×10^{-6}
10-year latent fatal cancer risk	9.5×10^{-9}	4.4×10^{-10}	9.9×10^{-9}	1.8×10^{-11}	1.6×10^{-11}

[a] As described in Section 4.26.3.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] The annual natural background radiation level at Pantex is 332 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 99,300 person-rem. The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive approximately 232,000 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Pantex (299,000) and the SRS APSF (approximately 790,000), if built, in 2010.

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility.

Source: Appendix J.

member of the public, and the average exposed member of the public. The table depicts the projected aggregate LCF risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Given incident-free operation of all three surplus plutonium disposition facilities, the total population dose in the year 2010 would be 0.61 person-rem at Pantex and 2.8×10^{-3} person-rem at SRS. The corresponding number of LCFs in the population from 10 years of operation would be 3.0×10^{-3} around Pantex and 1.4×10^{-5} around SRS. The total dose to the maximally exposed member of the public from annual operation of the pit conversion and MOX facilities at Pantex would be 0.077 mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 3.9×10^{-7}. The impacts on the average individual would be lower. The dose to the maximally exposed member of the public from annual operation of the immobilization facility at SRS would be 2.8×10^{-5} mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 1.4×10^{-10}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with the operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–128; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose to pit conversion and MOX facility workers would be 500 mrem and 65 mrem, respectively; to immobilization facility workers, 750 mrem. The annual dose received by the total site workforce for each of these facilities has been estimated at 192, 22, and 242 person-rem, respectively. The risks and numbers of latent fatal cancers among the different workers from 10 years of operation are included in Table 4–128. Doses to individual workers would be kept to minimal levels by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Table 4–128. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

Impact	Pit Conversion	MOX	Pantex Total	Immobilization (Ceramic or Glass)
Number of badged workers	383	331	714	323
Total dose (person-rem/yr)	192	22	214	242
10-year latent fatal cancers	0.77	0.088	0.86	0.97
Average worker dose (mrem/yr)	500	65	300[a]	750
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	1.2×10^{-3}	3.0×10^{-3}

[a] Represents an average of the doses for both facilities.

Key: DWPF, Defense Waste Processing Facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998e, 1998h, 1999c, 1999d.

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at Pantex under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released as a result of operations.

4.17.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion facility at Pantex are equivalent to those described for Alternative 4A (see Table 4–60) and the potential consequences from operation of the immobilization facility at SRS are equivalent to those included in Alternative 3 (see Tables 4–44 and 4–45). The potential impacts of such accidents from operation of the MOX facility at Pantex are presented in Table 4–129. Details on the method of analysis, assumptions and specific accident scenarios are presented in the discussion of Alternative 2 in Section 4.3.2.5.

Public. The most severe consequences of a design basis accident for the MOX facility would be a nuclear criticality. A nuclear criticality of 10^{19} fissions would result in an MEI dose of 0.047 rem at the MOX facility at Pantex, corresponding to an LCF probability of 2.3×10^{-5}. Among the general population in the environs of Pantex, an estimated 5.4×10^{-3} LCF could occur as a result of the MOX criticality accident. The frequency of such an accident at Pantex is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year. The most severe consequences of a design basis accident for the pit conversion facility and the immobilization facility are discussed in Section 4.6.2.5 and 4.4.2.5, respectively.

A beyond-design-basis earthquake at Pantex could result in collapse of the pit conversion (as described in Section 4.6.2.5) and MOX facilities (as described below), and an estimated 5.1 LCFs among the general

population. It should be emphasized that a seismic event of sufficient magnitude to collapse these facilities would likely cause the collapse of other DOE facilities, and would almost certainly cause widespread failure of homes, office buildings, and other structures in the surrounding area. The overall impact of such an event must therefore be seen in the context not only of the potential radiological impacts of these other facilities, but

Table 4–129. Accident Impacts of MOX Facility Under Alternative 9: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in New Construction and DWPF at SRS

		Impacts on Noninvolved Worker		Impact at Site Boundary		Impacts on Population Within 80 km	
Accident	Frequency (per year)	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (rem)[a]	Probability of Cancer Fatality[b]	Dose (person-rem)[a]	Latent Cancer Fatalities[c]
Criticality	Extremely unlikely	2.4×10^{-1}	9.5×10^{-5}	4.7×10^{-2}	2.3×10^{-5}	1.1×10^{1}	5.4×10^{-3}
Explosion in sintering furnace	Extremely unlikely	8.9×10^{-4}	3.5×10^{-7}	1.3×10^{-4}	6.6×10^{-8}	4.2×10^{-2}	2.1×10^{-5}
Ion exchange exotherm	Unlikely	3.9×10^{-5}	1.5×10^{-8}	5.8×10^{-6}	2.9×10^{-9}	1.8×10^{-3}	9.0×10^{-7}
Fire	Unlikely	6.4×10^{-6}	2.6×10^{-9}	9.6×10^{-7}	4.8×10^{-10}	3.0×10^{-4}	1.5×10^{-7}
Spill	Extremely unlikely	8.1×10^{-6}	3.2×10^{-9}	1.2×10^{-6}	6.0×10^{-10}	3.8×10^{-4}	1.9×10^{-7}
Design basis earthquake	Unlikely	1.3×10^{-4}	5.1×10^{-8}	1.9×10^{-5}	9.4×10^{-9}	5.9×10^{-3}	3.0×10^{-6}
Beyond-design-basis fire	Beyond extremely unlikely	9.9×10^{-2}	4.0×10^{-5}	1.6×10^{-2}	7.8×10^{-6}	4.6	2.3×10^{-3}
Beyond-design-basis earthquake	Extremely unlikely to beyond extremely unlikely	1.6×10^{2}	6.3×10^{-2}	2.5×10^{1}	1.2×10^{-2}	7.3×10^{3}	3.6
Aircraft crash[d]	Beyond extremely unlikely	1.2×10^{3}	4.7×10^{-1}	1.9×10^{2}	9.3×10^{-2}	5.4×10^{4}	2.7×10^{1}

[a] For 95th percentile meteorological conditions. With the exception of doses due to criticality, the stated doses are from the inhalation of plutonium, and represent dose commitments that would be received over the lifetime of the impacted individual. See Appendix K.1.4.2 for a more detailed discussion of pathways.

[b] Increased likelihood (or probability) of cancer fatality for a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or for a hypothetical individual in the offsite population at the site boundary) if exposed to the indicated dose. The value that assumes that the accident has occurred.

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose. The value assumes that the accident has occurred.

[d] For the aircraft crash accident, the dose at 1,000 m (3,281 ft) is beyond the range of applicability of the standard probability coefficient for determining the likelihood of fatal cancer (i.e., 4×10^{-4} latent cancer fatality per rem). The standard coefficient would tend to overstate the cancer fatality risk at the stated dose. Also, the dose may be in the range where subacute injury is an additional concern.

Key: DWPF, Defense Waste Processing Facility.

Source: Calculated using the source terms in Table K–12 and the MACCS2 computer code.

of hundreds, possibly thousands, of immediate fatalities from falling debris. The frequency of an earthquake of this magnitude at Pantex is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year.

A beyond-design-basis aircraft crash at Pantex, involving a large commercial or military jet aircraft was also evaluated based on public interest. This crash could result in penetration of the surplus plutonium disposition facilities by a crash-induced missile such as a jet turbine shaft causing a release of plutonium resulting in LCFs among the general population. Penetration of the MOX facility could result in 27 LCFs. Penetration of the pit conversion facility would be equivalent to the accident described in Section 4.6.2.5. Other possible consequences of such a crash include immediate fatality to the aircraft occupants, as well as serious injuries and fatalities to persons in the facility and the surrounding area who are hit by aircraft or building debris. The frequency of such an airplane crash is estimated to be less than 1 in 1,000,000 per year.

The beyond-design-basis accident at SRS would be equivalent to that discussed in Section 4.4.2.5.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition Final PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. For design basis accidents, the radiological consequences for this worker were estimated to be highest for the criticality at the MOX facility. The consequences of such an accident would include an LCF probability of 9.5×10^{-5}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would either be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at Pantex and SRS could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated employment of 11,535 person-years of labor and the standard DOE occupational accident rates, approximately 420 cases of nonfatal occupational injury or illness and 0.31 fatality could be expected for the duration of operations.

4.17.2.6 Transportation

Operational transportation impacts may be divided into two parts: impacts due to incident-free transportation and those due to transportation accidents. They may be further divided into nonradiological and radiological impacts. Nonradiological impacts are specifically vehicular, such as vehicular emissions and traffic accidents. Radiological impacts are those related to the dose received by transportation workers and the public during normal operations

and in the case of accidents in which the radioactive materials being shipped may be released. For more detailed information on the transportation analysis performed for this SPD EIS, see Appendix L.

Under Alternative 9, transportation to and from Pantex would include the shipment of plutonium pits and clean plutonium metal via SST/SGT from sites throughout the DOE complex to the pit conversion facility.[24] During dismantlement of the pits, some HEU would be recovered. The pit conversion facility would ship HEU via SST/SGT to ORR for storage.[25] After conversion, the plutonium in the pit conversion facility would be in the form of plutonium dioxide. This material would be transferred through a secure tunnel to the MOX facility at Pantex for fabrication into MOX fuel pellets.

MOX fuel fabrication also requires uranium dioxide. Quantifying the uranium dioxide transportation requirements for this SPD EIS involved selecting representative sites for the source of the depleted uranium hexafluoride and the conversion facility. A DOE enrichment facility near Portsmouth, Ohio, was chosen as a representative site for the source of the depleted uranium hexafluoride, and the nuclear fuel fabrication facility in Wilmington, North Carolina, as representative of a uranium conversion facility. These sites were also used as representative sites in the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996e). It is assumed that depleted uranium hexafluoride needed for MOX fuel would be shipped via commercial truck to the uranium conversion facility, where it would converted into uranium dioxide (see Section 4.3.2.6). After conversion, the depleted uranium dioxide would be shipped via commercial truck from the conversion facility to the MOX facility at Pantex. This material would be blended with plutonium dioxide at the MOX facility, fabricated into MOX fuel pellets, and placed in MOX fuel rods. After fabrication, the MOX fuel rods would be shipped to a domestic reactor site, where they would be placed in fuel assemblies and irradiated. Shipments of unirradiated MOX fuel rods would be made in an SST/SGT because unirradiated MOX fuel in large enough quantities is subject to the same security concerns as pure weapons-grade plutonium. It is assumed in this transportation analysis that all MOX fuel is shipped from the MOX facility to the most distant reactor site, North Anna.

Immobilization at SRS under this alternative would require that surplus nonpit plutonium in various forms be shipped from current storage locations (i.e., SRS, Hanford, INEEL, LLNL, LANL, and RFETS) to the immobilization facility at SRS. Even though these materials are not clean plutonium metal or pits, the quantity of the plutonium contained in them would require that they be treated as materials that could be used in nuclear weapons, and thus that shipments be made in SST/SGTs.

Under the preferred technology alternative for immobilization, the surplus plutonium would be immobilized in a ceramic matrix in small cans at the immobilization facility, placed in HLW canisters, and transported via specially designed trucks to DWPF in S-Area. This intrasite transportation—from F-Area to S-Area—could require the temporary shutdown of roads on SRS. It would, however, provide for all the necessary security and for reduced risk to the public; SST/SGTs would not be required.

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[24] Work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 SI container for long-term storage. This effort would be completed over 10 years, and the estimated dose to involved workers received from this repackaging activity would be about 104 person-rem. The SPD Draft EIS analyzed repackaging of the pits in an AT–400A container. The change to the AL–R8 SI changes the long-term storage period for pits from 50 to 30 years because of the need to replace a seal in the container after 30 years; the AT–400A does not require that activity. After seal replacement, the pits could continue to be stored for another 30 years.

[25] Classified nuclear material parts would also result from pit disassembly. Although current plans are to store these parts at the pit conversion facility, this SPD EIS analyzes the possible transport of these nuclear material parts to LANL. Therefore, the transportation impacts are slightly overstated.

Use of the preferred ceramic (versus glass) matrix for immobilization would also require a small amount of depleted uranium dioxide (i.e., less than 10 t [11 tons] per year). It is assumed that this depleted uranium dioxide would be produced and shipped in the same manner as the depleted uranium dioxide needed by the MOX facility.

After the immobilized plutonium was encased by HLW at DWPF, it would eventually be shipped to a potential geologic repository for ultimate disposition. Because HLW would be displaced by the cans of immobilized plutonium suspended in the HLW canister, additional canisters—to accommodate the displaced HLW—would be required over the life of the immobilization program. According to estimates, up to 145 additional canisters of HLW would be needed to meet the demands of surplus plutonium disposition under Alternative 9. The *Yucca Mountain Draft EIS* evaluates different options for the shipment of these canisters to a potential geologic repository using either trucks or trains. The analysis revealed that shipment by train would pose the lower risk. However, no ROD has yet been issued regarding these shipments. To bound the risks associated with these additional shipments, this SPD EIS conservatively assumes that all of these shipments would be made by truck, one canister per truck.

Every alternative considered in this SPD EIS would require routine transportation of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities on the sites. This transportation would be handled in the same manner as other site waste shipments, and as shown in Sections 4.17.1.2 and 4.17.2.2, would involve no major increase in the amounts of waste already being managed at these sites. The shipments would pose no greater risks than the ordinary waste shipments at these sites as analyzed in the WM PEIS.

However, TRU waste generated at Pantex was not covered by the WM PEIS ROD as there was no such waste at Pantex at the time the ROD was issued, and none was likely to be generated in ongoing site operations. Location of the pit conversion facility at Pantex would result in the generation of TRU waste, as described in Section 4.17.2.2. Moreover, a fairly large increase in the amount of LLW at Pantex (i.e., 39 percent of the site's current storage capacity) could be expected under this alternative. Currently, this type of waste is shipped to the NTS for disposal. In order to account for the transportation of TRU waste from Pantex to WIPP, and LLW from Pantex to NTS, additional shipments are analyzed in this SPD EIS.

In all, approximately 2,000 shipments of radioactive materials would be carried out by DOE under this alternative. The total distance traveled on public roads by trucks carrying radioactive materials would be 4.8 million km (3.0 million mi).

Impacts of Incident-Free Transportation. The dose to transportation workers from all transportation activities entailed by this alternative has been estimated at 60 person-rem; the dose to the public, 69 person-rem. Accordingly, incident-free transportation of radioactive material associated with this alternative would result in 0.024 LCF among transportation workers and 0.034 LCF in the total affected population over the duration of the transportation activities. The estimated number of nonradiological fatalities from vehicular emissions associated with this alternative is 0.019.

Impacts of Accidents During Transportation (Consequences). The maximum foreseeable offsite transportation accident under this alternative (probability of occurrence: greater than 1 in 10 million per year) is a shipment of surplus nonpit plutonium from a DOE storage facility to SRS with a severity category VIII accident in a rural population zone under neutral (average) weather conditions. Because surplus nonpit plutonium shipments include plutonium oxide, an accident involving plutonium oxide is conservatively used to estimate the impacts of the maximum foreseeable accident. If this accident were to occur, it could result in a dose of 624 person-rem to the public for an LCF risk of 0.31 and 684 rem to the hypothetical MEI for an LCF risk of 0.68. (The MEI receives a larger dose than the population because it is unlikely that a person would be in position, and remain in position, to receive this hypothetical maximum dose.) No fatalities would be expected to occur. The probability of more severe accidents, different weather conditions at the time of accident, or occurrence in a

more densely populated area were also evaluated, and estimated to have a probability lower than 1 chance in 10 million per year. (See Appendix L.6.)

Impacts of Accidents During Transportation (Risks). The total ground transportation accident risks were estimated by summing the risks to the affected population from all hypothetical accidents. For Alternative 9, those risks are as follows: a radiological dose to the population of 7 person-rem, resulting in a total population risk of 0.004 LCF; and traffic accidents resulting in 0.052 fatality.

4.17.2.7 Environmental Justice

As discussed in other parts of Section 4.17.2, routine operations conducted under Alternative 9 would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near Pantex would be approximately 1 in 3 million (see Table 4–127); the likelihood for the MEI residing near SRS would be essentially zero. The number of LCFs expected among the general population residing near Pantex and SRS from accident-free operations would increase by approximately 3.0×10^{-3} and 1.4×10^{-5}, respectively.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public (see Section 4.17.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–44, 4–45, 4–60, and 4–129). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the sites pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.17.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 9 would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

4.18 [Section deleted because alternative deleted.]

4.19 ALTERNATIVE 10

Alternative 10 would involve constructing and operating the pit conversion and MOX facilities in Zone 4 West at Pantex and the immobilization facility in the existing FMEF building in the 400 Area at Hanford. Activities at Pantex would be the same as under Alternative 9 and activities at Hanford would be the same as under Alternative 8.

4.19.1 Construction

4.19.1.1 Air Quality and Noise

Potential air quality and noise impacts of construction under Alternative 10 at Pantex are the same as those for Alternative 9 (see Section 4.17.1.1).

Potential air quality and noise impacts of construction under Alternative 10 at Hanford are the same as those for Alternative 8 (see Section 4.16.1.1).

4.19.1.2 Waste Management

At Pantex, construction impacts of this alternative would be the same as for Alternative 9. See Section 4.17.1.2 for a description of the impacts of this alternative on the waste management infrastructure at Pantex.

At Hanford, construction impacts of this alternative would be the same as for Alternative 8. See Section 4.16.1.2 for a description of the impacts of this alternative on the waste management infrastructure at Hanford.

4.19.1.3 Socioeconomics

Construction-related employment requirements for Alternative 10 would be as indicated in Table 4–130.

Table 4–130. Construction Employment Requirements for Alternative 10: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in FMEF and HLWVF at Hanford

Year	Pit Conversion	MOX	Immobilization	Total
2001	297	0	0	297
2002	451	441	207	1,099
2003	276	772	376	1,424
2004	0	508	414	922
2005	0	221	226	447
2006	0	208	0	208

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.
Source: DOE 1999c; UC 1998e, UC 1999a, 1999b.

Employment requirements for construction of the new pit conversion and MOX facilities at Pantex under this alternative would be the same as those for Alternative 9 (see Section 4.17.1.3).

Employment requirements for construction of the immobilization facility at Hanford under this alternative would be the same as those for Alternative 8 (see Section 4.16.1.3).

4.19.1.4 Human Health Risk

Radiological Impacts. No radiological risk would be incurred by members of the public from construction activities. According to recent radiation surveys (DOE 1997f; Antonio 1998) conducted in the Zone 4 area at Pantex and 400-Area at Hanford, construction workers would not be expected to receive any additional radiation exposure above natural background levels in those areas. Nonetheless, if deemed necessary, construction workers may be monitored (badged) as a precautionary measure.

Hazardous Chemical Impacts. The probability of excess latent cancer incidence associated with exposure to benzene released as a result of construction activities at Pantex under this alternative has been estimated to be much less than 1 chance in 1 million over the lifetime of the maximally exposed member of the public.

No hazardous chemicals would be released at Hanford under this alternative; thus, no cancer or adverse, noncancer health effects would occur.

4.19.1.5 Facility Accidents

The construction of surplus plutonium disposition facilities at Pantex and Hanford could result in worker injuries or fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated 4,397 person-years of construction labor and standard industrial accident rates, approximately 440 cases of nonfatal occupational injury or illness and 0.61 fatality could be expected (DOL 1997a, 1997b). As all construction would be in nonradiological areas, no radiological accidents should occur.

4.19.1.6 Environmental Justice

As discussed in the other parts of Section 4.19.1, construction under Alternative 10 would pose no significant health risks to the public. The risks would be negligible regardless of the racial or ethnic composition or the economic status of the population. Therefore, construction activities under Alternative 10 at Pantex and Hanford would have no significant impacts on minority or low-income populations.

4.19.2 Operations

4.19.2.1 Air Quality and Noise

Potential air quality and noise impacts of the operation of facilities under Alternative 10 at Pantex are the same as those for Alternative 9 (see Section 4.17.2.1).

Potential air quality and noise impacts of the operation of the immobilization facility under Alternative 10 at Hanford are the same as those for Alternative 8 (see Section 4.16.2.1).

The combustion of fossil fuels associated with Alternative 10 would result in the emission of carbon dioxide, which is one of the atmospheric gases that are believed to influence the global climate. Annual carbon dioxide emissions from this alternative represent less than 1×10^{-4} percent of the 1995 annual U.S. emissions of carbon dioxide from fossil fuel combustion and industrial processes.

4.19.2.2 Waste Management

At Pantex, impacts of operations for this alternative would be the same as for Alternative 9. See Section 4.17.2.2 for a description of the impacts of this alternative on the waste management infrastructure at Pantex.

At Hanford, impacts of operations for this alternative would be the same as for Alternative 8. See Section 4.16.2.2 for a description of the impacts of this alternative on the waste management infrastructure at Hanford.

4.19.2.3 Socioeconomics

Employment requirements for operation of the pit conversion and MOX facilities at Pantex under Alternative 10 would be the same as those for Alternative 9 (see Section 4.17.2.3).

Employment requirements for operation of the immobilization facility at Hanford under Alternative 10 would be the same as those for Alternative 8 (see Section 4.16.2.3).

4.19.2.4 Human Health Risk

During normal operations, there would be both radiological and hazardous chemical releases to the environment, and also direct in-plant exposures. The resulting doses to, and potential health effects on, the public and workers under Alternative 10 would be as follows.

Radiological Impacts. Table 4–131 reflects the potential radiological impacts on three individual receptor groups at Pantex and Hanford: the population living within 80 km (50 mi) in the year 2010, the maximally exposed member of the public, and the average exposed member of the public. The table depicts the projected aggregate LCF risk to these groups from 10 years of incident-free operation. To put operational doses into perspective, comparisons with doses from natural background radiation are also provided in the table.

Table 4–131. Potential Radiological Impacts on the Public of Operations Under Alternative 10: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in FMEF and HLWVF at Hanford

Impact	Pit Conversion	MOX[a]	Pantex Total	Immobilization Ceramic	Immobilization Glass
Population within 80 km for year 2010					
Dose (person-rem)	0.58	0.027	0.61	7.8×10^{-3}	7.1×10^{-3}
Percent of natural background[b]	5.8×10^{-4}	2.7×10^{-5}	6.1×10^{-4}	6.7×10^{-6}	6.1×10^{-6}
10-year latent fatal cancers	2.9×10^{-3}	1.3×10^{-4}	3.0×10^{-3}	3.9×10^{-5}	3.6×10^{-5}
Maximally exposed individual					
Annual dose (mrem)	0.062	0.015	0.077	1.1×10^{-4}	9.7×10^{-5}
Percent of natural background[b]	0.019	4.5×10^{-3}	0.024	3.7×10^{-5}	3.2×10^{-5}
10-year latent fatal cancer risk	3.1×10^{-7}	7.5×10^{-8}	3.9×10^{-7}	5.5×10^{-10}	4.9×10^{-10}
Average exposed individual within 80 km[c]					
Annual dose (mrem)	1.9×10^{-3}	8.8×10^{-5}	2.0×10^{-3}	2.0×10^{-5}	1.8×10^{-5}
10-year latent fatal cancer risk	9.5×10^{-9}	4.4×10^{-10}	9.9×10^{-9}	1.0×10^{-10}	9.0×10^{-11}

[a] As described in Section 4.26.3.2.2., Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] The annual natural background radiation level at Pantex is 332 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 99,300 person-rem. The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Pantex (299,000) and Hanford (387,800) in 2010.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Source: Appendix J.

Given incident-free operation of all three facilities, the total population dose in the year 2010 would be 0.61 person-rem at Pantex and 7.8×10^{-3} person-rem at Hanford. The corresponding number of LCFs in the population from 10 years of operation would be 3.0×10^{-3} around Pantex and 3.9×10^{-5} around Hanford. The total dose to the maximally exposed member of the public from annual operation of the pit conversion and MOX facilities at Pantex would be 0.077 mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 3.9×10^{-7}. The impacts on the average individual would be lower. The dose to the maximally exposed member of the public from annual operation of the immobilization facility at Hanford would be 1.1×10^{-4} mrem. From 10 years of operation, the corresponding LCF risk to this individual would be 5.5×10^{-10}. The impacts on the average individual would be lower.

Estimated impacts resulting from "Total Site" operations are given in the Cumulative Impacts section of this SPD EIS (see Section 4.32). Within that section, projected incremental impacts associated with the operation of the proposed surplus plutonium disposition facilities are added to the impacts of other past, present, and reasonably foreseeable future actions at or near the candidate sites. These impacts are then compared against applicable regulatory standards established by DOE, EPA, and NRC (such as DOE Order 5400.5, the CAA [NESHAPs], the SDWA, and 10 CFR 20).

Doses to involved workers from normal operations are given in Table 4–132; these workers are defined as those directly associated with process activities. Under this alternative, the annual average dose to pit conversion and MOX facility workers would be 500 mrem and 65 mrem, respectively; to immobilization facility workers, 750 mrem. The annual dose received by the total site workforce for each of the facilities has been estimated at 192, 22, and 242 person-rem, respectively. The risks and numbers of LCFs among the different workers from

10 years of operation are included in Table 4–132. Doses to individual workers would be kept to minimal levels by instituting badged monitoring, administrative limits, and ALARA programs (which would include worker rotations).

Table 4–132. Potential Radiological Impacts on Involved Workers of Operations Under Alternative 10: Pit Conversion and MOX in New Construction at Pantex, and Immobilization in FMEF and HLWVF at Hanford

Impact	Pit Conversion	MOX	Pantex Total	Immobilization (Ceramic or Glass)
Number of badged workers	383	331	714	323
Total dose (person-rem/yr)	192	22	214	242
10-year latent fatal cancers	0.77	0.088	0.86	0.97
Average worker dose (mrem/yr)	500	65	300[a]	750
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	1.2×10^{-3}	3.0×10^{-3}

[a] Represents an average of the doses for both facilities.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995d and NRC 1999a). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994a). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999c; UC 1998e, 1998h, 1999a, 1999b.

Hazardous Chemical Impacts. No hazardous chemicals would be released as a result of operations at Pantex under this alternative; thus, no cancer or adverse, noncancer health effects would occur. No carcinogenic chemicals would be released as a result of operations.

No hazardous chemicals would be released as a result of operations at Hanford under this alternative; thus, no cancer or adverse noncancer health effects would occur.

4.19.2.5 Facility Accidents

The potential consequences of postulated bounding facility accidents from operation of the pit conversion facility at Pantex are equivalent to those included in Alternative 4A (see Table 4–60); potential consequences from operation of the MOX facilities at Pantex would be equivalent to those included in Alternative 9 (see Table 4–129); and potential consequences from operation of the immobilization facility at Hanford, equivalent to those included in Alternative 2 (see Tables 4–31 and 4–32). More details on the method of analysis, assumptions, and specific accident scenarios are presented in the discussion of Alternative 2 in Section 4.3.2.5.

Public. The most severe consequences of a design basis accident at the pit conversion facility are discussed in Section 4.6.2.5. The most severe design basis accident, a nuclear criticality, at the immobilization and MOX facilities are discussed in Sections 4.3.2.5 and 4.17.2.5, respectively.

The beyond-design-basis accidents at Pantex would be equivalent to those discussed in Section 4.17.2.5. The beyond-design-basis accident at Hanford would be equivalent to that discussed in Section 4.16.2.5.

Noninvolved Worker. Consistent with the analysis presented in the *Storage and Disposition PEIS*, the noninvolved worker is a hypothetical individual working on the site but not involved in the proposed action, and assumed to be 1,000 m (3,281 ft) from the location of the accident or at the site boundary, whichever is closer, and downwind from that location. The consequences for this worker were estimated to be highest for the

criticality at the MOX facility. The consequences of such an accident would include an LCF probability of 9.5×10^{-5}.

Maximally Exposed Involved Worker. No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would either be able to evacuate immediately or would not be affected by the events. Explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality occurred, workers within tens of meters could receive very high to fatal radiation exposures from the initial burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the accident. The design basis and beyond-design-basis earthquakes would also have substantial consequences, ranging from workers being killed by debris from collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For most accidents, immediate emergency response actions should reduce the consequences to workers near the accident. As discussed in the Emergency Preparedness sections of Chapter 3, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

Nonradiological Accidents. Surplus plutonium disposition operations at Pantex and Hanford could result in worker injuries and fatalities. DOE-required industrial safety programs would be in place to reduce the risks. Given the estimated employment of 11,535 person-years of labor and the standard DOE occupational accident rates, approximately 420 cases of nonfatal occupational injury or illness and 0.31 fatality could be expected for the duration of operations.

4.19.2.6 Transportation

Operational transportation impacts may be divided into two parts: impacts due to incident-free transportation and those due to transportation accidents. They may be further divided into nonradiological and radiological impacts. Nonradiological impacts are specifically vehicular, such as vehicular emissions and traffic accidents. Radiological impacts are those related to the dose received by transportation workers and the public during normal operations and in the case of accidents in which the radioactive materials being shipped may be released. For more detailed information on the transportation analysis performed for this SPD EIS, see Appendix L.

Under Alternative 10, transportation to and from Pantex would include the shipment of plutonium pits and clean plutonium metal via SST/SGT from sites throughout the DOE complex to the pit conversion facility.[26] During dismantlement of the pits, some HEU would be recovered. The pit conversion facility would ship HEU via SST/SGT to ORR for storage.[27] After conversion, the plutonium in the pit conversion facility would be in the form of plutonium dioxide. This material would be transferred through a secure tunnel to the MOX facility at Pantex for fabrication into MOX fuel pellets.

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[26] Work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 SI container for long-term storage. This effort would be completed over 10 years, and the estimated dose to involved workers received from this repackaging activity would be about 104 person-rem. The SPD Draft EIS analyzed repackaging of the pits in an AT–400A container. The change to the AL–R8 SI changes the long-term storage period for pits from 50 to 30 years because of the need to replace a seal in the container after 30 years; the AT–400A does not require that activity. After seal replacement, the pits could continue to be stored for another 30 years.

[27] Classified nuclear material parts would also result from pit disassembly. Although current plans are to store these parts at the pit conversion facility, this SPD EIS analyzes the possible transport of these nuclear material parts to LANL. Therefore, the transportation impacts are slightly overstated.

MOX fuel fabrication also requires uranium dioxide. Quantifying the uranium dioxide transportation requirements for this SPD EIS involved selecting representative sites for the source of the depleted uranium hexafluoride and the conversion facility. A DOE enrichment facility near Portsmouth, Ohio, was chosen as a representative site for the source of the depleted uranium hexafluoride, and the nuclear fuel fabrication facility in Wilmington, North Carolina, as representative of a uranium conversion facility. These sites were also used as representative sites in the *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996e). It is assumed that depleted uranium hexafluoride needed for MOX fuel would be shipped via commercial truck to the uranium conversion facility, where it would converted into uranium dioxide (see Section 4.3.2.6). After conversion, the depleted uranium dioxide would be shipped via commercial truck from the conversion facility to the MOX facility at Pantex. This material would be blended with plutonium dioxide at the MOX facility, fabricated into MOX fuel pellets, and placed in MOX fuel rods. After fabrication, the MOX fuel rods would be shipped to a domestic reactor site, where they would be placed in fuel assemblies and irradiated. Shipments of unirradiated MOX fuel rods would be made in an SST/SGT because unirradiated MOX fuel in large enough quantities is subject to the same security concerns as pure weapons-grade plutonium. It is assumed in this transportation analysis that all MOX fuel is shipped from the MOX facility to the most distant reactor site, North Anna.

Immobilization at Hanford under this alternative would require that surplus nonpit plutonium in various forms be shipped from current storage locations (i.e., SRS, Hanford, INEEL, LLNL, LANL, and RFETS) to the immobilization facility at Hanford. Even though these materials are not clean plutonium metal or pits, the quantity of the plutonium contained in them would require that they be treated as materials that could be used in nuclear weapons, and thus that shipments be made in SST/SGTs.

Under the preferred technology alternative for immobilization, the surplus plutonium would be immobilized in a ceramic matrix in small cans at the immobilization facility, placed in HLW canisters, and transported via specially designed trucks to HLWVF in 200 Area. This intrasite transportation—from 400 Area to 200 Area—could require the temporary shutdown of roads on Hanford. It would, however, provide for all the necessary security and for reduced risk to the public; SST/SGTs would not be required.

Use of the preferred ceramic (versus glass) matrix for immobilization would also require a small amount of depleted uranium dioxide (i.e., less than 10 t [11 tons] per year). It is assumed that this depleted uranium dioxide would be produced and shipped in the same manner as the depleted uranium dioxide needed by the MOX facility.

After the immobilized plutonium was encased by HLW at HLWVF, it would be shipped to a potential geologic repository for ultimate disposition. Because HLW would be displaced by the cans of immobilized plutonium suspended in the HLW canister, additional canisters—to accommodate the displaced HLW—would be required over the life of the immobilization program. According to estimates, up to 145 additional canisters of HLW would be needed to meet the demands of surplus plutonium disposition under Alternative 10. The *Yucca Mountain Draft EIS* evaluates different options for the shipment of these canisters to a potential geologic repository using either trucks or trains. The analysis revealed that shipment by train would pose the lower risk. However, no ROD has yet been issued regarding these shipments. To bound the risks associated with these additional shipments, this SPD EIS conservatively assumes that all of these shipments would be made by truck, one canister per truck.

Every alternative considered in this SPD EIS would require routine transportation of wastes from the proposed disposition facilities to treatment, storage, or disposal facilities on the sites. This transportation would be handled in the same manner as other site waste shipments, and as shown in Sections 4.19.1.2 and 4.19.2.2, would involve no major increase in the amounts of waste already being managed at these sites. The shipments would pose no greater risks than the ordinary waste shipments at these sites as analyzed in the WM PEIS.

However, TRU waste generated at Pantex was not covered by the WM PEIS ROD as there was no such waste at Pantex at the time the ROD was issued, and none was likely to be generated in ongoing site operations. Location of the pit conversion and MOX facilities at Pantex would result in the generation of TRU waste, as described in Section 4.19.2.2. Moreover, a fairly large increase in the amount of LLW at Pantex (i.e., 39 percent of the site's current storage capacity) could be expected under this alternative. Currently, this type of waste is shipped to the NTS for disposal. In order to account for the transportation of TRU waste from Pantex to WIPP, and LLW from Pantex to NTS, additional shipments are analyzed in this SPD EIS.

In all, approximately 1,900 shipments of radioactive materials would be carried out by DOE under this alternative. The total distance traveled on public roads by trucks carrying radioactive materials would be 3.6 million km (2.2 million mi).

Impacts of Incident-Free Transportation. The dose to transportation workers from all transportation activities entailed by this alternative has been estimated at 29 person-rem; the dose to the public, 39 person-rem. Accordingly, incident-free transportation of radioactive material associated with this alternative would result in 0.012 LCF among transportation workers and 0.019 LCF in the total affected population over the duration of the transportation activities. The estimated number of nonradiological fatalities from vehicular emissions associated with this alternative is 0.012.

Impacts of Accidents During Transportation (Consequences). The maximum foreseeable offsite transportation accident under this alternative (probability of occurrence: greater than 1 in 10 million per year) is a shipment of surplus nonpit plutonium from a DOE storage facility to Hanford with a severity category VIII accident in a rural population zone under neutral (average) weather conditions. Because surplus nonpit plutonium shipments include plutonium oxide, an accident involving plutonium oxide is conservatively used to estimate the impacts of the maximum foreseeable accident. If this accident were to occur, it could result in a dose of 624 person-rem to the public for an LCF risk of 0.3 and 684 rem to the hypothetical MEI for an LCF risk of 0.68. (The MEI receives a larger dose than the population because it is unlikely that a person would be in position, and remain in position, to receive this hypothetical maximum dose.) No fatalities would be expected to occur. The probability of more severe accidents, different weather conditions at the time of accident, or occurrence in a more densely populated area were also evaluated, and estimated to have a probability lower than 1 chance in 10 million per year. (See Appendix L.6.)

Impacts of Accidents During Transportation (Risks). The total transportation accident risks were estimated by summing the risks to the affected population from all hypothetical accidents. For Alternative 10, those risks are as follows: a radiological dose to the population of 7 person-rem, resulting in a total population risk of 0.003 LCF; and traffic accidents resulting in 0.043 fatality.

4.19.2.7 Environmental Justice

As discussed in other parts of Section 4.19.2, routine operations conducted under Alternative 10 would pose no significant health risks to the public. The likelihood of an LCF for the MEI residing near Pantex would be approximately 1 in 3 million (see Table 4–131); the likelihood for the MEI residing near Hanford would be essentially zero. The number of LCFs expected among the general population residing near Pantex and Hanford from accident-free operations would increase by approximately 3.0×10^{-3} and 3.9×10^{-5}, respectively.

Design basis accidents at the sites would not be expected to cause cancer fatalities among the public (see Section 4.19.2.5). A beyond-design-basis earthquake would be expected to result in LCFs among the general population (see Tables 4–31, 4–32, 4–60, and 4–129). However, it is highly unlikely that a beyond-design-basis earthquake would occur. Accidents at the sites pose no significant risks (when the probability of occurrence is considered) to the population residing within the area potentially affected by radiological contamination.

As described in Section 4.19.2.6, no radiological or nonradiological fatalities would be expected to result from accident-free transportation conducted under this alternative. Nor would radiological or nonradiological fatalities be expected to result from transportation accidents.

Thus, implementation of Alternative 10 would pose no significant risks to the public, nor would implementation of this alternative pose significant risks to groups within the public, including the risk of disproportionately high and adverse effects on minority and low-income populations.

Chapter 5
Environmental Regulations, Permits, and Consultations

5.1 LAWS, REGULATIONS, EXECUTIVE ORDERS, AND DOE ORDERS

The major Federal laws, regulations, Executive orders, and other compliance actions that potentially apply to surplus plutonium disposition activities, depending on the various alternatives, are identified in Table 5–1.[1] There are a number of Federal environmental statutes dealing with environmental protection, compliance, or consultation that affect compliance at every U.S. Department of Energy (DOE) location. In addition, certain environmental requirements have been delegated to State authorities for enforcement and implementation. It is DOE policy to conduct its operations in an environmentally safe manner in compliance with all applicable statutes, regulations, and standards. Although this chapter does not address pending legislation or future regulations, DOE recognizes that the regulatory environment is in transition, and subject to many changes, and that the construction, operation, and decommissioning of any surplus plutonium disposition facility must be conducted in compliance with all applicable regulations and standards.

The Atomic Energy Act of 1954 authorizes DOE to establish standards to protect health or minimize dangers to life or property for activities under DOE's jurisdiction. Through a series of DOE orders and regulations, an extensive system of standards and requirements has been established to ensure safe operation of facilities. DOE regulations are generally found in Title 10 of the Code of Federal Regulations (CFR). For purposes of this *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS), relevant regulations include 10 CFR 820, *Procedural Rules for DOE Nuclear Activities;* 10 CFR 830, *Nuclear Safety Management;* 10 CFR 834, *Radiation Protection of the Public and the Environment (Draft);* 10 CFR 835, *Occupational Radiation Protection;* 10 CFR 1021, *National Environmental Policy Act Implementing Procedures;* and 10 CFR 1022, *Compliance with Floodplains/Wetlands Environmental Review Requirements*. The DOE orders have been revised and reorganized to reduce duplication and eliminate obsolete provisions (though some older orders remain in effect during the transition). The new organization is by Series and is generally intended to include all DOE policies, orders, manuals, requirements documents, notices, and guides. Relevant DOE orders include those in the new Series 400, which deals with Work Process. Within this Series, DOE Order 420.1 addresses *Facility Safety*; 425.1A, *Startup and Restart of Nuclear Facilities*; 452.1A, *Nuclear Explosive and Weapons Surety Programs*; 452.2A, *Safety of Nuclear Explosives Operations*; 452.4, *Security and Control of Nuclear Explosives and Nuclear Weapons*; 460.1A, *Packaging and Transportation Safety*; 470.1, *Safeguards and Security Program*; and Manual 474.1, *Nuclear Materials Management and Safeguards System Reporting and Data Submission*. In addition, DOE (older number) Series 5400 addresses environmental, safety, and health programs for DOE operations.

5.2 REGULATORY ACTIVITIES

It is likely that new or modified permits would be needed before surplus plutonium disposition facilities could be constructed or operated. Permits regulate many aspects of facility construction and operations, including the quality of construction, treatment and storage of hazardous waste, and discharges of effluents to the environment. These permits would be obtained as required from appropriate Federal, State, and local agencies. Permits for constructing or operating surplus plutonium disposition facilities would not be obtained or modified before a Record of Decision was issued on this SPD EIS.

[1] It should be noted that not all of these statutes, regulations, and orders apply to all aspects of the surplus plutonium disposition program and that the descriptions provided represent only a broad summary of each listed requirement.

5.2.1 Pit Conversion and Immobilization Facilities

The pit conversion and immobilization facilities would be designed, constructed, and operated in accordance with DOE regulations and requirements, although the facilities may, as a matter of policy, take into account any appropriate NRC standards. These facilities are categorized as nonreactor nuclear facilities. The major DOE design criteria may be found in DOE Order 6430.1A, *General Design Criteria*, and its successor Orders 420.1A, *Facility Safety*, and 430.1, *Life Cycle Asset Management*, which delineate applicable regulatory and industrial codes and standards for both conventional facilities designed to industrial standards and "special facilities" (defined as nonreactor nuclear facilities and explosive facilities). The design of the facilities would be accomplished in stages that allow for adequate review and assurance that all required standards are met. Prior to operation, the facilities would undergo cold and hot startup testing and an operational readiness review in accordance with the requirements of DOE Order 425.1. Startup of these facilities would require the approval of the Secretary of Energy.

While there are a number of areas or buildings that would be designed to conventional codes and standards, plutonium processing and storage areas, and other areas where quantities of plutonium or other special nuclear materials in excess of a minimum quantity could be present, would be required to meet the more stringent requirements for facility integrity and safeguards and security. Other applicable regulations and standards would be related to worker health and safety and environmental protection, such as DOE's radiation protection standards found in 10 CFR 835. In addition, Federal or State regulations implementing the Clean Water Act (CWA), Clean Air Act (CAA), and Resource Conservation and Recovery Act (RCRA) are applicable. These regulations are implemented through permits, and DOE would require evaluations to determine whether the pit conversion or immobilization facility emissions and activities would necessitate modification of any of these permits. Analyses in Chapter 4 have shown that there would be minimal impact from construction and operation of these facilities.

5.2.2 MOX Facility

The mixed oxide (MOX) fuel fabrication facility would be licensed to operate by the U.S. Nuclear Regulatory Commission (NRC) under its regulations in 10 CFR 70, *Domestic Licensing of Special Nuclear Material*. Because the facility would be located at a DOE site, however, certain DOE requirements affecting site interfaces and infrastructure would also be applicable. In addition, as would be the case regardless of where the facility was built, certain Federal or State regulations implementing the CWA, the CAA, and RCRA would be applicable. These regulations are implemented through permits. Evaluation would be required to determine whether MOX facility emissions and activities necessitated modification of any of these permits. Analyses in Chapter 4 have shown that there would be minimal impacts from construction and operation of the MOX facility.

MOX facility design and operating parameters would be imposed by requirements of 10 CFR 70. Facility robustness, and worker health and safety, for example, are all specified by 10 CFR 70. This regulation incorporates and refers the licensee to provisions of other NRC regulations such as those found in 10 CFR 20, *Protection Against Radiation*. Safety and environmental analyses would be required to support the license application for the MOX facility.

Integral to the National Environmental Policy Act (NEPA) process is consideration of how the proposed action might affect biotic, cultural, and Native American resources and of the need for mitigation of any potential impacts. Required consultations with agencies and recognized Native American groups have been initiated as part of the NEPA process for this SPD EIS.

5.2.3 Reactors

Nuclear power reactors undergo a lengthy licensing process under 10 CFR 50, *Domestic Licensing of Production and Utilization Facilities*, beginning before facility construction. This process includes preparation of safety analysis and environmental reports. The safety analysis report remains a living document that serves as the licensing basis for the plant and is updated throughout the life of the plant. Public hearings before a licensing board are conducted before a license is issued. Once issued, operating licenses may be amended only with proper evaluation, review, and approval as specified in 10 CFR 50.90. This prescriptive process requires demonstration that a proposed change does not involve an unreviewed environmental or safety question and provides for public notice and opportunity to comment before issuance of the license amendment. Minor license amendments can be processed fairly expeditiously, but more involved amendments can require multiple submittals before NRC is assured that the proposed action will not reduce the margin of safety of the plant. All submittals, except the portions that contain proprietary information, are available to the public.

The six reactors proposed to use MOX fuel have been operating for many years. Revisions to each of their operating licenses would be required prior to MOX fuel being brought to the reactor sites and loaded into the reactors. The regulatory process for requesting reactor license amendments to use MOX fuel would be the same as that for any 10 CFR 50 operating license amendment request. This process is initiated by the reactor licensee submitting an operating license amendment request in accordance with 10 CFR 50.90. The license amendment request would need to include a discussion of all potential impacts and changes in reactor operation that could be important to safety or the environment.

The need for modifications to site permits would be evaluated by the individual plants. The contractor team of Duke Engineering & Services, COGEMA Inc., and Stone & Webster has indicated that there would be minimal changes in effluents, emissions, and wastes (radiological or nonradiological).

5.3 CONSULTATIONS

Certain statutes and regulations require DOE to consider consultations with Federal, State, and local agencies and federally recognized Native American groups regarding the potential for alternatives for surplus plutonium disposition to disturb sensitive resources. The needed consultations must occur on a timely basis and are generally required before any land disturbance can begin. Most of these consultations are related to biotic, cultural, and Native American resources. Biotic resource consultations generally pertain to the potential for activities to disturb sensitive species or habitats. Cultural resource consultations relate to the potential for disruption of important cultural resources and archaeologic sites. Finally, Native American consultations are concerned with the potential for disturbance of ancestral Native American sites and the traditional practices of Native Americans.

DOE has initiated consultations with Federal and State agencies and federally recognized Native American groups regarding the potential for alternatives for surplus plutonium disposition to disturb sensitive resources. Table 5–2 presents a summary of the consultations initiated by DOE. Appendix O contains copies of the consultation letters sent by DOE to agencies and Native American groups, and any written responses provided by those agencies or groups. Attachments to responses are not included in Appendix O but are, nevertheless, part of the public record. All agencies and Native American groups were also sent a copy of the SPD Draft EIS. Information from the agencies and Native American group responses has been incorporated into Chapters 3 and 4 as appropriate.

5.3.1 Native American Consultations

Upon publication of the SPD Draft EIS, DOE initiated the government-to-government consultation process with federally recognized Native American groups for the proposed action and alternatives discussed herein. The consultations were conducted consistent with the direction outlined in DOE Order 1230.2, *American Indian Tribal Government Policy*. A copy of the SPD Draft EIS was presented to each federally recognized tribe that has acknowledged potential concern for resources at the Hanford Site, Idaho National Engineering and Environmental Laboratory (INEEL), Pantex Plant, and Savannah River Site (SRS) during prior consultations initiated for compliance with statutes such as the National Historic Preservation Act (16 USC 470 et seq.) and the Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001).

The consultation process was initiated by DOE through a formal letter identifying the potential actions at the DOE site accompanied by a copy of the SPD Draft EIS. The letter requested a response from each Native American group regarding concerns, including any concerns under the American Indian Religious Freedom Act (42 USC 1996) and NAGPRA. Among the areas of specific concern that may be identified by Native American groups are religious and sacred places and resources, Native American human remains, associated funerary objects, unassociated funerary objects, sacred objects, and cultural patrimony objects. [Text deleted.] The intent of these consultations was to identify all potential Native American concerns associated with each action discussed in the SPD Draft EIS and to consider the results of the consultation processes in this SPD Final EIS.

Consultations were requested with the Native American groups listed in Table 5–2, which included four groups related to Hanford, one to INEEL, four to Pantex and six to SRS. Consultations with the Native American groups indicate that there are no significant concerns related to the proposed action and alternatives evaluated in this SPD EIS.

In the event of inadvertent discovery of potential important materials such as human remains, associated funerary objects, unassociated funerary objects, sacred objects, and cultural patrimony during construction and operation, another consultation process will be initiated. Each DOE site considered in this SPD EIS has plans and procedures that address inadvertent discoveries of cultural material. In each case, the ground-disturbing activities would be immediately suspended upon recognition of human remains or potential cultural materials. DOE would be notified and qualified cultural resource specialists would evaluate the materials to determine potential Native American origin. If the remains or materials are determined to be of potential Native American origin and within the criteria of applicable statutes such as NAGPRA, DOE would immediately initiate consultation with Native American groups with interest in the locations, as determined during the SPD Draft EIS consultation process described above. Based on the results of the consultations, DOE would take appropriate action prior to resuming ground-disturbing activities.

5.3.2 Archaeological and Historical Resources Consultations

Each DOE site evaluated in this SPD EIS has cultural (archaeological and historical) resource management plans that prescribe consultation processes for activities that have the potential to adversely affect sites and properties eligible for nomination, or listed, on the National Register of Historic Places. The management plans have been developed consistent with archaeological and historical resource laws (see Table 5–1) as implemented under 36 CFR 800, *Protection of Historic and Cultural Properties*.

Upon publication of the SPD Draft EIS, DOE initiated consultation with the State Historic Preservation Officers (SHPOs) of Idaho, Washington, and South Carolina as appropriate under each site's programmatic agreement and management plan (see Table 5–2). Consultation with the SHPO in Texas was not required because extensive surveys of Pantex have shown that significant cultural resources are not likely to be present, and both the Texas SHPO and the Advisory Council on Historic Preservation have agreed that additional archaeological surveys are

not required. The intent of each consultation was to determine potential eligibility for nomination to the National Register of Historic Places of archaeological and historic resources that may be associated with the proposed actions and alternatives. As discussed in Section 5.3.1, DOE also initiated consultation with Native Americans. [Text deleted.] The consultation process was initiated by DOE through a formal letter to the appropriate SHPO identifying the potential actions at the DOE site accompanied by a copy of the SPD Draft EIS. In all cases, the consultation process was conducted in conformance with 36 CFR 800 requirements and programmatic agreements for the management of archaeological and historic resources and properties.

The letters sent by DOE solicited specific concerns the SHPOs may have about the DOE proposal. Consultations with the SHPOs indicate that only the South Carolina SHPO had significant concerns related to the proposed action and alternatives evaluated in this SPD EIS. The South Carolina SHPO response noted that if Alternative 3 (DOE's preferred alternative) is selected, further consultations would be required. In response to the SHPO's concerns about cultural resources present near the F-Area, additional surveys were performed. Investigations identified archaeological sites near this portion of F-Area that have been recommended to the South Carolina SHPO as eligible for nomination to the National Register. DOE currently plans to mitigate impact by avoiding these sites.

In the event that potential archaeological and historic materials are discovered during construction and operation, another consultation process will be initiated. Each DOE site considered in this SPD EIS has plans and procedures that address inadvertent discoveries of cultural material. In each case, the ground-disturbing activities would be immediately suspended upon recognition of human remains or potential archaeological and historical materials. DOE would be notified and qualified cultural resource specialists would evaluate the materials to identify and determine their potential archaeological and historical value under 36 CFR 800. If the materials are determined to be potentially eligible for nomination to the National Register of Historic places, DOE would immediately initiate an expedited formal consultation process with the appropriate SHPO, as appropriate under the programmatic agreement. Based on the results of the consultations, DOE would take appropriate action to ensure mitigation of any adverse effects to resources determined eligible for the National Register of Historic Places.

5.3.3 Endangered Species Act Consultation

Upon publication of the SPD Draft EIS, DOE conducted consultations with the appropriate regional and field offices of the U.S. Department of the Interior, Fish and Wildlife Service (USFWS) and the equivalent State agencies. The consultations were conducted to solicit input on the potential for impacts on ecological resources, especially Federal threatened, endangered, and other species of concern or their critical habitat and/or State-protected species. These consultations were conducted in accordance with Sections 7(a)-(d) of the Endangered Species Act of 1973 (16 USC Sections 1536(a)-(d)) and its implementing regulations under 50 CFR 402, *Interagency Cooperation-Endangered Species Act of 1973, As Amended*, and relevant State statutes and regulations (see Table 5–1).

The consultation process was initiated by DOE through formal letters that identified the potential actions at each DOE site and was accompanied by a copy of the SPD Draft EIS. Each letter also summarized the preliminary analysis of the potential impacts on ecological resources at each site, including any known Federal- or State-listed species with the potential for occurrence. As shown in Table 5–2, letters were sent to each respective USFWS regional or field office with primary jurisdiction over the four DOE surplus plutonium disposition candidate sites. The letters requested that the USFWS offices provide any available information on Federal threatened and endangered animal and plant species (listed or proposed) and their habitats in the vicinity of the specific project areas. Each office was also asked to identify any other issues or concerns that should be considered in this SPD EIS. A similar written request for comment was also sent to each equivalent State agency including: the Washington Department of Fish and Wildlife, Department of Ecology; Idaho Department of Fish and Game,

Conservation Data Center; Texas Parks and Wildlife Department; and the South Carolina Department of Natural Resources, Lower Coastal Wildlife Diversity.

Of the four consultations initiated with the USFWS, three of the offices provided written responses, with the resulting information considered in the preparation of this SPD Final EIS. Additional species information was provided by the USFWS Moses Lake, Washington, and Charleston, South Carolina offices. The USFWS Charleston office also indicated in its response that the proposed facilities at SRS do not appear to present a substantial risk to federally protected ecological resources and that DOE has satisfied its obligations under Section 7 of the *Endangered Species Act*. The USFWS Boise, Idaho, office indicated that the information provided in the SPD Draft EIS was accurate. In the absence of receipt of a written response, telephone communication was initiated with the USFWS office in Arlington, Texas, with officials indicating that the office had no additional information to provide or comment on the SPD Draft EIS.

Three of the four State agencies contacted also provided written responses, with one agency (i.e., South Carolina Department of Natural Resources) verbally responding that it had no additional information to provide or other comment on the SPD Draft EIS. Additional information was provided by the Washington State Department of Fish and Wildlife and the Idaho Department of Fish and Game, which was considered in development of this SPD Final EIS.

Prior to any project implementation activities at any site, additional consultations with Federal and State agencies would be conducted, as appropriate. Additionally, site-specific surveys and assessments would be conducted, as necessary, to determine the potential for impacts to protected or other sensitive animal and plant species and sensitive habitats and to identify any required mitigation measures.

Table 5–1. Federal Environmental Statutes, Regulations, and Executive Orders

Statute, Regulation, Executive Order	Citation	Potential Requirements
	Air Quality and Noise	
Clean Air Act of 1970 (CAA)	42 USC 7401 et seq.	Requires sources to meet standards and obtain permits to satisfy: National Ambient Air Quality Standards (NAAQS), State implementation plans, Standards of Performance for New Stationary Sources, National Emission Standards for Hazardous Air Pollutants, and Prevention of Significant Deterioration (PSD). Public radiological dose limits for DOE facilities are outlined in 40 CFR 61.92, under the authority of this act.
National Ambient Air Quality Standards	42 USC 7409; 40 CFR 50	Establishes primary and secondary ambient air quality standards governing carbon monoxide, lead, nitrogen dioxide, ozone, sodium dioxide, and particulate matter with an aerodynamic diameter less than or equal to 10 microns.
Standards of Performance for New Stationary Sources	42 USC 7411; 40 CFR 60	Establishes control/emission standards and recordkeeping requirements for new or modified sources specifically addressed by a standard.
National Emission Standards for Hazardous Air Pollutants	42 USC 7412; 40 CFR 61, 63	Establishes emission levels for carcinogenic or mutagenic pollutants or operation requirements; may require a preconstruction approval, depending on the process being considered and the level of emissions that will result from the new or modified source.
Prevention of Significant Deterioration	42 USC 7470 et seq.; 40 CFR 51.166	Establishes requirements for the State implementation plans for PSD programs. Applies to areas that are in compliance with NAAQS. Requires comprehensive preconstruction review and the application of Best Available Control Technology to major stationary sources (emissions of 100 tons per year [tons/yr]) and major modifications; requires a preconstruction review of air quality impacts and the issuance of a construction permit from the responsible State agency setting forth emission limitations to protect the PSD increment.
Determining conformity of Federal actions to State or Federal implementation plans	40 CFR 93	Requires Federal facilities to demonstrate compliance with State or Federal implementation plans for applicable actions in nonattainment areas.
Executive Order 12843, Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances	April 21, 1993	Requires Federal agencies to minimize procurement of ozone-depleting substances and conform their practices to comply with Title VI of CAA Amendments regarding stratospheric ozone protection and to recognize the increasingly limited availability of Class I substances until final phaseout.
Noise Control Act of 1972	42 USC 4901 et seq.	Requires facilities to maintain noise levels that do not jeopardize the health and safety of the public.
	Water Resources	
Clean Water Act (CWA)	33 USC 1251 et seq.	Requires U.S. Environmental Protection Agency (EPA)- or State-issued permits and compliance with provisions of permits regarding discharge of effluents to waters of the United States.

Table 5–1. Federal Environmental Statutes, Regulations, and Executive Orders (Continued)

Statute, Regulation, Executive Order	Citation	Potential Requirements
	Water Resources (Continued)	
National Pollutant Discharge Elimination System	33 USC 1342	Requires permit to discharge effluents (pollutants) and storm water to waters of the United States; permit modifications are required if discharge effluents are altered.
Wild and Scenic Rivers Act of 1968	16 USC 1271 et seq.	Requires consultation before construction of any new Federal project associated with a river designated as wild and scenic or under study in order to minimize and mitigate any adverse effects on the physical and biological properties of the river.
Safe Drinking Water Act of 1974	42 USC 300f et seq.; 40 CFR 141	Requires certification of any plant water treatment facility constructed on a site to ensure that the quality of public drinking water is protected and that maximum radioactive contaminant levels do not exceed 4 mrem dose equivalents.
Executive Order 11990, Protection of Wetlands	May 24, 1977	Requires Federal agencies to avoid the long- and short-term adverse impacts associated with the destruction or modification of wetlands.
Executive Order 11988, Floodplain Management	May 29, 1977	Directs Federal agencies to establish procedures to ensure that the potential effects of flood hazards and floodplain management are considered for any action undertaken in a floodplain and that floodplain impacts be avoided to the extent practical. Requires consultation if project impacts a floodplain.
Compliance with Floodplain/ Wetlands Environmental Review Requirements	10 CFR 1022	DOE's floodplain and wetlands environmental review requirements.
	Civilian Use of Nuclear Materials	
Standards for Protection Against Radiation	10 CFR 20	Establishes standards for protection against ionizing radiation resulting from activities conducted by NRC licensees for both radiation workers and the public.
Domestic Licensing of Production and Utilization Facilities	10 CFR 50	Provides for the licensing of production and utilization facilities, which includes commercial nuclear power reactors. This part describes in detail the information needed to support an operational license application, a license amendment request, design criteria, enforcement actions, and other specifics of the licensing process.
Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions	10 CFR 51	Implements NRC's NEPA requirements.
Domestic Licensing of Special Nuclear Material	10 CFR 70	Establishes procedures and criteria for issuance of licenses to receive title to, own, possess, use, and initially transfer special nuclear material; and establishes and provides for the terms and conditions upon which NRC will issue such licenses.

Table 5–1. Federal Environmental Statutes, Regulations, and Executive Orders (Continued)

Statute, Regulation, Executive Order	Citation	Potential Requirements
	Waste Management and Pollution Prevention	
Resource Conservation and Recovery Act; Hazardous and Solid Waste Amendments of 1984 (RCRA)	42 USC 6901 et seq.	Requires notification and permits for operations involving hazardous waste treatment, storage, or disposal facilities; changes to site hazardous waste operations could require amendments to RCRA hazardous waste permits involving public hearings.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); Superfund Amendments and Reauthorization Act of 1986	42 USC 9601 et seq.	Requires cleanup and notification if there is a release or threatened release of a hazardous substance; requires DOE to enter into Interagency Agreements with EPA and State to control the cleanup of each DOE site on the National Priorities List.
Nuclear Waste Policy Act of 1982	42 USC 10101 et seq.	Establishes a schedule for the siting, construction, and operation of a geologic repository that will provide a reasonable assurance that the public and the environment will be protected from the hazards posed by disposal of high-level radioactive waste (HLW) and spent nuclear fuel; establishes Federal responsibility and a Federal policy for the disposal of HLW and spent nuclear fuel; defines the relationship between Federal and State governments with respect to the disposal of HLW and spent nuclear fuel; and establishes a Nuclear Waste Fund.
Pollution Prevention Act of 1990	42 USC 13101 et seq.	Establishes a national policy that pollution should be reduced at the source and requires a toxic chemical source reduction and recycling report for an owner or operator of a facility required to file an annual toxic chemical release form under Section 313 of the Superfund Amendments and Reauthorization Act.
Toxic Substances Control Act of 1976 (TSCA)	15 USC 2601 et seq.	Requires compliance with inventory reporting and chemical control provisions of TSCA to protect the public from the risks of exposure to chemicals; TSCA imposes strict limitations on use and disposal of equipment contaminated with polychlorinated biphenyls.
Federal Facility Compliance Act of 1992	42 USC 6961	Waives sovereign immunity for Federal facilities under RCRA and requires DOE to develop plans and enter into agreements with States as to specific management actions for specific mixed waste streams.
Executive Order 12088, Federal Compliance with Pollution Control Standards	October 13, 1978	Requires Federal agency landlords to submit to the Office of Management and Budget an annual plan for the control of environmental pollution and to consult with EPA and State agencies regarding the best techniques and methods.

Table 5–1. Federal Environmental Statutes, Regulations, and Executive Orders (Continued)

Statute, Regulation, Executive Order	Citation	Potential Requirements
Waste Management and Pollution Prevention (Continued)		
Executive Order 12856, Federal Compliance with Right-To-Know Laws and Pollution Prevention Requirements	August 3, 1993	Requires Federal agencies to achieve 50 percent reduction of agency's total releases of toxic chemicals to the environment and offsite transfers, to prepare a written facility pollution prevention plan not later than 1995, and to publicly report toxic chemicals entering any waste stream from Federal facilities, including any releases to the environment, and to improve local emergency planning, response and accident notification.
[Text deleted.]		
Executive Order 12580, Superfund Implementation	January 23, 1987	Delegates to the heads of Executive departments and agencies the responsibility for undertaking remedial actions for releases, or threatened releases, that are not on the National Priorities List and removal actions other than emergencies where the release is from any facility under the jurisdiction or control of Executive departments and agencies.
Biotic Resources		
Fish and Wildlife Coordination Act	16 USC 661 et seq.	Requires consultation on the possible effects on wildlife of construction, modification, or control of bodies of water in excess of 10 acres in surface area.
Bald and Golden Eagle Protection Act of 1972	16 USC 668 et seq.	Requires consultations to determine if any protected birds are found to inhabit the area. If so, must obtain a permit prior to moving any nests due to construction or operation of disposition facilities.
Migratory Bird Treaty Act of 1918	16 USC 703 et seq.	Requires consultation to determine if there are any impacts on migrating bird populations due to construction or operation of disposition facilities. If so, must develop mitigation measures to avoid adverse effects.
Anadromous Fish Conservation Act of 1965	16 USC 757	Requires consultation to determine if there are any impacts on anadromous fish that spawn in fresh water or estuaries and migrate to ocean waters and on anadromous fishery resources that are subject to depletion from water resource development.
Wilderness Act of 1964	16 USC 1131 et seq.	Requires consultation with the Department of Commerce and the Department of Interior to minimize impacts.
Wild Free-Roaming Horses and Burros Act of 1971	16 USC 1331 et seq.	Requires consultation with the Department of Interior to minimize impacts.

Table 5–1. Federal Environmental Statutes, Regulations, and Executive Orders (Continued)

Statute, Regulation, Executive Order	Citation	Potential Requirements
	Biotic Resources (Continued)	
Endangered Species Act of 1973	16 USC 1531 et seq.	Requires consultation to identify endangered or threatened species and their habitats, assess impacts thereon, obtain biological opinions and, if necessary, develop mitigation measures to reduce or eliminate adverse effects of construction or operation.
	Cultural Resources	
Antiquities Act of 1906	16 USC 431 et seq.	Requires protection of historic, prehistoric, and paleontological objects in federal lands from appropriation, excavation, injury, and destruction without permission.
DOE American Indian Tribal Government Policy	DOE Order 1230.2	Establishes government-to-government protocols for DOE interactions with tribal governments.
National Historic Preservation Act of 1966	16 USC 470 et seq.	Requires consultation with the State Historic Preservation Office prior to undertaking construction to ensure that no historical resources will be affected.
Archaeological and Historical Preservation Act of 1974	16 USC 469	Requires obtaining authorization for any disturbance of archaeological resources.
Archaeological Resources Protection Act of 1979	16 USC 470aa et seq.	Requires obtaining authorization for any excavation or removal of archaeological resources.
American Indian Religious Freedom Act of 1978	42 USC 1996 et seq.	Requires consultation with local Native American tribes to ensure that their religious customs, traditions, and freedoms are preserved.
Native American Graves Protection and Repatriation Act of 1990	25 USC 3001 et seq.	Requires repatriation of cultural items to Native Americans.
Executive Order 13007, Indian Sacred Sites	May 24, 1996	Requires the protection and preservation of Native American religious practices.
Executive Order 11593, Protection and Enhancement of the Cultural Environment	May 13, 1971	Requires the preservation of historic and archaeological data that may be lost during construction activities.
	Worker Safety and Health	
Occupational Safety and Health Act of 1970	5 USC 5108 et seq.	Requires compliance with all applicable worker safety and health regulations.
Hazard Communication	29 CFR 1910.1200	Ensures that workers are informed of, and trained to handle, all chemical hazards in the workplace.
	Transportation	
Transportation regulations	49 CFR 171, 172, 173, 174, 176, 177, 178, 397	Establishes standards for materials transportation including: packaging, marking and labeling, placarding, monitoring, routes, accident reporting, and manifesting. Includes requirements for transport by rail, air, and public highway.

Table 5–1. Federal Environmental Statutes, Regulations, and Executive Orders (Continued)

Statute, Regulation, Executive Order	Citation	Potential Requirements
	Transportation (Continued)	
Packaging and Transportation of Radioactive Materials	10 CFR 71	Establishes requirements for packaging, preparation for shipment, and transportation of licensed radioactive material, and standards for approval of packaging and shipping procedures for fissile material and for a quantity of other licensed material in excess of a Type A quantity. This part establishes the certification process, including the required documentation for and testing of shipping containers, and quality assurance program that must be in place for vendors and users of approved shipping containers.
Hazardous Materials Transportation Act of 1974	49 USC 1801 et seq.	Requires compliance with hazardous materials and waste transportation requirements.
[Text deleted.]		
Regulations of the International Atomic Energy Agency	IAEA Safety Series 6	Establishes standards for radioactive materials transportation.
International Maritime Organization Regulations	International Maritime Dangerous Goods Code, 1994	Requires segregation of radioactive materials packages from other dangerous goods and other aspects of stowage.
	Other	
Atomic Energy Act of 1954	42 USC 2011 et seq.	Authorizes DOE to establish standards to protect health or minimize dangers to life or property for activities under DOE's jurisdiction.
Price Anderson Act	42 USC 2210	Allows DOE to indemnify its contractors if the contract involves the risk of public liability from a nuclear incident.
Department of Energy Orders	Parts 100–500	Establishes standards and requirements to ensure safe operation of facilities.
National Environmental Policy Act (NEPA)	42 USC 4321 et seq.	Requires Federal agency to prepare an environmental impact statement for any major Federal action with significant environmental impact.
NEPA Implementing Procedures	10 CFR 1021	Requires DOE to follow its own implementing regulations to ensure environmental quality.
Emergency Planning and Community Right-To-Know Act of 1986	42 USC 11001 et seq.	Requires the development of emergency response plans and reporting requirements for chemical spills and other emergency releases, and imposes right-to-know reporting requirements covering storage and use of chemicals that are reported on toxic chemical release forms.
Executive Order 11514, Protection and Enhancement of Environmental Quality	March 6, 1970	Requires Federal agencies to demonstrate leadership in achieving the environmental quality goals of NEPA; provides for DOE consultation with appropriate Federal, State, and local agencies in carrying out their activities as they affect the environment.

Table 5–1. Federal Environmental Statutes, Regulations, and Executive Orders (Continued)

Statute, Regulation, Executive Order	Citation	Potential Requirements
	Other (Continued)	
Farmland Protection Policy Act of 1981	7 USC 4201 et seq.	Requires avoidance of any adverse effects to prime and unique farmlands.
Executive Order 12114, Environmental Effects Abroad of Major Federal Actions	January 4, 1979	Requires officials of Federal agencies having ultimate responsibility for authorizing and approving actions encompassed by this order to be informed of pertinent environmental considerations and to take such considerations into account, along with other pertinent considerations of national policy, in making decisions regarding such actions. While based on independent authority, this order furthers the purpose of NEPA.
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations	February 11, 1994	Requires Federal agencies to identify and address as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.
Executive Order 12656, Assignment of Emergency Preparedness Responsibilities	November 18, 1988	Assigns emergency preparedness responsibilities to Federal departments and agencies.

Table 5–2. Summary of Consultations Initiated by DOE

DOE Site	Subject	DOE Consultation Letter		Agency/Group Response	
		Addressed To (Date of Letter)	Page No.	From (Date of Response or Last Contact)	Page No.
Hanford	Cultural Resources	Mr. David Hansen State Historic Preservation Officer (October 30, 1998)	O–2	Mr. Robert Whitlam (March 2, 1999)	NA[a]
	Native American	Mr. Russell Jim Confederated Tribes and Bands of the Yakima Indian Nation (October 30, 1998)	O–4	Ms. Nancy Peters (March 5, 1999)	NA[b]
	Native American	Ms. Donna L. Powaukee Nez Perce Tribe (October 30, 1998)	O–6	Mr. Pat Sobotta (March 2, 1999)	NA[b]
	Native American	Ms. Lenora Seelatsee Wanapum Band (October 30, 1998)	O–8	Ms. Lenora Seelatsee (March 5, 1999)	NA[b]
	Native American	Mr. J.R. Wilkinson Confederated Tribes of the Umatilla Indian Reservation (October 30, 1998)	O–10	Mr. J.R. Wilkinson (March 2, 1999)	NA[b]
	EcologicalResources	Mr. Richard Roy U.S. Fish and Wildlife Service (July 28, 1998)	O–12	Mr. Richard Roy (December 3, 1998)	O–14
	EcologicalResources	Mr. Jay McConnaughey Washington Department of Fish and Wildlife (July 28, 1998)	O–16	Mr. Jay McConnaughey (December 7, 1998)	O–18
INEEL	Cultural Resources	Mr. Robert Yohe State Historic Preservation Officer (October 30, 1998)	O–21	Mr. Robert Yohe (March 2, 1999)	NA[a]
	Native American	Mr. Keith Tinno Fort Hall Reservation (October 30, 1998)	O–23	Mr. Jim Reed (March 2, 1999)	NA[b]
	EcologicalResources	Ms. Susan Burch U.S. Fish and Wildlife Service (July 28, 1998)	O–25	Mr. Robert Kuesink (August 18, 1998)	O–27
	EcologicalResources	Mr. George Stephens Idaho Department of Fish and Game (July 28, 1998)	O–29	Mr. George Stephens (August 12, 1998 and February 12, 1999)	O–31 O–32
Pantex	Native American	Mr. Virgil Franklin Sr. Cheyenne-Arapaho Tribe of Oklahoma (October 30, 1998)	O–33	Mr. Gordon Yellowman (March 2, 1999)	NA[b]
	Native American	Mr. Billy Evans Horse Kiowa Tribe of Oklahoma (October 30, 1998)	O–35	Mr. William Hensley (March 2, 1999)	NA[b]
	Native American	Mr. D.J. Mowatt Apache Tribe of Oklahoma (October 30, 1998)	O–37	Mr. D.J. Mowatt (March 2, 1999)	NA[b]
	Native American	Mr. Don Wauahdooah Comanche Tribe of Oklahoma (October 30, 1998)	O–39	Ms. Phyllis Attocknie (March 2, 1999)	NA[b]
	EcologicalResources	Mr. Robert Short U.S. Fish and Wildlife Service (July 28, 1998)	O–41	Agency office had no comment based on personal communication with Mr. Clayton Napier (December 2, 1998)	NA[a]
	EcologicalResources	Mr. Pat Martin Texas Parks and Wildlife Department (July 28, 1998)	O–43	Ms. Shannon Breslin (March 22, 1999)	O–45

Table 5–2. Summary of Consultations Initiated by DOE (Continued)

DOE Site	Subject	DOE Consultation Letter		Agency/Group Response	
		Addressed To (Date of Letter)	Page No.	From (Date of Response or Last Contact)	Page No.
SRS	Cultural Resources	Dr. Rodger Stroup State Historic Preservation Officer (October 30, 1998)	O–46	Ms. Nancy Brock (November 12, 1998)	O–48
	Native American	Mr. Tom Berryhill National Council of the Muskogee Creek (October 30, 1998)	O–49	Mr. Ken Childers (March 2, 1999)	NA[b]
	Native American	Ms. Nancy Carnley Ma Chis Lower Alabama Creek Indian Tribe (October 30, 1998)	O–51	Ms. Nancy Carnley (March 2, 1999)	NA[b]
	Native American	Miko Tony Hill Indian People's Muskogee Tribal Town Confederacy (October 30, 1998)	O–53	Miko Tony Hill (March 2, 1999)	NA[b]
	Native American	Ms. Virginia Montoya Pee Dee Indian Association (October 30, 1998)	O–55	Ms. Virginia Montoya (March 2, 1999)	NA[b]
	Native American	Mr. Al Rolland Yuchi Tribal Organization, Inc. (October 30, 1998)	O–57	Mr. Al Rolland (March 2, 1999)	NA[b]
	Native American	Mr. John Ross United Keetoowah Band (October 30, 1998)	O–59	Ms. Julie Moss (March 2, 1999)	NA[b]
	EcologicalResources	Mr. Roger Banks U.S. Fish and Wildlife Service (July 28, 1998)	O–61	Mr. Edwin EuDaly (September 8, 1998)	O–63
	EcologicalResources	Mr. Tom Murphy South Carolina Department of Natural Resources	O–67	Agency office had no comment based on personal communication with Mr. Tom Murphy (December 2, 1998)	NA[a]

[a] No written response was received. Response obtained via telephone conversation.
[b] No response was received.

siltstone A fine-grained, elastic (fragmented) sedimentary rock whose particles range from 1/6 to 1/256 millimeter in diameter.

sinter To form a homogenous mass by heating without melting.

sitewide environmental impact statement A legal document prepared in accordance with the requirements of Section 102(2)(C) of the National Environmental Policy Act that reflects an evaluation of the environmental impacts of proposed Government actions at a large, multiple-facility site.

solid waste Discarded solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. Solid waste does not include solid or dissolved materials in domestic sewage; industrial discharges subject to permit under the Clean Water Act; or source, special nuclear, or byproduct material as defined by the Atomic Energy Act.

source term The estimated quantities of radionuclides or chemical pollutants released to the environment.

special nuclear materials As defined in Section 11 of the Atomic Energy Act, "(1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the NRC determines to be special nuclear material, or (2) any material artificially enriched by any of the foregoing."

Spent Fuel Standard A term, coined by the National Academy of Sciences and modified by DOE, denoting the main objective of alternatives for the disposition of surplus weapons-usable plutonium: that such plutonium be made roughly as inaccessible and unattractive for weapons use as the much larger and growing stock of plutonium in civilian spent nuclear fuel.

spent nuclear fuel Fuel that has been withdrawn from a nuclear reactor following irradiation, and whose constituents have not been separated.

stabilization Treatment, packaging, and removal of hazardous and radioactive materials in such a manner as to ensure that a facility is safe and environmentally secure.

stabilize To convert a compound, mixture, or solution to a nonreactive form.

staging An interim storage or gathering of items pending their use, transportation, consumption, or other disposition.

standby That condition in which a reactor facility is neither operable nor declared excess, and as authorized in writing, is being kept in readiness for possible future operation.

State Historic Preservation Officer That State officer charged with the identification and protection of prehistoric and historic resources in accordance with the National Historic Preservation Act.

steppe A semiarid, grass-covered, generally treeless plain.

steppe climate (semiarid climate) The type of climate in which precipitation is very slight but sufficient for the growth of short, sparse grass.

stored weapons standard A storage standard that invokes the high standards of security and accounting for the storage of intact nuclear weapons. Invocation of the standard for weapons-usable fissile materials implies maintenance thereof to the extent practical through the processes of dismantlement, storage, and disposition.

Superfund Amendments and Reauthorization Act of 1986 An environmental act that, in addition to certain freestanding provisions of law, extensively amends the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) and the Safe Drinking Water Act. The act's major goals are a stepped-up pace of cleanup, increased public participation, and more stringent and better-defined cleanup standards, emphasizing remedial actions. See also *Comprehensive Environmental Response, Compensation, and Liability Act of 1980; Safe Drinking Water Act, as amended.*

surface water Water on the Earth's surface, as distinguished from water in the ground (groundwater).

surplus fissile materials Weapons-usable fissile materials that have no identified programmatic use or do not fall into one of the categories of national security reserves.

Tertiary The first geologic period of the Cenozoic era, dating from 66 million to about 3 million years ago. During this period, mammals became the dominant life form.

threatened species As defined in the Endangered Species Act of 1973, "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

total effective dose equivalent The sum of the internal dose (committed effective dose equivalent) and the external dose (effective dose equivalent).

toxic air pollutants See *hazardous/toxic air pollutants*.

Toxic Substances Control Act of 1976 An act authorizing the U.S. Environmental Protection Agency to secure information on all new and existing chemical substances and to control any of these substances determined to cause an unreasonable risk to public health or the environment. This law requires that the health and environmental effects of all new chemicals be reviewed by the Agency before such chemicals are manufactured for commercial purposes.

transmissivity A measure of a water-bearing unit's capacity to transmit fluid, expressed as the product of the thickness and the average hydraulic conductivity of the unit. Also, the rate at which water is transmitted through a strip of an aquifer of a unit width under a unit hydraulic gradient at a prevailing temperature and pressure.

transuranic Of, relating to, or being any element whose atomic number is higher than that of uranium (that is, 92). All transuranic elements are produced artificially and are radioactive.

transuranic waste Waste containing more than 100 nanocuries per gram of alpha-emitting transuranic isotopes with half-lives greater than 20 years, except for (1) high-level waste; (2) waste that DOE has determined, with the concurrence of the U.S. Environmental Protection Agency, does not need the degree of isolation called for by 40 CFR 191; or (3) waste that the U.S. Nuclear Regulatory Commission has approved for disposal case by case in accordance with 10 CFR 61.

treatment An operation necessary to prepare material for storage, disposal, or transportation.

Triassic The first period of the Mesozoic era, dating from 245 to 208 million years ago.

tritium A radioactive isotope of the element hydrogen having two neutrons and one proton.

tritium recycling The recovery, purification, and reuse of tritium contained in tritium reservoirs within the nuclear weapons stockpile.

unconfined aquifer A permeable geologic unit having the following properties: a water-filled pore space (saturated), the capability to transmit significant quantities of water under ordinary differences in pressure, and an upper water boundary at atmospheric pressure.

uranium A heavy, silvery-white metallic element (atomic number: 92) with many radioactive isotopes. One isotope, uranium 235, is most commonly used as a fuel for nuclear fission; another, uranium 238, is transformed into fissionable plutonium 239 following its capture of a neutron in a nuclear reactor.

vadose zone A region in a porous medium in which the pore space is not filled with water (unsaturatured zone).

viewshed The extent of the area that may be viewed from a particular location. Viewsheds are generally bounded by topographic features such as hills or mountains.

Visual Resource Management A process devised by the Bureau of Land Management to assess analytically the aesthetic quality of a landscape, and consistent with the results of that analysis, to so design proposed activities as to minimize their visual impact on that landscape. The process consists of a rating of site visual quality followed by a measurement of the degree of contrast between proposed development activities and the existing landscape.

Visual Resource Management Class Any of the classifications of visual resources established through application of the Visual Resources Management process of the Bureau of Land Management. Four classifications are employed to describe different degrees of modification to landscape elements: Class I, areas where the natural landscape is preserved, including national wilderness areas and the wild sections of national wild and scenic rivers; Class II, areas with very limited land development activity, resulting in visual contrasts that are seen but do not attract attention; Class III, areas in which development may attract attention, but the natural landscape still dominates; Class IV, areas in which development activities may dominate the view and may be the major focus in the landscape.

visual resources Natural and cultural features by which the appearance of a particular landscape is defined.

vitrification A process by which glass (for example, borosilicate glass) is used to encapsulate or immobilize radioactive wastes.

volatile organic compounds A broad range of organic compounds, often halogenated, that vaporize at rather low ambient temperatures. Examples include certain solvents, paint thinners, degreasers (for example, benzene), chloroform, and methyl alcohol.

waste A discardable residue of a manufacturing or purification process.

Waste Isolation Pilot Plant A facility in southeastern New Mexico that is being developed as the national disposal site for transuranic and mixed transuranic waste.

waste minimization and pollution prevention An action that economically avoids or reduces the generation of waste and pollution by means of source reduction, reduction in the toxicity of hazardous waste and pollution, improvement in energy use, and recycling. These actions are consistent with the general goal of minimizing present and future threats to human health, safety, and the environment.

waste package The waste, waste container, and any absorbent that are intended for disposal as a unit. In the case of surface-contaminated, damaged, leaking, or breached waste packages, any overpack is considered the waste container, and the original container is considered part of the waste.

wastewater Water originating from human sanitary water use (domestic wastewater) and from a variety of industrial processes (industrial wastewater).

water quality standards and criteria Limits on the concentrations of specific constituents or on the characteristics of water, often based on water use classifications (for example, drinking water, recreation, propagation of fish and aquatic life, agricultural and industrial use). Water quality standards are legally enforceable, whereas water quality criteria are nonenforceable recommendations based on biotic impacts.

water table The boundary between the unsaturated zone and the deeper, saturated zone. The upper surface of an unconfined aquifer.

weapons-grade material Plutonium or highly enriched uranium, in metallic form, that was manufactured for weapons application. Weapons-grade plutonium contains less than 7 percent plutonium 240.

weapons-usable material Plutonium or highly enriched uranium in forms (for example, metals, oxides) that can be readily converted for use in nuclear weapons. Weapons-grade, fuel-grade, and power reactor–grade plutonium are all weapons usable.

wetland Land areas exhibiting hydric soil conditions, saturated or inundated soil during some portion of the year, and plant species tolerant of such conditions.

whole-body dose Dose of radiation resulting from the uniform exposure of all organs and tissues in a human body. See also *effective dose equivalent.*

Wild and Scenic Rivers Act The Act that established the National Wild and Scenic Rivers System with a view to preserving and protecting the free-flowing condition of selected rivers having outstanding natural, cultural, or recreational features. For federally owned land within the boundaries of rivers in the system, certain activities that would have a direct and adverse effect on river values may be controlled.

zooplankton A collective term for nonphotosynthetic organisms present in plankton.

6M A container, resembling a 55-gallon stainless steel drum, that is used by the U.S. Department of Energy for the shipment of radioactive material. This container is one unit of a containment package that includes an inner impact absorber material (Type B packaging), which protects another inner container (usually Type 2R) in which the radioactive material is placed.

Chapter 7
List of Preparers

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Chapter 8
Distribution List

The U.S. Department of Energy is providing copies of the *Surplus Plutonium Disposition Final Environmental Impact Statement* to Federal, State, and local elected and appointed government officials and agencies; Native American groups; and other organizations and individuals listed below. Copies will be distributed in bulk to some individuals and organizations for further distribution (e.g., the State single points of contact for the National Environmental Policy Act [NEPA]). Copies will be provided to other organizations and individuals on request.

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Organizations and individuals who have requested copies of the *Surplus Plutonium Disposition Final Environmental Impact Statement*

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Office of
Fissile Materials Disposition

United States Department of Energy

Surplus Plutonium Disposition Final Environmental Impact Statement

Volume II

November 1999

For Further Information Contact:
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Office of Fissile Materials Disposition, P.O. Box 23786, Washington, DC 20026-3786

DOE/EIS-0283

Surplus Plutonium Disposition Final Environmental Impact Statement

Volume II

United States Department of Energy
Office of Fissile Materials Disposition

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Cover Sheet

Responsible Agency: United States Department of Energy (DOE)

Title: *Surplus Plutonium Disposition Final Environmental Impact Statement* (SPD EIS) (DOE/EIS-0283)

Locations of Candidate Sites: California, Idaho, New Mexico, North Carolina, South Carolina, Tennessee, Texas, Virginia, and Washington

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Abstract: On May 22, 1997, DOE published a Notice of Intent in the Federal Register (62 Federal Register 28009) announcing its decision to prepare an environmental impact statement (EIS) that would tier from the analysis and decisions reached in connection with the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS*. At that time, the U.S. Environmental Protection Agency decided to be a cooperating agency. The *Surplus Plutonium Disposition Draft Environmental Impact Statement* (SPD Draft EIS) (DOE/EIS-0283-D) was prepared in accordance with NEPA and issued in July 1998. It identified the potential environmental impacts of reasonable alternatives for the proposed siting, construction, and operation of three facilities for the disposition of up to 50 metric tons (55 tons) of surplus plutonium, as well as a No Action Alternative. These three facilities would accomplish pit disassembly and conversion, plutonium conversion and immobilization, and mixed oxide (MOX) fuel fabrication.

For the alternatives that included MOX fuel fabrication, the SPD Draft EIS described the potential environmental impacts of using from three to eight commercial nuclear reactors to irradiate MOX fuel. The potential impacts were based on a generic reactor analysis that used actual reactor data and a range of potential site conditions. In May 1998, DOE initiated a procurement process to obtain MOX fuel fabrication and reactor irradiation services. In March 1999, DOE awarded a contract to Duke Engineering & Services, COGEMA Inc., and Stone & Webster (known as DCS) to provide the requested services. A *Supplement to the SPD Draft EIS* was issued in April 1999, which analyzed the potential environmental impacts of using MOX fuel in six specific reactors named in the DCS proposal. Those reactors are Catawba Nuclear Station Units 1 and 2 in South Carolina, McGuire Nuclear Station Units 1 and 2 in North Carolina, and North Anna Power Station Units 1 and 2 in Virginia.

DOE has identified the hybrid approach as its Preferred Alternative for the disposition of surplus plutonium. This approach allows for the immobilization of 17 metric tons (19 tons) of surplus plutonium and the use of 33 metric tons (36 tons) as MOX fuel. DOE has identified the Savannah River Site near Aiken, South Carolina, as the preferred site for all three disposition facilities (Alternative 3). DOE has also identified Los Alamos National

Laboratory in New Mexico as the preferred site for lead assembly fabrication, and Oak Ridge National Laboratory in Tennessee as the preferred site for postirradiation examination of lead assemblies.

Public Involvement: In preparing the SPD Final EIS, DOE considered comments on the SPD Draft EIS and the *Supplement to the SPD Draft EIS* received via mail, fax, and email, and comments recorded by phone and transcribed from videotapes. In addition, comments were captured by notetakers during interactive public meetings held on the SPD Draft EIS in August 1998 in Amarillo, Texas; Idaho Falls, Idaho; North Augusta, South Carolina; Portland, Oregon; and Richland, Washington, as well as during a public meeting on the *Supplement to the SPD Draft EIS* held in June 1999 in Washington, D.C. Comments received and DOE's responses to these comments are found in Volume III, the Comment Response Document, of the SPD Final EIS. Information on the surplus plutonium disposition program can be obtained by visiting the Office of Fissile Materials Disposition Web site at http://www.doe-md.com.

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List of Acronyms

AEA	Atomic Energy Act of 1954
AECL	Atomic Energy of Canada Limited
AED	aerodynamic equivalent diameter
AIRFA	American Indian Religious Freedom Act
ALARA	as low as is reasonably achievable
AMWTP	Advanced Mixed Waste Treatment Project
ANL–W	Argonne National Laboratory–West
APSF	Actinide Packaging and Storage Facility
AQCR	Air Quality Control Region
ARF	airborne release fraction
ARIES	Advanced Recovery Integrated Extraction System
AVLIS	Atomic Vapor Laser Isotope Separation
BEA	Bureau of Economic Analysis
BEIR V	Report V of the Committee on the Biological Effects of Ionizing Radiations
BIO	Basis for Interim Operation
BLM	Bureau of Land Management
BNFL	British Nuclear Fuels
BWR	boiling water reactor
CAA	Clean Air Act
CAB	Citizens Advisory Board
CANDU	Canadian Deuterium Uranium (reactors)
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CPP	Chemical Processing Plant
CWA	Clean Water Act of 1972, 1987
D&D	decontamination and decommissioning
DBA	design basis accident
DCS	Duke Engineering & Services, COGEMA Inc., and Stone & Webster
DNFSB	Defense Nuclear Facilities Safety Board
DOC	U.S. Department of Commerce
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
DR	damage ratio
DU PEIS	*Final Programmatic Environmental Impact Statement for Alternative Strategies for Long-Term Management and Use of Depleted Uranium Hexafluoride*
DWPF	Defense Waste Processing Facility
EA	environmental assessment
EBR	Experimental Breeder Reactor (I or II)
EIS	environmental impact statement
EPA	Environmental Protection Agency

ES&H	environment, safety, and health
ESTEEM	Education in Science, Technology, Energy, Engineering, and Math
ETB	Engineering Test Bay
ETTP	East Tennessee Technology Park
FAA	Federal Aviation Administration
FDP	fluorinel dissolution process
FEMA	Federal Emergency Management Agency
FFCA	Federal Facility Compliance Agreement
FFF	Uranium Fuel Fabrication Facility
FFTF	Fast Flux Test Facility
FI	field investigation
FM	Farm-to-Market (road)
FMF	Fuel Manufacturing Facility
FMEA	failure modes and effects analysis
FMEF	Fuels and Materials Examination Facility
FONSI	finding of no significant impact
FPF	Fuel Processing Facility
FPPA	Farmland Protection Policy Act
FR	Federal Register
GAO	General Accounting Office
GDP	gaseous diffusion plant
GE	General Electric Company
GENII	Generation II, Hanford environmental radiation dosimetry software system
GPS	global positioning satellite
HE	high explosive
HEPA	high-efficiency particulate air (filter)
HEU	highly enriched uranium
HFEF	Hot Fuel Examination Facility
HHS	Department of Health and Human Services
HIGHWAY	(computer code for distances and populations along U.S. highways)
HLW	high-level waste
HLWVF	high-level-waste vitrification facility
HMIS	Hazardous Materials Information System
HWTPF	Hazardous Waste Treatment and Processing Facility
HYDOX	hydride oxidation
IAEA	International Atomic Energy Agency
ICPP	Idaho Chemical Processing Plant
ICRP	International Commission on Radiological Protection
ID DHW	Idaho Department of Health and Welfare
INEEL	Idaho National Engineering and Environmental Laboratory
INRAD	Intrinsic Radiation
INTEC	Idaho Nuclear Technology and Engineering Center
IPE	Individual Plant Examination
ISC	Industrial Source Complex Model
ISC3	Industrial Source Complex Model, Version 3
ISCST3	Industrial Source Complex Model, Short-Term, Version 3
ISLOCA	interfacing systems loss-of-coolant accident
ITP	In-Tank Precipitation Process

LANL	Los Alamos National Laboratory
LCF	latent cancer fatality
LDR	Land Disposal Restrictions
LEU	low-enriched uranium
LLNL	Lawrence Livermore National Laboratory
LLW	low-level waste
LOCA	loss-of-coolant accident
LPF	leak path factor
LWR	light water reactor
M&H	Mason & Hanger Corporation
MACCS2	Melcor Accident Consequence Code System (computer code)
MAR	material at risk
MD	Office of Fissile Materials Disposition
MEI	maximally exposed individual
MIMAS	Micronized Master
MMI	Modified Mercalli Intensity
MOX	mixed oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Science
NCRP	National Council on Radiation Protection and Measurements
NDA	nondestructive analysis
NEPA	National Environmental Policy Act of 1969
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPH	natural phenomena hazard
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRU	National Research Universal
NTS	Nevada Test Site
NWCF	New Waste Calcining Facility
NWPA	Nuclear Waste Policy Act
NWS	National Weather Service
ORIGEN	ORNL Isotope Generation and Depletion Code
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PBF	Power Burst Facility
PEIS	programmatic environmental impact statement
PFP	Plutonium Finishing Plant
PIE	postirradiation examination
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
PNNL	Pacific Northwest National Laboratory
PRA	probabilistic risk assessment
PSD	prevention of significant deterioration
PUREX	Plutonium-Uranium Extraction (Facility)
PWR	pressurized water reactor
R&D	research and development

RADTRAN 4	(computer code: risks and consequences of radiological materials transport)
RANT	Radioactive Assay and Nondestructive Test
RAMROD	Radioactive Materials Research, Operations and Demonstration
RCRA	Resource Conservation and Recovery Act, as amended
REA	regional economic area
RF	respirable fraction
RfC	reference concentration
RfD	reference dose
RFETS	Rocky Flats Environmental Technology Site
RFP	Request for Proposal
RIA	Reactivity Insertion Accidents
RIMS II	Regional Input-Output Modeling System II (computer code)
RISKIND	(computer code: risks and consequences of radiological materials transport)
ROD	Record of Decision
ROI	region of influence
RMF	Radiation Measurements Facility
RWMC	Radioactive Waste Management Complex
S/A	Similarity of Appearance (provision of Endangered Species Act)
SAR	safety analysis report
SARA	Superfund Amendments and Reauthorization Act of 1986
SCDHEC	South Carolina Department of Health and Environmental Control
SCE&G	South Carolina Electric & Gas Company
SCSHPO	South Carolina State Historic Preservation Officer
SDWA	Safe Drinking Water Act, as amended
SEIS	supplemental environmental impact statement
SHPO	State Historic Preservation Officer
SI	sealed insert
SMC	Specific Manufacturing Complex
SNF	spent nuclear fuel
SNM	special nuclear material
SPD	surplus plutonium disposition
SPD EIS	*Surplus Plutonium Disposition Environmental Impact Statement*
SPERT	Special Power Excursion Reactor Test
SRS	Savannah River Site
SSM PEIS	*Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management*
SST/SGT	safe, secure trailer/SafeGuards Transport
SWMU	solid waste management unit
SWP 1	Service Waste Percolation Pond 1
TA	Technical Area
TCE	trichloroethylene
TNRCC	Texas Natural Resource Conservation Commission
TPBAR-LTA	tritium-producing burnable absorber rod lead test assembly
TRA	technical risk assessment
TRANSCOM	transportation tracking and communications system
TRU	transuranic
TRUPACT	TRU waste package transporter
TSCA	Toxic Substances Control Act
TSP	total suspended particulates

TVA	Tennessee Valley Authority
TWRS	tank waste remediation system
TWRS EIS	*Tank Waste Remediation System Final Environmental Impact Statement*
UC	Regents of the University of California
UFSAR	updated final safety analysis report
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEC	United States Enrichment Corporation
USFWS	U.S. Fish and Wildlife Service
UV	ultraviolet
VOC	volatile organic compounds
VORTAC	very high frequency omnidirectional range/tactical air navigation (facility)
VRM	Visual Resource Management
WAG 3	Waste Area Grouping 3
WERF	Waste Experimental Reduction Facility
WIPP	Waste Isolation Pilot Plant
WM PEIS	*Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*
WNP–1	Washington Nuclear Plant–1
WNP–2	Washington Nuclear Plant–2
WPPSS	Washington Public Power Supply System
WROC	Waste Reduction Operations Complex
WSRC	Westinghouse Savannah River Company
ZPPR	Zero Power Physics Reactor

Chemicals and Units of Measure

°C	degrees Celsius (Centigrade)
°F	degrees Fahrenheit
μCi	microcurie
μg	microgram
μm	micrometer (micron)
46°26'07"	46 degrees, 26 minutes, 7 seconds
Ci	curie
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dBA	decibel, A-weighted
DUF_6	depleted uranium hexafluoride
eH	oxidation reduction potential
ft	foot
ft^2	square foot
ft^3	cubic foot
g	gram
g	gravitational acceleration
gal	gallon
GWD	gigawatt days (per ton)
ha	hectare
hr	hour (in compound units)
in	inch
kg	kilogram
km	kilometer
km^2	square kilometers
kV	kilovolt
l	liter
lb	pound
m	meter
m^2	square meter
m^3	cubic meter
mg	milligram
mi	mile
min	minute
mph	miles per hour
mrem	millirem
MTHM	metric tons of heavy metal
MVA	megavolt-ampere
MW	megawatt
MWe	megawatt electric
MWh	megawatt-hour
N_2	nitrogen
nCi	nanocurie
NO_2	nitrogen dioxide
pCi	picocurie
pcm/F	percent mille/Farenheit
pH	hydrogen ion concentration
$PM_{2.5}$	particulate matter less than or equal to 2.5 μm in diameter
PM_{10}	particulate matter less than or equal to 10 μm in diameter
ppm	parts per million
PuO_2	plutonium dioxide
rad	radiation absorbed dose
rem	roentgen equivalent man
s	second
SO_2	sulfur dioxide
t	metric ton
ton	short ton
UF_6	uranium hexafluoride
UO_2	uranium dioxide
yd	yard
yd^3	cubic yard
yr	year (in compound units)
wt %	weight percent

Metric Conversion Chart

To Convert Into Metric			To Convert Out of Metric		
If You Know	**Multiply By**	**To Get**	**If You Know**	**Multiply By**	**To Get**
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
sq. inches	6.4516	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.092903	sq. meters	sq. meters	10.7639	sq. feet
sq. yards	0.8361	sq. meters	sq. meters	1.196	sq. yards
acres	0.40469	hectares	hectares	2.471	acres
sq. miles	2.58999	sq. kilometers	sq. kilometers	0.3861	sq. miles
Volume					
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.45360	kilograms	kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

Metric Prefixes

Prefix	Symbol	Multiplication Factor
exa-	E	1 000 000 000 000 000 000 = 10^{18}
peta-	P	1 000 000 000 000 000 = 10^{15}
tera-	T	1 000 000 000 000 = 10^{12}
giga-	G	1 000 000 000 = 10^{9}
mega-	M	1 000 000 = 10^{6}
kilo-	k	1 000 = 10^{3}
hecto-	h	100 = 10^{2}
deka-	da	10 = 10^{1}
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	μ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001= 10^{-12}
femto-	f	0.000 000 000 000 001 = 10^{-15}
atto-	a	0.000 000 000 000 000 001= 10^{-18}

Appendix A
Federal Register Notices
and
Joint Statement

A.1 RECORD OF DECISION FOR THE STORAGE AND DISPOSITION OF WEAPONS-USABLE FISSILE MATERIALS FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Responses: 18,620 Burden Hours: 64,310.

Abstract: The LESCP is being conducted in response to the legislative requirement in P.L. 103–382, Section 1501 to assess the implementation of Title I and related education reforms. The information will be used to examine changes—over a 3-year period—that are occurring in schools and classrooms. Teachers and teacher aides will complete a mail survey, and district Title I administrators, principals, school-based staff, and parents will be interviewed during on-site field work.

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DEPARTMENT OF ENERGY

Record of decision for the Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement

AGENCY: Department of Energy.

ACTION: Record of Decision.

SUMMARY: The Department of Energy (DOE) has decided to implement a program to provide for safe and secure storage of weapons-usable fissile materials (plutonium and highly enriched uranium [HEU]) and a strategy for the disposition of surplus weapons-usable plutonium, as specified in the Preferred Alternative in the Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement (S&D Final PEIS, DOE/EIS–0229, December 1996). The fundamental purpose of the program is to maintain a high standard of security and accounting for these materials while in storage, and to ensure that plutonium produced for nuclear weapons and declared excess to national security needs (now, or in the future) is never again used for nuclear weapons.

DOE will consolidate the storage of weapons-usable plutonium by upgrading and expanding existing and planned facilities at the Pantex Plant in Texas and the Savannah River Site (SRS) in South Carolina, and continue the storage of weapons-usable HEU at DOE's Y–12 Plant at the Oak Ridge Reservation (ORR) in Tennessee, in upgraded and, as HEU is dispositioned, consolidated facilities. After certain conditions are met, most plutonium now stored at the Rocky Flats Environmental Technology Site (RFETS) in Colorado will be moved to Pantex and SRS. Plutonium currently stored at the Hanford Site (Hanford), the Idaho National Engineering Laboratory (INEL), and the Los Alamos National Laboratory (LANL) will remain at those sites until disposition (or movement to lag storage at the disposition facilities).

DOE's strategy for disposition of surplus plutonium is to pursue an approach that allows immobilization of surplus plutonium in glass or ceramic material for disposal in a geologic repository pursuant to the Nuclear Waste Policy Act, and burning of some of the surplus plutonium as mixed oxide (MOX) fuel in existing, domestic, commercial reactors, with subsequent disposal of the spent fuel in a geologic repository pursuant to the Nuclear Waste Policy Act. DOE may also burn MOX fuel in Canadian Deuterium Uranium [CANDU] reactors in the event of an appropriate agreement among Russia, Canada, and the United States, as discussed below. The timing and extent to which either or both of these disposition approaches (immobilization or MOX) are ultimately deployed will depend upon the results of future technology development and demonstrations, follow-on (tiered) site-specific environmental review, contract negotiations, and detailed cost reviews, as well as nonproliferation considerations, and agreements with Russia and other nations. DOE's program will be subject to the highest standards of safeguards and security throughout all aspects of storage, transportation, and processing, and will include appropriate International Atomic Energy Agency verification.

Due to technology, complexity, timing, cost, and other factors that would be involved in purifying certain plutonium materials to make them suitable for potential use in MOX fuel, approximately 30 percent of the total quantity of plutonium (that has or may be declared surplus to defense needs) would require extensive purification to use in MOX fuel, and therefore will likely be immobilized. DOE will immobilize at least 8 metric tons (MT) of currently declared surplus plutonium materials that DOE has already determined are not suitable for use in MOX fuel. DOE reserves the option of using the immobilization approach for all of the surplus plutonium.

The exact locations for disposition facilities will be determined pursuant to a follow-on, site-specific disposition environmental impact statement (EIS) as well as cost, technical and nonproliferation studies. However, DOE has decided to narrow the field of candidate disposition sites. DOE has decided that a vitrification or immobilization facility (collocated with a plutonium conversion facility) will be located at either Hanford or SRS, that a potential MOX fuel fabrication facility will be located at Hanford, INEL, Pantex, or SRS (only one site), and that a ''pit'' disassembly and conversion facility will be located at Hanford, INEL, Pantex, or SRS (only one site). (''Pits'' are weapons components containing plutonium.) The specific reactors, and their locations, that may be used to burn the MOX fuel will depend on contract negotiations, licensing, and environmental reviews. Because there are a number of technology variations that could be used for immobilization, DOE will also determine the specific immobilization technology based on the follow-on EIS, technology developments, cost information, and nonproliferation considerations. Based on current technological and cost information, DOE anticipates that the follow-on EIS will identify, as part of the proposed action, immobilizing a portion of the surplus plutonium using the ''can-in-canister'' technology at the Defense Waste Processing Facility (DWPF) at the Savannah River Site.

The use of MOX fuel in existing reactors would be undertaken in a manner that is consistent with the United States' policy objective on the irreversibility of the nuclear disarmament process and the United States' policy discouraging the civilian use of plutonium. To this end, implementing the MOX alternative would include government ownership and control of the MOX fuel fabrication facility at a DOE site, and use of the facility only for the surplus plutonium disposition program. There would be no reprocessing or subsequent reuse of spent MOX fuel. The MOX fuel would be used in a once-through fuel cycle in existing reactors, with appropriate arrangements, including contractual or licensing provisions, limiting use of MOX fuel to surplus plutonium disposition.

The Department of Energy also retains the option of using MOX fuel in Canadian Deuterium Uranium (CANDU) reactors in Canada in the event a multilateral agreement is negotiated among Russia, Canada, and the United States to use CANDU reactors for surplus United States' and Russian plutonium. DOE will engage in a test and demonstration program for CANDU MOX fuel as appropriate and consistent with future cooperative efforts with Russia and Canada.

These efforts will provide the basis and flexibility for the United States to initiate disposition efforts either multilaterally or bilaterally through negotiations with other nations, or unilaterally as an example to Russia and

other nations. Disposition of the surplus plutonium will serve as a nonproliferation and disarmament example, encourage similar actions by Russia and other nations, and foster multilateral or bilateral disposition efforts and agreements.

EFFECTIVE DATE: The decisions set forth in this Record of Decision (ROD) are effective upon issuance of this document, in accordance with DOE's National Environmental Policy Act (NEPA) Implementing Procedures and Guidelines (10 CFR Part 1021) and the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Parts 1500-1508).

ADDRESSES: Copies of the S&D Final PEIS, the Technical Summary Report For Long-Term Storage of Weapons-Usable Fissile Materials, the Technical Summary Report for Surplus Weapons-Usable Plutonium Disposition, the Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition, and this ROD may be obtained by writing to the U.S. Department of Energy, Office of Fissile Materials Disposition, MD–4, 1000 Independence Avenue, SW., Washington, DC 20585, or by calling (202) 586–4513. The 56-page Summary of the S&D Final PEIS, the other documents noted above (other than the full PEIS), and this ROD are also available on the Fissile Materials Disposition World Wide Web Page at: http://web.fie.com/htdoc/fed/DOE/fsl/pub/menu/any/

FOR FURTHER INFORMATION CONTACT: For information on the storage and disposition of weapons-usable fissile materials program or this ROD contact: Mr. J. David Nulton, Director, NEPA Compliance and Outreach, Office of Fissile Materials Disposition (MD–4), U.S. Department of Energy, 1000 Independence Avenue, SW., Washington, DC 20585, telephone (202) 586–4513.

For information on the DOE NEPA process, contact: Carol M. Borgstrom, Director, Office of NEPA Policy and Assistance (EH–42), U.S. Department of Energy, 1000 Independence Ave., SW, Washington, DC 20585, telephone (202) 586–4600 or leave a message at (800) 472–2756.

SUPPLEMENTARY INFORMATION:

I. Background

The end of the Cold War has created a legacy of surplus weapons-usable fissile materials both in the United States and the former Soviet Union. Further agreements on disarmament may increase the surplus quantities of these materials. The global stockpiles of weapons-usable fissile materials pose a danger to national and international security in the form of potential proliferation of nuclear weapons and the potential for environmental, safety, and health consequences if the materials are not properly safeguarded and managed.

In September 1993, President Clinton issued a Nonproliferation and Export Control Policy in response to the growing threat of nuclear proliferation. Further, in January 1994, President Clinton and Russia's President Yeltsin issued a Joint Statement Between the United States and Russia on Nonproliferation of Weapons of Mass Destruction and the Means of Their Delivery. In accordance with these policies, the focus of the U.S. nonproliferation efforts in this regard is five-fold: (i) To secure nuclear materials in the former Soviet Union; (ii) to assure safe, secure, long-term storage and disposition of surplus weapons-usable fissile materials; (iii) to establish transparent and irreversible nuclear arms reductions; (iv) to strengthen the nuclear nonproliferation regime; and (v) to control nuclear exports. The policy also states that the United States will not encourage the civil use of plutonium and that the United States does not engage in plutonium reprocessing for either nuclear power or nuclear explosive purposes.

To demonstrate the United States' commitment to these objectives, President Clinton announced on March 1, 1995, that approximately 200 metric tons of U.S.-origin weapons-usable fissile materials, of which 165 metric tons are HEU and 38 metric tons are weapons-grade plutonium, had been declared surplus to the United States' defense needs.[1] The safe and secure storage of weapons-usable plutonium and HEU, and the disposition of surplus weapons-usable plutonium, consistent with the Preferred Alternative in the S&D Final PEIS and the decisions described in section V of this ROD, are consistent with the President's nonproliferation policy.

II. Decisions Made in This ROD

This ROD encompasses two categories of decisions: (1) The sites and facilities for storage of non-surplus weapons-usable plutonium and HEU, and storage of surplus plutonium and HEU pending disposition; and (2) the programmatic strategy for disposition of surplus weapons-usable plutonium. This ROD does not encompass the final selection of sites for plutonium disposition facilities, nor the extent to which the two plutonium disposition approaches (immobilization or MOX) will ultimately be implemented. Those decisions will be made pursuant to a follow-on EIS. However, DOE does announce in this ROD that the slate of candidate sites for plutonium disposition has been narrowed. This ROD does not include decisions about the disposition of surplus HEU, which were made in July 1996 in the separate ROD for the Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement, 61 FR 40619 (Aug. 5, 1996).[2]

III. NEPA Process

A. S&D Draft PEIS

On June 21, 1994, DOE published a Notice of Intent (NOI) in the Federal Register (59 FR 31985) to prepare a Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement (S&D PEIS), which was originally to address the storage and disposition of both plutonium and HEU. DOE subsequently concluded that a separate EIS on surplus HEU disposition would be appropriate. Accordingly, DOE published a notice in the Federal Register (60 FR 17344) on April 5, 1995, to inform the public of the proposed plan to prepare a separate EIS for the disposition of surplus HEU.

DOE published an implementation plan (IP) for the S&D PEIS in March 1995 (DOE/EIS–0229–IP). The IP recorded the issues identified during the scoping process, indicated how they would be addressed in the S&D PEIS, and provided guidance for the preparation of the S&D PEIS. DOE issued the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement (S&D Draft PEIS, DOE/EIS–0229–D) for public comment in February 1996. On March 8, 1996, both DOE and the Environmental Protection

[1] The Secretary of Energy's Openness Initiative announcement of February 6, 1996, announced that the United States has about 213 metric tons of surplus fissile materials, including the 200 metric tons the President announced in March, 1995. Of the 213 metric tons of surplus materials, the Openness Initiative announcement indicated that about 174.3 metric tons are HEU and about 38.2 metric tons are weapons-grade plutonium. Additional quantities of plutonium may be declared surplus in the future; therefore, the S&D Final PEIS analyzes the disposition of a nominal 50 metric tons of plutonium, as well as the storage of 89 metric tons of plutonium and 994 metric tons of HEU.

[2] The material considered in the S&D Final PEIS, and covered by the decisions in this ROD, does not include spent nuclear fuel, irradiated targets, uranium-233, plutonium-238, plutonium residues of less than 50-percent plutonium by weight, or weapons program materials-in-use.

Agency (EPA) published Notices of Availability of the S&D Draft PEIS in the Federal Register (61 FR 9443 and 61 9450), announcing a public comment period from March 8 until May 7, 1996. In response to requests from the public, DOE on May 13, 1996 published another Notice in the Federal Register (61 FR 22038) announcing an extension of the comment period until June 7, 1996. Eight public meetings on the S&D Draft PEIS were held during March and April 1996 in Washington, DC and in the vicinity of the DOE sites under consideration for the proposed actions.

During the 92-day public comment period, the public was encouraged to provide comments via mail, toll-free fax, electronic bulletin board (Internet), and toll-free telephone recording device. By these means, DOE received 8,442 comments from 6,543 individuals and organizations for consideration. In addition, 250 oral comments were recorded from some of the 734 individuals who attended the eight public meetings. All of the comments received, and the Department's responses to them, are presented in Volume IV (the Comment Response Document) of the S&D Final PEIS. All of the comments were considered in preparation of the S&D Final PEIS, and in many cases resulted in changes to the document. The Notice of Availability for the S&D Final PEIS was published by EPA in the Federal Register on December 13, 1996 (61 FR 65572). DOE published its own Notice of Availability for the S&D Final PEIS in the Federal Register on December 19, 1996 (61 FR 67001).

B. Alternatives Considered

The S&D PEIS analyzes the reasonable action alternatives in addition to the Preferred Alternative and the No Action Alternative. The Preferred Alternative, which is described below in section V, Decisions, and which DOE has decided to implement, represents a combination of alternatives for both storage and disposition.

1. The Proposed Action

The proposed action, as described in the S&D PEIS, would involve the following actions for U.S. weapons-usable fissile materials:

- Storage—provide a long-term storage system (for up to 50 years) for nonsurplus plutonium and HEU that meets the Stored Weapons Standard [3] and applicable environmental, safety, and health standards while reducing storage and infrastructure costs.
- Storage Pending Disposition—provide storage that meets the Stored Weapons Standard for inventories of weapons-usable plutonium and HEU [4] that have been or may be declared surplus.
- Disposition—convert surplus plutonium and plutonium that may be declared surplus in the future to forms that meet the Spent Fuel Standard,[5] thereby providing evidence of irreversible disarmament and setting a model for proliferation resistance.

2. Long-Term Storage Alternatives and Related Activities

a. No Action. Under the No Action Alternative, all weapons-usable fissile materials would remain at existing storage sites. Maintenance at existing storage facilities would be done as required to ensure safe operation for the balance of the facility's useful life. Sites covered under the No Action Alternative included Hanford, INEL, Pantex, the ORR, SRS, RFETS, and LANL. Although there are no weapons-usable fissile materials within the scope of the S&D PEIS stored currently at Nevada Test Site (NTS), it was also analyzed under No Action to provide an environmental baseline against which impacts of the storage and disposition action alternatives were analyzed.

b. Upgrade at Multiple Sites. Under this alternative for storage, DOE would either modify certain existing facilities or build new facilities, depending on the site's ability to meet standards for nuclear material storage facilities, and would utilize existing site infrastructure to the extent possible. These modified or new facilities would be designed to operate for up to 50 years. Plutonium materials currently stored at Hanford, INEL, Pantex, and SRS would remain at those four sites (in upgraded or new facilities), and HEU would remain at ORR (in upgraded, consolidated facilities). This alternative does not apply to NTS because NTS does not currently store weapons-usable fissile materials.

A sub-alternative of relocating portions of the plutonium inventory (a total of 14.4 metric tons according to DOE's Openness Initiative announcements of December 7, 1993, and February 6, 1996, respectively) from RFETS and LANL to one or more of the four existing plutonium storage sites is analyzed. Storage of surplus materials without strategic reserve and weapons research and development (R&D) materials is also included as a sub-alternative. Within some of the five candidate storage sites under this alternative, there are also multiple storage options.

c. Consolidation of Plutonium. Under this alternative, plutonium materials at existing sites would be removed, and the entire DOE inventory of plutonium would be consolidated at one site, while the HEU inventory would remain at ORR. Again, Hanford, INEL, Pantex and SRS would be candidate sites for plutonium consolidation. In addition, NTS would be a candidate site for this alternative. Consolidation of plutonium at ORR would result in a situation in which inventories of plutonium and HEU were collocated at one site; this alternative was therefore analyzed as one option under the Collocation Alternative (see below). A sub-alternative to account for the separate storage of surplus materials without strategic reserve and weapons R&D materials was also included.

d. Collocation of Plutonium and Highly Enriched Uranium. Under the Collocation Alternative, the entire DOE inventory of plutonium and HEU would be consolidated and collocated at the same site. The six candidate sites would be Hanford, NTS, INEL, Pantex, ORR, and SRS. A sub-alternative for the separate storage of surplus materials without strategic reserve and weapons R&D materials was also included.

3. Plutonium Disposition Alternatives and Related Activities

The disposition technologies analyzed in the S&D PEIS were those that would convert surplus plutonium into a form that would meet the Spent Fuel Standard. For the purpose of environmental impact analyses of the various disposition alternatives, both generic and specific sites were used to provide perspective on these

[3] The ''Stored Weapons Standard'' for weapons-usable fissile materials storage was initially defined in Management and Disposition of Excess Weapons Plutonium, National Academy of Sciences, 1994. DOE defines the Stored Weapons Standard as follows: The high standards of security and accounting for the storage of intact nuclear weapons should be maintained, to the extent practical, for weapons-usable fissile materials throughout dismantlement, storage, and disposition.

[4] The S&D PEIS covers long-term storage of nonsurplus HEU and storage of surplus HEU pending disposition. Until storage decisions are implemented, surplus HEU that has not gone to disposition will continue to be stored pursuant to, and not to exceed the 10-year interim storage time period evaluated in, the Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above the Maximum Historical Storage Level at the Y–12 Plant, Oak Ridge, Tennessee (Y–12 EA) (DOE/EA–0929, September 1994) and Finding of No Significant Impact (FONSI).

[5] The ''Spent Fuel Standard'' for disposition was also initially defined in Management and Disposition of Excess Weapons Plutonium, National Academy of Sciences, 1994. DOE defines the Spent Fuel Standard as follows: The surplus weapons-usable plutonium should be made as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

alternatives. Under each alternative, there are various ways to implement the alternative. These ''variants'' (such as the can-in-canister[6] approach) are shown in Table 1 to provide a range of available options for consideration.

TABLE 1.—DESCRIPTION OF VARIANTS UNDER PLUTONIUM DISPOSITION ALTERNATIVES

Alternatives analyzed	Possible variants
• Deep Borehole Direct Disposition	• Arrangement of plutonium in different types of emplacement canisters.
• Deep Borehole Immobilized Disposition	• Emplacement of pellet-group mix.
	• Pumped emplacement of pellet-grout mix.
	• Plutonium concentration loading, size and shape of ceramic pellets.
• New Vitrification Facilities	• Collocated pit disassembly/conversion, plutonium conversion, and immobilization facilities.
	• Use of either Cs–137 from capsules or HLW as a radiation barrier.
	• Wet or dry feed preparation technologies.
	• An adjunct melter adjacent to the DWPF at SRS, in which borosilicate glass frit with plutonium (without highly radioactive radionuclides) is added to borosilicate glass containing HLW from the DWPF.
	• A can-in-canister approach at SRS in which cans of plutonium glass (without highly radioactive radionuclides) are plaed in DWPF canisters which are then filled with borosilicate glass containing HLW in the DWPF (see Appendix O of the Final PEIS).
	• A can-in-canister approach similar to above but using new facilities at sites other than SRS.
• New Ceramic Immobilization Facilities	• Collocated pit disassembly/plutonium conversion, and immobilization facilities.
	• Use of either Cs–137 from capsules or HLW as a radiation barrier.
	• Wet or dry feed preparation technologies.
	• A can-in-canister approach at SRS in which the plutonium is immobilized without highly radioactive radionuclides in a ceramic matrix and then placed in the DWPF canisters that are then filled with borosilicate glass containing HLW (See Appendix O of the Final PEIS).
	• A can-in-canister approach similar to above but using new facilities at sites other than SRS.
• Electrometallurgical Treatment (glass-bonded zeolite form)	• Immobilize plutonium into metal ingot form.
	• Locate at DOE sites other than ANL–W at INEL.
• Existing LWR With New MOX Facilities	• Pressurized or Boiling Water Reactors.
	• Different numbers of reactors.
	• European MOX fuel fabrication.
	• Modification/completion of existing facilities for MOX fabrication.
	• Collocated pit disassembly/conversion, plutonium conversion, and MOX facilities.
	• Reactors with different core management schemes (plutonium loadings, refueling intervals).
• Partially Completed LWR With New MOX Facilities	• Same as for existing LWR (except that MOX fuel would not be fabricated in Europe).
• Evolutionary LWR With New MOX Facilities	• Same as for partially completed LWR.
• Existing CANDU Reactor With New MOX Facilities	• DIfferent numbers of reactors.
	• Modification/completion of existing facilities for MOX fabrication.
	• Collocated pit disassembly/conversion, plutonium conversion, and MOX facilities.
	• Reactors with different core management schemes (plutonium loadings, refueling intervals).

Note: ANL–W=Argonne National Laboratory-West; Cs–137=cesium-137; HLW=high-level waste; LWR=light water reactor

The first step in plutonium disposition is to remove the surplus plutonium from storage, then process this material in a pit disassembly/conversion facility (for pits) or in a plutonium conversion facility (for non-pit materials). The processing would convert the plutonium material into a form suitable for each of the disposition alternatives described in the following sections. The pit disassembly/conversion facility and the plutonium conversion facility would be built at a DOE site. The six candidate sites for long-term storage were evaluated for the potential environmental impacts of constructing and operating these facilities.

a. No Disposition Action. A ''No Plutonium Disposition'' action means disposition would not occur, and surplus plutonium-bearing weapon components (pits) and other forms, such as metal and oxide, would remain in storage in accordance with decisions on the long-term storage of weapons-usable fissile materials.

b. Deep Borehole Category. Under this category of alternatives, surplus weapons-usable plutonium would be disposed of in deep boreholes that would be drilled at least 4 kilometers (km) (2.5 miles [mi]) into ancient, geologically stable rock formations beneath the water table. The deep borehole would provide a geologic barrier against potential proliferation. A generic site was evaluated for the construction and operation of a borehole complex where the surplus plutonium would be prepared for emplacement in the borehole. This complex would consist of five major facilities: Processing; drilling; emplacing/sealing; waste management; and support (security, maintenance, and utilities).

(1) Direct Disposition (Borehole). Under the Direct Disposition Alternative, surplus plutonium would be removed from storage, processed as necessary, converted to a form suitable for emplacement, packaged, and placed in a deep borehole. The deep borehole would be sealed to isolate the

[6] In the can-in-canister variant, cans of plutonium in a glass or ceramic matrix would be placed in a canister. This canister would then be filled with borosilicate glass containing high-level radioactive waste (HLW) or highly radioactive material such as cesium. This variant, at an existing facility (the Defense Waste Processing Facility [DWPF] at SRS), is described in Appendix O of the S&D Final PEIS.

plutonium from the accessible environment. Long-term performance of the deep borehole would depend on the stability of the geologic system. A generic site was used for the borehole complex to analyze the environmental impact of this alternative.

(2) Immobilized Disposition (Borehole). Under the Immobilized Disposition Alternative, the surplus plutonium would be removed from storage, processed, and converted to a suitable form for shipment to a ceramic immobilization facility. The output of this facility would be spherical ceramic pellets containing plutonium, facilitating handling during transportation and emplacement. The ceramic pellets (about 2.54 centimeters [cm] [1 inch {in}] in diameter and containing 1 percent plutonium by weight) would then be placed in drums and shipped to the borehole complex. At the deep borehole site, the ceramic pellets would be mixed with non-plutonium ceramic pellets and fixed with grout during emplacement. The deep borehole would be sealed to isolate the plutonium from the accessible environment. Long-term performance of the deep borehole would depend on the stability of the geologic system.

Although a generic site was used for analyses of the borehole complex in this alternative, the ceramic immobilization facility would be built at a DOE site. Therefore, the six candidate sites for long-term storage were used to evaluate the environmental impacts of the borehole immobilization facility.

c. Immobilization Category. Under this category of alternatives, surplus plutonium would be immobilized to create a chemically stable form for disposal in a geologic repository pursuant to the Nuclear Waste Policy Act (NWPA).[7] The plutonium material would be mixed with or surrounded by high-level waste (HLW) or other radioactive isotopes and immobilized to create a radiation field that could serve as a proliferation deterrent, along with safeguards and security comparable to those of commercial spent nuclear fuel, thereby achieving the Spent Fuel Standard. All immobilized plutonium would be encased in stainless steel canisters and would remain in onsite vault-type storage until a geologic repository pursuant to the NWPA is operational.

(1) Vitrification. Under the Vitrification Alternative, surplus plutonium would be removed from storage, processed, packaged, and transported to the vitrification facility. In this facility, the plutonium would be mixed with glass frit and highly radioactive cesium-137 (Cs-137) or HLW to produce borosilicate glass logs (a slightly different process, using HLW, would be used for the can-in-canister variant, as discussed in Appendix O of the S&D Final PEIS). The Cs-137 isotope could come from the cesium chloride (CsCl) capsules currently stored at Hanford or from existing HLW if the site selected for vitrification already manages HLW. Each glass log produced from the vitrification facility would contain about 84 kilograms (kg) (185 pounds [lb]) of plutonium. The vitrification facility would be built at a DOE site. The six candidate sites for long-term storage were analyzed for this alternative.

(2) Ceramic Immobilization. Under the Ceramic Immobilization Alternative, surplus plutonium would be removed from storage, processed, packaged, and transported to a ceramic immobilization facility. In this facility, the plutonium would be mixed with nonradioactive ceramic materials and Cs-137 or HLW to produce ceramic disks (a slightly different process, using HLW, would be used for the can-in-canister variant, as discussed in Appendix O of the S&D Final PEIS). Each disk would be approximately 30 cm (12 in) in diameter and 10 cm (4 in) thick, and would contain approximately 4 kg (9 lb) of plutonium. The Cs-137 or HLW would be provided as previously described. The ceramic immobilization facility would be built at a DOE site. The six candidate sites for long-term storage were analyzed for this alternative.

(3) Electrometallurgical Treatment. Under the Electrometallurgical Treatment Alternative, surplus plutonium would be removed from storage, processed, packaged, and transported to new or modified facilities for electrometallurgical treatment. This process could immobilize surplus fissile materials into a glass-bonded zeolite (GBZ) form. With the GBZ material, the plutonium would be in the form of a stable, leach-resistant mineral that is incorporated in durable glass materials.[8] Existing electrometallurgical facilities at INEL were used as a representative site for analysis of potential environmental impacts.

d. Reactor Category. Under the reactor alternatives considered in the S&D PEIS, DOE would fabricate surplus plutonium into MOX fuel for use in reactors. The irradiated MOX fuel would reduce the proliferation risks of the plutonium material, and the reactors would also generate electricity. MOX fuel would be used in a once-through fuel cycle, with no reprocessing or subsequent reuse of spent fuel. The spent nuclear fuel generated by the reactors would then be sent to a geologic repository pursuant to the NWPA.

Because the United States does not have a MOX fuel fabrication facility or capability, a new dedicated MOX fuel fabrication facility would be built at a DOE or commercial site.[9] The surplus plutonium from storage would be processed, converted to plutonium dioxide (PuO_2), and transferred to the MOX fuel fabrication facility. In this facility, PuO_2 and uranium dioxide (UO_2) (from existing domestic sources) would be blended and fabricated into MOX pellets, loaded into fuel rods, and assembled into fuel bundles suitable for use in the reactor alternatives under consideration.

(1) Existing Light Water Reactors. Under the Existing Light Water Reactor (LWR) Alternative, the MOX fuel containing surplus plutonium would be fabricated and transported to existing commercial LWRs in the United States, where the MOX fuel would be used instead of conventional UO_2 fuel. The LWRs employed for domestic electric power generation are pressurized water reactors (PWRs) and boiling water reactors (BWRs). Both types of reactors use the heat produced from nuclear fission reactions to generate steam that drives turbines and generates electricity. Three to five reactor units would be needed.[10]

[7] Also referred to as a permanent, or HLW repository. Pursuant to the Nuclear Waste Policy Act, DOE is currently characterizing the Yucca Mountain Site in Nevada as a potential repository for spent nuclear fuel and HLW. Legislative clarification, or a determination by the Nuclear Regulatory Commission that the immobilized plutonium should be isolated as HLW, may be required before the material could be placed in Yucca Mountain should DOE and the President recommend, and Congress approve, its operation. No Resource Conservation and Recovery Act (RCRA) wastes would be immobilized unless the immobilization would constitute adequate treatment under RCRA. The immobilized product would be consistent with the repository's waste acceptance criteria.

[8] In May 1996, the Department issued a Finding of No Significant Impact (FONSI) (61 Fed. Reg. 25647) and decision to proceed with the limited demonstration of the electrometallurgical treatment process at Argonne National Laboratory-West (ANL–W) at INEL for processing up to 125 spent fuel assemblies from the Experimental Breeder Reactor II (100 drivers and 25 blanket assemblies). Although this alternative could be conducted at other DOE sites, ANL–W is described in the S&D PEIS as the representative site for analysis.

[9] Although a generic commercial site was evaluated in the S&D PEIS, it is not part of the Preferred Alternative or the decisions in this ROD.

[10] It is possible that an existing LWR can be configured to produce tritium, consume plutonium as fuel, and generate revenue through the production of electricity. This configuration is called a multipurpose reactor. Environmental

(2) Partially Completed Light Water Reactors. Under the Partially Completed LWR Alternative, commercial LWRs on which construction has been halted would be completed. The completed reactors would use MOX fuel containing surplus plutonium. The characteristics of these LWRs would be the same as those of the existing LWRs discussed in the Existing LWR Alternative. The Bellefonte Nuclear Plant located along the west bank of the Tennessee River in Alabama was used as a representative site for the environmental analysis of this alternative. Two reactor units (such as those at the Bellefonte Nuclear Plant) would be needed to implement this alternative.

(3) Evolutionary Light Water Reactors. The evolutionary LWRs are improved versions of existing commercial LWRs. Two design approaches were considered in the S&D PEIS. The first is a large PWR or BWR similar to the size of the existing PWR and BWR. The second is a small PWR approximately one-half the size of the large PWR. Two large or four small evolutionary LWRs would be needed to implement this alternative.

Under each design approach for this alternative, evolutionary LWRs would be built at a DOE site. Therefore, the six candidate sites for long-term storage were used to evaluate the environmental impacts of this alternative.

(4) Canadian Deuterium Uranium Reactor. Under the CANDU Reactor Alternative, the MOX fuel containing surplus plutonium would be fabricated in a U.S. facility, then transported for use in one or more commercial heavy water reactors in Canada. The Ontario Hydro Bruce-A Nuclear Generating Station identified by the Government of Canada was used as a representative site for evaluation of this alternative. This station is located on Lake Huron about 300 km (186 mi) northeast of Detroit, Michigan. Environmental analysis of domestic activities up to the U.S./Canadian border is presented in the S&D PEIS. The use of CANDU reactors would be subject to the policies, regulations, and approval of the Federal and Provincial Canadian Governments. Pursuant to Section 123 of the Atomic Energy Act, any export of MOX fuel from the United States to Canada must be made under the agreement for cooperation between the two countries. Spent fuel generated by a CANDU reactor would be disposed under the Canadian spent fuel program.

C. Preferred Alternative

The S&D Final PEIS presented the Department's Preferred Alternative for both storage and disposition. DOE has decided to implement the Preferred Alternative as described in the S&D Final PEIS. Thus, the Preferred Alternative is described in Section V of this ROD, Decisions.

D. Environmental Impacts

Chapter 4 and the appendices of the S&D Final PEIS analyzed the potential environmental impacts of the storage and disposition alternatives in detail. The S&D Final PEIS also evaluated the maximum site impacts that would result at Hanford, INEL, Pantex, and SRS from combining the Preferred Alternative for storage with the Preferred Alternative for disposition. Consistent with the Preferred Alternative, Hanford, INEL, Pantex, and SRS are each a possible location for all or some plutonium disposition activities. The siting, construction, and operation of disposition facilities will be covered in a separate, follow-on EIS. The S&D Final PEIS described the total life cycle impacts that would result from the Preferred Alternative at the DOE sites identified for potential placement of the disposition facilities.

Based on analyses in the S&D Final PEIS, the areas where impacts might be significant are as follows:

- The use of groundwater at the Pantex Plant for storage and disposition facilities could contribute to the overall declining water levels of the Ogallala Aquifer. The projected No Action Alternative water usage at Pantex in the year 2005 reflects a reduction from current usage due to planned downsizing over the next few years. The Preferred Alternative would require a 72-percent increase in the projected No Action Alternative water use; the total amount (428 million liters per year) is considerably less than what is currently being withdrawn (836 million liters per year) at Pantex.
- A set of postulated accidents was used for each plutonium disposition alternative over the life of the campaign to obtain potential radiological impacts at the four DOE sites where disposition facilities could be built. The PEIS analyzes the risk of latent cancer fatalities (reflecting the probability of accident occurrence and the latent cancer fatalities potentially caused by the accident) for accidents that have low probabilities of occurrence and severe consequences, as well as those that have higher probabilities and low consequences. For potential severe accidents, the risk of latent cancer fatalities to the population located within 80 kilometers (50 miles) of the accident for the ''front-end'' disposition process campaign would range from $4.5x10^{-16}$ (that is, approximately 1 chance in 2 quadrillion) to $1.7x10^{-4}$ (approximately 1 chance in 6,000) for the pit disassembly/conversion facility, and from $1.5x10^{-16}$ to $1.3x10^{-4}$ for the plutonium conversion facility. This risk would range from $2.8x10^{-14}$ to $1.8x10^{-5}$ for the vitrification facility, from $7.0x10^{-16}$ to $1.9x10^{-7}$ for the ceramic immobilization facility, and from $4.6x10^{-16}$ to $4.3x10^{-4}$ for the MOX fuel fabrication facility. To estimate the change in risk associated with using MOX fuel instead of uranium fuel in existing LWRs, the severe accident scenarios assumed a large population distribution near a generic existing LWR and extreme meteorological conditions for dispersal, leading to large doses that were not necessarily reflective of actual site conditions. The resultant change in risk of cancer fatalities to a generic population located within 80 km (50 mi) of the severe accidents was estimated to range from $-2.0x10^{-4}$ to $3.0x10^{-5}$ per year[11], reflecting a postulated risk of using MOX fuel that ranges from seven percent lower to eight percent higher than the risk of using uranium fuel. Under the Preferred Alternative, the estimated risk of cancer fatalities under severe accident conditions using MOX fuel in existing LWRs ranges from 0.01 to 0.098 for an 11-year campaign.
- Under the Preferred Alternative, HEU would continue to be stored at the Y–12 Plant at ORR in existing facilities that would be upgraded to meet requirements for withstanding natural phenomena, including earthquakes and tornadoes. This upgrade would reduce the expected risk for the design basis accidents analyzed in the Y–12 EA (for example, Building 9212) by approximately 80 percent, resulting in a latent cancer fatality risk of 7.4×10^{-6} (approximately 7 in a million) to the maximally exposed individual, 5.7×10^{-8} (approximately 6 in 100

analysis of the multipurpose reactor is included in Chapter 4 of the Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling (TSR PEIS) (DOE/EIS–0161, October 1995) and Appendix N of the S&D PEIS. In the TSR PEIS ROD (December 1995), the multipurpose reactor was preserved as an option for future consideration. The Fast Flux Test Facility (FFTF) at Hanford has been under consideration for tritium production, and could also use surplus plutonium as reactor fuel if it were shown to be useful for tritium production. This ROD does not preclude use of the FFTF for tritium production or the potential use of surplus plutonium as fuel for the FFTF.

[11] Accidents severe enough to cause a release of plutonium involved combinations of events that are highly unlikely. Estimates and analyses presented in Chapter 4 and summarized in Table 2.5–3 of the PEIS indicate a range of latent cancer fatalities of 5,900 to 7,300 and a risk of 0.016 to 0.15 of a fatality in the population for the 17-year campaign analyzed under the Existing LWR Alternative.

million) to a non-involved worker, and 5.1×10^{-7} (approximately 5 in 10 million) to the 80-km offsite population.

• Under the Preferred Alternative, safe, secure storage would continue for materials at Hanford, INEL, and ORR, pending disposition. Therefore, there would be no transportation impact at these sites until disposition. The storage transportation impact would come from movement of the RFETS materials to Pantex and SRS. If, following the EIS for construction and operation of plutonium disposition facilities, potential plutonium disposition activities were added to Hanford, INEL, Pantex, and SRS, the estimated total health effects for the life of the project from transportation of surplus plutonium (including transportation of those materials from RFETS to Pantex and SRS) would range from 0.193 fatalities for transportation to Pantex, to 1.87 fatalities for transportation to SRS (primarily from normal expected traffic accidents, not from radiological releases). In addition to the disposition activities at DOE sites, there would be transportation of the MOX fuel from the DOE fuel fabrication site to existing LWRs. The location of the LWRs and the destination of the MOX fuel could be either the eastern or western United States. For 4,000 km (2,486 mi) of such transportation, there could be up to an additional 3.61 potential fatalities (primarily from normal expected traffic accidents, not from radiological releases) for the life of the campaign, assuming 100 percent of the surplus plutonium would be used in commercial reactors. The actual amount would be smaller, and therefore potential fatalities would be lower, under the Preferred Alternative.

• At Hanford, INEL, Pantex, and SRS the Preferred Alternative would slightly increase regional employment and income. At RFETS, phaseout of plutonium storage would result in the loss of approximately 2,200 direct jobs. Compared to the total employment in the area, the loss of these jobs and the impacts to the regional economy would not be severe.

DOE has fully considered all of the environmental analyses in the S&D Final PEIS in reaching the decisions set forth in Section V, below.

E. Avoidance/Minimization of Environmental Harm

For the long-term storage of fissile material, there are four sites (Hanford, NTS, INEL, and LANL) where the Preferred Alternative is ''no action''; that is, no plutonium would be stored at NTS, and at Hanford, INEL, and LANL, DOE would continue storage at existing facilities, using proven nuclear materials safeguards and security procedures, until disposition. These existing facilities would be maintained to ensure their safe operation and compliance with applicable environmental, safety and health requirements. At RFETS, the Preferred Alternative is to phase out storage of weapons-usable fissile materials, thus mitigating environmental impacts at RFETS. There are three sites (Pantex, ORR, and SRS) where the Preferred Alternative is to upgrade existing and planned new facilities. Site-specific mitigation measures for storage at these sites have been described in the S&D Final PEIS, and are summarized as follows:

• At Pantex, to alleviate the effects from using groundwater from the Ogallala Aquifer, the city of Amarillo is considering supplying treated wastewater to Pantex from the Hollywood Road Wastewater Treatment Plant for industrial use; the Department will use such treated wastewater to the extent possible. Radiation doses to individual workers will be kept low by maintaining comprehensive badged monitoring and programs to keep worker exposures ''as low as reasonably achievable'' (ALARA).

• At ORR, radiation doses to individual workers will be kept low by maintaining comprehensive badged monitoring and ALARA programs, including worker rotations. Upgrades for HEU storage to meet performance requirements will include seismic structural modifications as documented in Natural Phenomena Upgrade of the Downsized/Consolidated Oak Ridge Uranium/Lithium Plant Facilities. These modifications will reduce the risk of accidents to workers and the public.

• At SRS, to minimize soil erosion impacts during construction, storm water management and erosion control measures will be employed. Mitigation measures for potential Native American resources will be identified through consultation with the potentially affected tribes. Radiation doses to individual workers will be kept low by maintaining comprehensive badged monitoring and ALARA programs including worker rotations. The modified Actinide Packaging and Storage Facility (APSF) will be designed and operated in accordance with contemporary DOE Orders and regulations to reduce risks to workers and the public.

From a nonproliferation standpoint, the highest standards for safeguards and security will be employed during transportation, storage, and disposition. With respect to transportation, DOE will coordinate the transport of plutonium and HEU with State officials, consistent with current policy. Although the actual routes will be classified, they will be selected to circumvent populated areas, maximize the use of interstate highways, and avoid bad weather. DOE will continue to coordinate emergency preparedness plans and responses with involved states through a liaison program. The packaging, vehicles, and transport procedures being used are specifically designed and tested to prevent a radiological release under all credible accident scenarios.

For the Preferred Alternative for disposition, site-specific mitigation measures will be addressed in the follow-on, site-specific EIS. In the Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives, measures are proposed to reduce the possibility of the theft or loss of material. For both immobilization and MOX fuel fabrication, bulk processing is the point in the disposition process when the material is most vulnerable to covert attempts to steal or divert it. A variety of opportunities for improving safeguards, some of which are already implemented at large, modern facilities, include near real-time accounting, increased automation in the process design, and improved containment and surveillance.

The security risks posed by transportation can be reduced by minimizing the amount of transportation required (for example, putting the plutonium processing and MOX fabrication operations at the same site), minimizing the number of sites to which material has to be shipped, and minimizing the distance between those sites.

F. Environmentally Preferable Alternatives

The environmental analyses in Chapter 4 of the S&D Final PEIS indicate that the environmentally preferable alternative (the alternative with the lowest environmental impacts over the 50 years considered in the PEIS) for storage of weapons-usable fissile materials would be the Preferred Alternative, which consists of No Action at Hanford, NTS, INEL, and LANL pending disposition, phaseout of storage at RFETS, and upgrades that would ultimately reduce environmental vulnerabilities at ORR, SRS, and Pantex.

For disposition of surplus plutonium, the environmentally preferable alternative would be the No Disposition Action alternative, because the

plutonium would remain in storage in accordance with decisions on the long-term storage of weapons-usable fissile materials, and there would be no new Federal actions that could impact the environment. For normal operations, analyses show that immobilization would be somewhat preferable to the existing LWR and preferred alternatives, although these alternatives, with the exception of waste generated, would be essentially environmentally comparable.[12]

Severe facility accident considerations indicate that immobilization options would be environmentally preferable to the existing reactor and preferred alternatives, although the likelihood of occurrence of severe accidents and the risk to the public are expected to be fairly low. Although No Disposition Action would be environmentally preferable, it would not satisfy the purpose and need for the Proposed Action, because the stockpile of surplus plutonium would not be reduced, and the Nonproliferation and Export Control Policy would not be implemented.

The hybrid approach (pursuing both reactors/MOX and immobilization) is being chosen over immobilization alone because of the increased flexibility it will provide by ensuring that plutonium disposition can be initiated promptly should one of the approaches ultimately fail or be delayed. Establishing the means for expeditious plutonium disposition will also help provide the basis for an international cooperative effort that can result in reciprocal, irreversible plutonium disposition actions by Russia. (See discussion in sections IV and V, below.)

IV. Non-Environmental Considerations

A. Technical Summary Reports

To assist in the preparation of this ROD, DOE's Office of Fissile Materials Disposition prepared and in July 1996 issued a *Technical Summary Report for Surplus Weapons-Usable Plutonium Disposition and a Technical Summary Report for Long-Term Storage of Weapons-Usable Fissile Materials.* These Technical Summary Reports (TSRs) summarize technical, cost, and schedule data for the storage and disposition alternatives that are considered in the S&D PEIS. After receiving comments on each of the TSRs, DOE issued revised versions of the reports in October and November, 1996, respectively.

1. Storage Technical Summary Report

This report provides technical, cost and schedule information for long-term storage alternatives analyzed in the S&D PEIS. The cost information for each alternative is presented in constant 1996 dollars and also discounted or present value dollars. It identifies both capital costs and life cycle costs. The following costs are in 1996 dollars.

The cost analyses show that the combination (preferred) alternative for the storage of plutonium would provide advantages to the Department with respect to implementing disposition technologies and would be the least expensive compared to other storage alternatives. The cost of the combination (preferred) alternative would be approximately $30 million in investment and $360 million in operating costs from inception until disposition occurs. The cost of the upgrade at multiple sites alternative would be approximately $380 million in investment and $3.2 billion in operating costs for 50 years. The costs for the consolidation alternative could range from approximately $40 million to $360 million in investment and $600 million to $1.1 billion for operating costs for 50 years, depending on the extent to which existing facilities and capabilities can be shared with other programs at the sites.

The schedule analysis shows that the upgraded storage facilities for plutonium under the combination (preferred) alternative could be operational by 2004 at Pantex (Zone 12), and by 2001 at SRS. The upgrade for the storage of HEU could be completed by 2004 (or earlier). RFETS pits could be received at Pantex beginning in 1997 in Zone 4 on a temporary basis until Zone 12 upgrades are completed. The other analyzed alternatives (upgrade and consolidation) would require about six years to complete.

2. Disposition Technical Summary Report

This report provides technical viability, cost, and schedule information for plutonium disposition alternatives and variants analyzed in the S&D PEIS. The variants analyzed in the report are based on pre-conceptual design information in most cases.

a. Technical Viability Estimates. The report indicates that each of the alternatives appears to be technically viable, although each is currently at a different level of technical maturity. There is high confidence that the technologies are sufficiently mature to allow procurement and/or construction of facilities and equipment to meet plutonium disposition technical requirements and to begin disposition in about a decade.[13]

Reactor Alternatives—Light water reactors (LWRs) can be readily converted to enable the use of MOX fuels. Many European LWRs currently operate on MOX fuel cycles. Although some technical risks exist, they are all amenable to engineering resolution. Sufficient existing domestic reactor capacity exists, unless significant delays occur in the disposition mission. CANDU reactors appear to be capable of operating on MOX fuel cycles, but this has never been demonstrated on any industrial scale. Therefore, additional development would be required to achieve the level of maturity for the CANDU reactors that exists for light water reactors. Partially complete and evolutionary LWRs would involve increased technical risk relative to existing LWRs, as well as the need to complete or build (and license) new reactor facilities. The spent MOX fuel waste form that results from reactor disposition of surplus plutonium will have to satisfy waste acceptance criteria for the geologic repository.

Immobilization Alternatives—All vitrification alternatives require additional research and development prior to implementation of immobilization of weapons-usable plutonium. However, a growing experience base exists relating to the vitrification of high-level waste. These existing technologies can be adapted to the plutonium disposition mission, though different equipment designs and glass formulations will generally be necessary due to criticality considerations and chemical differences between plutonium and HLW that may affect the stability of the glass matrix. Vitrification and ceramic immobilization alternatives are similar with regard to the technical maturity of incorporating plutonium in their respective matrices. The technical viability of electrometallurgical treatment has not yet been established for the plutonium disposition mission. The experimental data base for this alternative is limited, and critical questions on waste form performance are not yet resolved. This alternative is considered practical only if the underlying technology is further

[12] The potential risk of latent cancer fatality for a maximally exposed individual of the public from lifetime accident-free operation under the various alternatives are: $1.2x10^{-9}$ to $1.2x10^{-7}$ for boreholes, $1.2x10^{-9}$ to $1.2x10^{-7}$ for immobilization (vitrification or ceramic immobilization), $1.3x10^{-6}$ to $2.6x10^{-6}$ for existing LWRs, and $9.0x10^{-7}$ to $1.7x10^{-6}$ for the Preferred Alternative.

[13] Actual timing would depend on technical demonstrations, follow-on site-specific environmental review, detailed cost estimates, and international agreements.

developed for spent nuclear fuels.[14] All of the immobilization alternatives will require qualification (to meet acceptance criteria) of the waste form for the geologic repository, and may require legislative clarification or NRC rulemaking.

Deep Borehole Alternatives—Uncertainties for the deep borehole alternatives relate to selecting and qualifying a site; additional legislation and regulations, or legislative and regulatory clarification, may be required. The front-end feed processing operations for the deep borehole alternatives are much simpler than for other alternatives because no highly radioactive materials are processed, thus avoiding the need for remote handling operations. Emplacement technologies are comprised of largely low-technology operations which would be adaptations from existing hardware and processes used in the oil and gas industry.

Hybrid Approaches—Two hybrid approaches that combine technologies were considered as illustrative examples, using existing LWR or CANDU reactors in conjunction with a can-in-canister (immobilization) approach. Hybrids provide insurance against technical or institutional hurdles which could arise for a single technology approach for disposition. If any significant roadblock is encountered in any one area of a hybrid, it would be possible to simply divert the feed material to the more viable technology. In the case of a single technology, such roadblocks would be more problematic.

b. Cost Estimates. The following discussion is in constant 1996 dollars unless otherwise stated.

(1) Investment Costs.

• The investment costs for existing reactor variants tends to be about $1 billion; completing or building new reactors increases the investment cost to between $2 billion and $6 billion.

• The investment cost for the immobilization alternatives ranges from approximately $0.6 billion for the can-in-canister variants to approximately $2 billion for new greenfield variants.[15]

• Hybrid alternatives (combining both immobilization and reactor alternatives) require approximately $200 million additional investment over the existing light water reactor stand-alone alternatives.

• Investment costs for the deep borehole alternatives range from about $1.1 billion for direct emplacement to about $1.4 billion for immobilized emplacement.

• Alternatives that utilize existing facilities for plutonium processing, immobilization, or fuel fabrication would realize significant investment cost savings over building new facilities for the same function.

• Large uncertainties in the cost estimates exist, relating to both engineering and institutional factors.

• A significant fraction of the investment cost for an alternative/variant is related to the front-end facilities for the extraction of the plutonium from pits and other plutonium-bearing materials and for other functions that are common to all alternatives.

(2) Life Cycle Costs.

• The life cycle costs for hybrid alternatives are similar to the stand-alone reactor alternatives. For the existing LWR/immobilization hybrid alternative (preferred alternative), the cost is $260 million higher than the stand-alone reactor alternative; for the CANDU/immobilization hybrid alternative, the cost is $70 million higher.

• The combined investment and net operating costs for MOX fuel are higher than for commercial uranium fuel; thus, the cost of MOX fuel cannot compete economically with low-enriched uranium fuel for LWRs or natural uranium fuel for CANDU reactors.

• The can-in-canister approaches are the most attractive variants for immobilization based on cost considerations.

• The deep borehole alternatives are more expensive than the can-in-canister and existing reactor alternatives. The immobilized borehole alternative life cycle cost is $1 billion greater than that for the direct emplacement alternative ($3.6 billion vs. $2.6 billion).

• Large uncertainties in the cost estimates exist, relating to engineering, regulatory, and policy considerations.

c. Schedule Estimates. The key conclusions of the Disposition Technical Summary Report with respect to schedules are as follows:

• Significant schedule uncertainties exist, relating to both engineering and institutional factors.

• Opportunities for compressing or expanding schedules exist.

(1) Reactor Alternatives. • The rate at which MOX fuel is consumed in reactors will depend on the rate that MOX fuel is provided and fabricated, and the rate that plutonium oxide is provided to the MOX fuel fabrication facility.

• The time to attain production scale operation in existing LWRs and CANDU reactors could be about 8–12 years, depending on the need for and source of test assemblies that might be required.

• The time to complete the disposition mission is a function of the number of reactors committed to the mission, among other factors. For the variants considered, the time to complete varies from about 24 to 31 years.

(2) Immobilization Alternatives.

• The time to start the disposition mission ranges from 7 to 13 years, depending on the technology used and whether existing facilities are used.

• The operating campaign for the immobilization alternatives at full-scale operation would be about 10 years; it is possible to compress or expand the operating schedule by several years, if desired, by resizing the immobilization facility designs selected for analysis in this study. The overall mission duration (including research and development, construction, and operation) is expected to be about 18 to 24 years.

• Potential delays for start-up of the immobilization alternatives involve completing process development and demonstration, and qualifying the waste form for a geologic repository.

(3) Deep Borehole Alternatives. • The time to start-up is expected to be 10 years.

• The operating duration of the mission would be about 10 years, although completing all burial operations at the borehole site in 3 years is possible. Therefore, the overall mission duration is estimated to be 20 years with accelerated emplacement reducing the duration by about 7 years.

• The schedule for the deep borehole alternatives would depend in part on selecting and qualifying a site, and obtaining legislative and regulatory clarification as well as any necessary permits.

(4) Hybrid Approaches. • In general, the schedule data that apply to the component technologies apply to the hybrid alternatives as well.

• Confidence in an early start-up and an earlier completion can both be improved with a hybrid approach, relative to stand-alone alternatives.

• Hybrid alternatives provide an inherent back-up technology approach to enhance confidence in attaining schedule goals.

[14] A recent study by the National Research Council concludes that the electrometallurgical treatment technology is not sufficiently mature to provide a reliable basis for timely plutonium disposition. ''An Evaluation of the Electrometallurgical Approach for Treatment of Excess Weapons Plutonium'' (National Academy Press, Washington, D.C., 1996).

[15] ''Greenfield'' means a variant involving a new facility, with no existing plutonium-handling infrastructure.

B. Nonproliferation Assessment

To assist in the development of this ROD, DOE's Office of Arms Control and Nonproliferation, with support from the Office of Fissile Materials Disposition, prepared a report, Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives. The report was issued in draft form in October 1996, and following a public comment period, was issued in final form in January 1997. It analyzes the nonproliferation and arms reduction implications of the alternatives for storage of plutonium and HEU, and disposition of excess plutonium. It is based in part on a Proliferation Vulnerability Red Team Report prepared for the Office of Fissile Materials Disposition by Sandia National Laboratory. The assessment describes the benefits and risks associated with each option. Some of the ''options'' and ''alternatives'' discussed in the Nonproliferation Assessment are listed as ''variants'' (such as can-in-canister) in the S&D Final PEIS. The key conclusions of the report, as presented in its Executive Summary, are reproduced below.

1. Storage. • Each of the options under consideration for storage of U.S. weapons-usable fissile materials has the potential to support U.S. nonproliferation and arms reduction goals, if implemented appropriately.

• Each of the storage options could provide high levels of security to prevent theft of nuclear materials, and could provide access to excess materials for international monitoring.

• Making excess plutonium and HEU available for bilateral U.S.-Russian monitoring and International Atomic Energy Agency (IAEA) safeguards, while protecting proliferation-sensitive information, would help demonstrate the U.S. commitment never to return this material to nuclear weapons, providing substantial arms reduction and nonproliferation benefits in the near-term.

2. Disposition of U.S. Excess Plutonium

a. In General. • Each of the options for disposition of excess weapons plutonium that meets the Spent Fuel Standard would, if implemented appropriately, offer major nonproliferation and arms reduction benefits compared to leaving the material in storage in directly weapons-usable form. Taking into account the likely impact on Russian disposition activities, the no-action alternative appears to be by far the least desirable of the plutonium disposition options from a nonproliferation and arms reduction perspective.

• Carrying out disposition of excess U.S. weapons plutonium, using options that ensured effective nonproliferation controls and resulted in forms meeting the Spent Fuel Standard, would:

• reduce the likelihood that current arms reductions would be reversed, by significantly increasing the difficulty, cost, and observability of returning this plutonium to weapons;

• increase international confidence in the arms reduction process, strengthening political support for the nonproliferation regime and providing a base for additional arms reductions, if desired;

• reduce long-term proliferation risks posed by this material by further helping to ensure that weapons-usable material does not fall into the hands of rogue states or terrorist groups; and

• lay the essential foundation for parallel disposition of excess Russian plutonium, reducing the risks that Russia might threaten U.S. security by rebuilding its Cold War nuclear weapons arsenal, or that this material might be stolen for use by potential proliferators.

• Choosing the ''no-action alternative'' of leaving U.S. excess plutonium in storage in weapons-usable form indefinitely, rather than carrying out disposition:

• would represent a clear reversal of the U.S. position seeking to reduce excess stockpiles of weapons-usable materials worldwide;

• would make it impossible to achieve disposition of Russian excess plutonium;

• could undermine international political support for nonproliferation efforts by leaving open the question of whether the United States was maintaining an option for rapid reversal of current arms reductions; and

• could undermine progress in nuclear arms reductions.

• The benefits of placing U.S. excess plutonium under international monitoring and then transforming it into forms that met the Spent Fuel Standard would be greatly increased, and the risks of these steps significantly decreased, if Russia took comparable steps with its own excess plutonium on a parallel track. The two countries need not use the same plutonium disposition technologies, however.

• As the 1994 NAS committee report [16] concluded, options for disposition of U.S. excess weapons plutonium will provide maximum nonproliferation and arms control benefits if they:

• minimize the time during which the excess plutonium is stored in forms readily usable for nuclear weapons;

• preserve material safeguards and security during the disposition process, seeking to maintain to the extent possible the same high standards of security and accounting applied to stored nuclear weapons (the Stored Weapons Standard);

• result in a form from which the plutonium would be as inaccessible and unattractive for weapons use as the larger and growing quantity of plutonium in commercial spent fuel (the Spent Fuel Standard).

• In order to achieve the benefits of plutonium disposition as rapidly as possible, and to minimize the risks and negative signals resulting from leaving the excess plutonium in storage, it is important for disposition options to begin, and to complete the mission as soon as practicable taking into account nonproliferation, environment, safety, and health, and economic constraints. Timing should be a key criterion in judging disposition options. Beginning the disposition quickly is particularly important to establishing the credibility of the process, domestically and internationally.

• Each of the options under consideration for plutonium disposition has its own advantages and disadvantages with respect to nonproliferation and arms control, but none is clearly superior to the others.

• Each of the options under consideration for plutonium disposition can potentially provide high levels of security and safeguards for nuclear materials during the disposition process, mitigating the risk of theft of nuclear materials.

• Each of the options under consideration for plutonium disposition can potentially provide for effective international monitoring of the disposition process.

• Plutonium disposition can only reduce, not eliminate, the security risks posed by the existence of excess plutonium, and will involve some risks of its own:

• Because all plutonium disposition options would take decades to complete, disposition is not a near-term solution to the problem of nuclear theft and smuggling. While disposition will make a long-term contribution, the near-term problem must be addressed through programs to improve security and safeguarding for nuclear materials, and to ensure adequate police, customs, and intelligence capabilities to interdict nuclear smuggling.

[16] See footnote 3, above.

• All plutonium disposition options under consideration would involve processing and transport of plutonium, which will involve more risk of theft in the short term than if the material had remained in heavily guarded storage, in return for the long-term benefit of converting the material to more proliferation-resistant forms.

• Both the United States and Russia will still retain substantial stockpiles of nuclear weapons and weapons-usable fissile materials even after disposition of the fissile materials currently considered excess is complete. These weapons and materials will continue to pose a security challenge regardless of what is done with excess plutonium.

• None of the disposition options under consideration would make it impossible to recover the plutonium for use in nuclear weapons, or make it impossible to use other plutonium to rebuild a nuclear arsenal. Therefore, disposition will only reduce, not eliminate, the risk of reversal of current nuclear arms reductions.

• A U.S. decision to choose reactor alternatives for plutonium disposition could offer additional arguments and justifications to those advocating plutonium reprocessing and recycle in other countries. This could increase the proliferation risk if it in fact led to significant additional separation and handling of weapons-usable plutonium. On the other hand, if appropriately implemented, plutonium disposition might also offer an opportunity to develop improved procedures and technologies for protecting and safeguarding plutonium, which could reduce proliferation risks and would strengthen U.S. efforts to reduce the stockpiles of separated plutonium in other countries.

• Large-scale bulk processing of plutonium, including processes to convert plutonium pits to oxide and prepare other forms for disposition, as well as fuel fabrication or immobilization processes, represents the stage of the disposition process when material is most vulnerable to covert theft by insiders or covert diversion by the host state. Such bulk processing is required for all options, however; in particular, initial processing of plutonium pits and other forms is among the most proliferation-sensitive stages of the disposition process, but is largely common to all the options. More information about the specific process designs is needed to determine whether there are significant differences between the various immobilization and reactor options in the overall difficulty of providing effective assurance against theft or diversion during the different types of bulk processing involved, and if so, which approach is superior in this respect.

• Transport of plutonium is the point in the disposition process when the material is most vulnerable to overt armed attacks designed to steal plutonium. With sufficient resources devoted to security, however, high levels of protection against such overt attacks can be provided. International, and particularly overseas, shipments would involve greater transportation concerns than domestic shipments.[17]

b. Conclusions Relating to Specific Disposition Options.

• The reactor options, homogeneous immobilization[18] options, and deep borehole immobilized emplacement option can all meet the Spent Fuel Standard. The can-in-canister options are being refined to increase the resistance to separation of the plutonium cans from the surrounding glass, with the goal of meeting the Spent Fuel Standard. The deep borehole direct emplacement option substantially exceeds the Spent Fuel Standard with respect to recovery by sub-national groups, but could be more accessible and attractive for recovery by the host state than spent fuel.

• The reactor options have some advantage over the immobilization options with respect to perceived irreversibility, in that the plutonium would be converted from weapons-grade to reactor-grade, even though it is possible to produce nuclear weapons with both weapons and reactor-grade plutonium. The immobilization and deep borehole options have some advantage over the reactor options in avoiding the perception that they could potentially encourage additional separation and civilian use of plutonium, which itself poses proliferation risks.

• Options that result in accountable ''items'' (for purposes of international safeguards) whose plutonium content can be accurately measured (such as fuel assemblies or immobilized cans without fission products in the ''can-in-canister'' option) offer some advantage in accounting to ensure that the output plutonium matches the input plutonium from the process. Other options (such as homogeneous immobilization or immobilized emplacement in deep boreholes) would require greater reliance on containment and surveillance to provide assurance that no material was stolen or diverted—but in some cases could involve simpler processing, easing the task of providing such assurance.

• The principal uncertainty with respect to using excess weapons plutonium as MOX in U.S. LWRs relates to the potential difficulty of gaining political and regulatory approvals for the various operations required.

• Compared to the LWR option, the CANDU option would involve more transport and more safeguarding issues at the reactor sites themselves (because of the small size of the CANDU fuel bundles and the on-line refueling of the CANDU reactors). Demonstrating the use of MOX in CANDU reactors by carrying out this option for excess weapons plutonium disposition could somewhat detract from U.S. efforts to convince nations operating CANDU reactors in regions of proliferation concern not to pursue MOX fuel cycles, but these nations are likely to base their fuel cycle decisions primarily on factors independent of disposition of this material. Disposing of excess weapons plutonium in another country long identified with disarmament could have significant symbolic advantages, particularly if carried out in parallel with Russia. Disposition of Russian plutonium in CANDU reactors, however, would require resolving additional transportation issues and additional questions relating to the likely Russian desire for compensation for the energy value of the plutonium.

• The immobilization options have the potential to be implemented more quickly than the reactor options. They face somewhat less political uncertainty but somewhat more technical uncertainty than the reactor options.

• The likelihood of very long delays in gaining approval for siting and construction of deep borehole sites represents a very serious arms reduction and nonproliferation disadvantage of the borehole option, in either of its variants. While the deep borehole direct-emplacement option requires substantially less bulk processing than the other disposition options, that option may not meet the Spent Fuel Standard for retrievability by the host state, as mentioned above. Any potential

[17] International shipments would be involved (from the United States to Canada) if the CANDU option were pursued as a result of international agreements among the U.S., Canada, and Russia. Overseas shipments would be involved if European MOX fuel fabrication were utilized in the interim before a domestic MOX fabrication facility were completed. The Preferred Alternative and the decisions in this ROD do not involve European MOX fuel fabrication.

[18] The term ''homogeneous immobilization'' refers to mixing of solutions of plutonium and either HLW or cesium in liquid form, followed by solidification of the mixture in either glass or ceramic matrices. This contrasts with the ''can-in-canister'' variant, in which the plutonium and HLW or cesium materials are never actually mixed together.

advantage from the reduced processing is small compared to the large timing uncertainty and the potential retrievability disadvantage.

• Similarly, the electrometallurgical treatment option, because it is less developed than the other immobilization options, involves more uncertainty in when it could be implemented, which represents a significant arms reduction and nonproliferation disadvantage. It does not appear to have major compensating advantages compared to the other immobilization options.

• The ''can-in-canister'' immobilization options have a timing advantage over the homogeneous immobilization options, in that, by potentially relying on existing facilities, they could begin several years sooner. As noted above, however, modified systems intended to allow this option to meet the Spent Fuel Standard are still being designed.

C. Comments on the S&D Final PEIS

After issuing the Final PEIS, DOE received approximately 100 letters from organizations and individuals commenting on the alternatives addressed in the PEIS. Many of these letters expressed opposition to the MOX fuel approach for surplus plutonium disposition. The major concern raised in these letters was the contention that the use of MOX fuel is associated with proliferation risk as well as additional delays, costs, and safety and environmental risks. One of these letters was from a coalition of 14 national organizations recommending that the Department decide to utilize immobilization for the disposition of all surplus plutonium and that MOX be retained for use, if at all, only as an ''insurance policy'' if immobilization should prove infeasible. Several of those 14 organizations also wrote separately making similar points. Conversely, many of the letters provided comments in support of the use of MOX fuel and/or a dual path, while a few expressed opposition to the immobilization alternatives.

Seven of the letters received suggested the use of disposition approaches that were not analyzed in the PEIS. Three of these approaches (dropping plutonium into volcanoes, burying it in the sea at the base of a volcano, and storing it in large granite or marble structures) are similar to options that were either considered (but found to be unreasonable) in a screening process that preceded the PEIS, or were addressed in the PEIS Comment Response Document. These approaches were considered to be potentially damaging to the environment, among other things, and were therefore dismissed as unreasonable. Three other alternatives (plasma technology, binding and neutralizing plutonium with a new organic material, and use in rocket engines) recommended in these letters would require a substantial amount of development and could not be accomplished in the same time frame as alternatives analyzed in the PEIS. One commentor suggested adding the plutonium to the radioactive sludge being stored at Hanford for eventual disposal. The Department views this as unreasonable because of delays and increased costs that would be incurred in the program to manage the wastes in the Hanford tanks. One commentor was opposed to the utilization of Hanford's Fuels and Materials Examination Facility for MOX fuel fabrication and the Fast Flux Test Facility for MOX fuel burning.

All of the issues raised in these letters are covered in the body of the Final PEIS, in the Comment Response Document, the Summary Report of the Screening Process (DOE/MD–0002, March 19, 1995), the Technical Summary Report for Surplus Weapons-Usable Plutonium Disposition, or the Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives, which have each been considered in reaching this ROD.

The Department's decision for surplus plutonium disposition is to pursue both the existing LWR (MOX fuel) and immobilization approaches. DOE recognizes that the estimated life-cycle cost of immobilization alone would be less than that of the hybrid approach (pursuing both), but the additional expense would be warranted by the increased flexibility should one of the approaches ultimately fail, and the increased ability to influence Russian plutonium disposition actions. (The lowest cost approach would be the No Disposition Action alternative; however, as noted in section III.F, above, that option would not satisfy the purpose and need for this program.) DOE also recognizes that analyses in the PEIS indicated that, for normal operation, the environmental and health impacts would be somewhat lower for immobilization, although, with the exception of waste generation, impacts for the preferred, immobilization, and existing LWR (MOX) alternatives would be essentially comparable (see prior discussion).

Potential latent cancer fatalities for members of the public under the MOX approach would be significantly higher than under the immobilization approach only under highly unlikely facility accident scenarios; the risk (taking into account accident probabilities) to the public of latent cancer fatalities from accidents would be fairly low for both approaches.

From the nonproliferation standpoint, results of the Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives (see section IV.B) indicated that each of the options under consideration for plutonium disposition has its own advantages and disadvantages, and each can potentially provide high levels of security and safeguards for nuclear materials during the disposition process, mitigating the risk of theft of nuclear materials. Initial processing of plutonium pits and other forms is among the most proliferation-sensitive stages of the disposition process, but is largely common to all the options. Although the Assessment also concluded that none of the approaches is clearly superior to the others, both the Nonproliferation Assessment and a letter from the Secretary of Energy Advisory Board Task Force on the Non-proliferation and Arms Control Implications of Weapons-Usable Fissile Materials Disposition Alternatives (included as Appendix B to the Nonproliferation Assessment) concluded that the hybrid approach (both reactors/MOX and immobilization) is preferable because of uncertainties in each approach and because it would minimize potential delays should problems develop with either approach. Numerous comment letters have made similar points.

One such letter was received from five individuals who were the U.S. participants on the U.S.-Russian Independent Scientific Commission on Disposition of Excess Weapons Plutonium. This letter supported the dual-track approach on the grounds that ''ruling out reactors and thus depending solely on vitrification as the only approach to plutonium disposition that might be implementable anytime soon, would have far bigger nonproliferation liabilities then would the two-track approach.'' These commentors argued that designating only immobilization as the preferred approach, with MOX as a back-up, would have essentially all the nonproliferation and arms reduction liabilities of a one-track approach, which would weaken the U.S. position and have severe consequences for the likely success of programs to carry out permanent disposition of weapons plutonium in Russia, and therefore jeopardize the success of programs to

carry out U.S. disposition. These commentors stated that without the dual-track approach, the U.S. will lose any leverage it might have over the conditions and safeguards accompanying the use of Russian plutonium in their reactors. They also pointed out that pursuing both the MOX option and immobilization in the U.S. may be the best way to convince Russia, which currently favors converting its own plutonium to MOX fuel, of the value of immobilization for a portion of its excess plutonium. These commentors argued that the dual-track approach would not undermine U.S. nonproliferation policy, would not increase the risk of nuclear theft and terrorism, and would not lead to a new domestic plutonium recycle industry since it would not significantly affect the huge economic barriers to using MOX fuel on a commercial basis.

Two commentors expressed opposition to plutonium recycling (reprocessing), citing the Final Generic Environmental Statement on the Use of Recycle Plutonium in Mixed Oxide Fuel in Light Water Cooled Reactors (GESMO), NUREG–0002, which was issued by the NRC in 1976, and President Carter's decision to ban plutonium recycling. DOE notes that plutonium recycling is not part of the plutonium disposition program or the decisions in this ROD; on the contrary, this ROD includes conditions on the use of MOX fuel that are intended to prevent the use of recycled plutonium.

The use of MOX fuel in existing reactors would be undertaken in a manner that is consistent with the United States' policy objective on the irreversibility of the nuclear disarmament process and the United States' policy discouraging the use of plutonium for civil purposes. To this end, implementing the MOX alternative would include government ownership and control of the MOX fuel fabrication facility at a DOE site, and use of the facility only for the surplus plutonium disposition program. There would be no reprocessing or subsequent reuse of spent MOX fuel. The MOX fuel would be used in a once-through fuel cycle in existing reactors, with appropriate arrangements, including contractual or licensing provisions, limiting use of MOX fuel to surplus plutonium disposition.

One commentor, who opposed MOX fuel use, urged DOE not to use European MOX fuel fabrication capability if the MOX approach is pursued. In this ROD, DOE has not decided to use European MOX fuel fabrication.

V. Decisions

A. Storage of Weapons-Usable Fissile Materials

Consistent with the Preferred Alternative in the S&D Final PEIS, the Department has decided to reduce, over time, the number of locations where the various forms of plutonium are stored, through a combination of storage alternatives in conjunction with a combination of disposition alternatives. DOE will begin implementing this decision by moving surplus plutonium from RFETS as soon as possible, transporting the pits to Pantex beginning in 1997, and non-pit plutonium materials to SRS upon completion of the expanded Actinide Packing and Storage Facility (APSF), anticipated in 2001. Over time, DOE will store this plutonium in upgraded facilities at Pantex and in the expanded APSF. Surplus and non-surplus HEU will be stored in upgraded facilities at ORR. Storage facilities for the surplus HEU will also be modified, as needed, to accommodate international inspection requirements consistent with the President's Nonproliferation and Export Control Policy. Accordingly, DOE has decided to pursue the following actions for storage:

- Phase out storage of all weapons-usable plutonium at RFETS beginning in 1997; move pits to Pantex, and non-pit materials to SRS upon completion of the expanded APSF. At Pantex, DOE will repackage pits from RFETS in Zone 12, then place them in existing storage facilities in Zone 4, pending completion of facility upgrades in Zone 12. At SRS, DOE will expand the planned new APSF, and move separated and stabilized non-pit plutonium materials from RFETS to the expanded APSF upon completion. The small number of pits currently at RFETS that are not in shippable form will be placed in a shippable condition in accordance with existing procedures prior to shipment to Pantex. Additionally, some pits and non-pit plutonium materials from RFETS could be used at SRS, LANL, and Lawrence Livermore National Laboratory (LLNL) for tests and demonstrations of aspects of disposition technologies (see disposition decision, below). All non-pit weapons-usable plutonium materials currently stored at RFETS are surplus.

The Department's decision to remove plutonium from RFETS is based on the cleanup agreement among DOE, EPA, and the State of Colorado for RFETS, the proximity of RFETS to the Denver metropolitan area, and the fact that some of the RFETS plutonium is currently stored in buildings 371 and 376, two of the most vulnerable facilities as defined by and identified in DOE's Plutonium Working Group Report on Environmental, Safety, and Health Vulnerabilities Associated With the Department's Plutonium Storage (DOE/EH–0414, November, 1994).

- Upgrade storage facilities at Zone 12 South (to be completed by 2004) at Pantex to store those surplus pits currently stored at Pantex, and surplus pits from RFETS, pending disposition. Storage facilities at Zone 4 will continue to be used for these pits prior to completion of the upgrade.
- In accordance with the preferred alternative in the Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management (Stockpile Stewardship and Management PEIS), store Strategic Reserve pits at Pantex in other upgraded facilities in Zone 12.

The Department's decision to consolidate pit storage at Pantex places the pits at a central location where most of the pits already reside and where the expertise and infrastructure are already in place to accommodate pit storage.[19] Pantex has more than 40 years of experience with the handling of pits. Zone 12 facilities would be modified for long-term storage of the Pantex plutonium inventory and the small number of pits transferred from RFETS and SRS for a modest cost (about $10 million capital cost). Pursuant to the Final EIS for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components (DOE/EIS–0225), DOE is proposing to continue nuclear weapons stockpile management operations and related activities at the Pantex Plant, including interim storage of up to 20,000 pits.[20] Consequently, the storage of surplus pits at Pantex would offer the opportunity to share trained people and other resources, and a decreased cost could be realized over other sites without similar experience. Using the Pantex Plant for pit storage would also involve the lowest cost and the least new construction relative to other sites.

- Expand the planned APSF at SRS (Upgrade Alternative) to store those surplus, non-pit plutonium materials currently at SRS and surplus non-pit plutonium materials from RFETS, pending disposition (see disposition decision, below). DOE analyzed the

[19] A small number of research and development pits located at RFETS that have been and will continue to be packaged and returned to LANL and LLNL are outside the scope of the S&D PEIS and this ROD.

[20] The pits that are to be moved to Pantex pursuant to this ROD fall within the 20,000 pit limit.

potential impacts of constructing and operating the APSF in the Final Environmental Impact Statement, Interim Management of Nuclear Materials (DOE/EIS–0220) and announced the decision to build the facility in the associated ROD (60 FR 65300, December 19, 1995). DOE, pursuant to the decisions announced here to store surplus non-pit plutonium at SRS, will likely design and build the APSF and the expanded space to accommodate the RFETS material as one building,[21] which DOE plans to complete in 2001. The RFETS surplus non-pit plutonium materials[22] will be moved to SRS after stabilization is performed at RFETS under corrective actions in response to Defense Nuclear Facilities Safety Board Recommendation 94–1; and after the material is packaged in DOE-approved storage and shipping containers pursuant to existing procedures. The surplus plutonium already on-site at SRS and the movement of separated and stabilized non-pit plutonium from RFETS would result in the storage of a maximum of 10 metric tons of surplus plutonium in the new, expanded APSF at SRS. In addition, shipment of the non-pit plutonium from RFETS to SRS, after stabilization, would only be implemented if the subsequent ROD for a plutonium disposition site (see Section V.B., below) calls for immobilization of plutonium at SRS. Placement of surplus, non-pit plutonium materials in a new storage facility at SRS will allow utilization of existing expertise and plutonium handling capabilities in a location where disposition activities could occur (see disposition decision, below). The decision to store non-pit plutonium from RFETS at SRS places most non-pit material at a plutonium-competent site with the most modern, state-of-the-art storage and processing facilities, and at a site with the only remaining large-scale chemical separation and processing capability in the DOE complex.[23] Pits currently located at SRS will be moved to Pantex for storage consistent with the Preferred Alternative in the Stockpile Stewardship and Management PEIS. There are no strategic non-pit materials currently located at SRS.

- Continue current storage (No Action) of surplus plutonium at Hanford and INEL, pending disposition (or movement to lag storage[24] at disposition facilities when selected).[25] This action will allow surplus plutonium to remain at the sites with existing expertise and plutonium handling capabilities, and where potential disposition activities could occur (see disposition decision, below). There are no non-surplus weapons-usable plutonium materials currently stored at either site.
- Continue current storage (No Action) of plutonium at LANL, pending disposition (or movement to lag storage at the disposition facilities). This plutonium will be stored in stabilized form with the non-surplus plutonium in the upgraded Nuclear Material Storage Facility pursuant to the No Action alternative for the site.
- Take No Action at the NTS. DOE will not introduce plutonium to sites that do not currently have plutonium in storage.
- Upgrade storage facilities at the Y–12 Plant (Y–12) (to be completed by 2004 or earlier) at ORR to store non-surplus HEU and surplus HEU pending disposition. Existing storage facilities at Y–12 will be modified to meet natural phenomena requirements, as documented in Natural Phenomena Upgrade of the Downsized/Consolidated Oak Ridge Uranium/Lithium Plant Facilities (Y/EN–5080, 1994). Storage facilities will be consolidated, and the storage footprint will be reduced, as surplus HEU is dispositioned and blended to low-enriched uranium, pursuant to the ROD for the Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement (61 FR 40619, August 5, 1996). Consistent with the Preferred Alternative in the Stockpile Stewardship and Management PEIS, HEU strategic reserves will be stored at the Y–12 Plant.

B. Plutonium Disposition

Consistent with the Preferred Alternative in the S&D Final PEIS, DOE has decided to pursue a strategy for plutonium disposition that allows for immobilization of surplus weapons plutonium in glass or ceramic forms and burning of the surplus plutonium as mixed oxide fuel (MOX) in existing reactors. The decision to pursue disposition of the surplus plutonium using these approaches is supported by the analyses in the Disposition Technical Summary Report (section IV.A.2 above) and the Nonproliferation Assessment (section IV.B above), as well as the S&D Final PEIS. The results of additional technology development and demonstrations, site-specific environmental review, detailed cost proposals, nonproliferation considerations, and negotiations with Russia and other nations will ultimately determine the timing and extent to which MOX as well as immobilization is deployed. These efforts will provide the basis and flexibility for the United States to initiate disposition efforts either multilaterally or bilaterally through negotiations with other nations, or unilaterally as an example to Russia and other nations.

Pursuant to this decision, the United States policy not to encourage the civil use of plutonium and, accordingly, not to itself engage in plutonium reprocessing for either nuclear power or nuclear explosive purposes, does not change. Although under this decision some plutonium may ultimately be burned in existing reactors, extensive measures will be pursued (see below) to ensure that federal support for this unique disposition mission does not encourage other civil uses of plutonium or plutonium reprocessing. The United States will maintain its commitments regarding the use of plutonium in civil nuclear programs in western Europe and Japan.

The Disposition Technical Summary Report (section IV.A.2 above) concluded that the lowest cost option for plutonium disposition would be immobilization using the can-in-canister variant and existing facilities to the maximum extent possible, with a net life-cycle cost of about $1.8 billion. The Disposition Technical Summary Report also estimated that the net life-cycle cost of the hybrid immobilization/MOX approach would be about $2.2 billion. The additional expense of pursuing the hybrid approach would be warranted by

[21] Building the APSF in this way, rather than as originally configured plus an expansion, will not increase the potential impacts of constructing and operating the facility beyond those analyzed in the S&D Final PEIS in conjunction with the analyses in the Final Environmental Impact Statement, Interim Management of Nuclear Materials.

[22] This decision does not include residues at RFETS that are less than 50-percent plutonium by weight, or scrub alloys. The management and disposition of those materials has been or is being considered in separate NEPA reviews. See Environmental Assessment for Solid Residue Treatment, Repackaging, and Storage (DOE/EA–1120, April 1996); Notice of Intent to Prepare an EIS on the Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site (61 FR 58866, November 19, 1996).

[23] SRS is one of the preferred candidate sites for plutonium disposition facilities, including the potential for the early start of disposition by immobilization using the can-in-canister option at the DWPF.

[24] Lag storage is temporary storage at the applicable disposition facility.

[25] Lawrence Livermore National Laboratory (LLNL) currently stores 0.3 metric tons of plutonium, which are primarily research and development and operational feedstock materials not surplus to government needs. Adequate storage facilities for this material currently exist at LLNL, where it will be stored and used for research and development activities. None of the plutonium stored at LLNL falls within the scope of the disposition alternatives in the S&D Final PEIS or the disposition decisions in this ROD.

the increased flexibility it would provide, as noted in the Nonproliferation Assessment, to ensure that plutonium disposition could be initiated promptly should one of the approaches ultimately fail or be delayed. Establishing the means for expeditious plutonium disposition will also help provide the basis for an international cooperative effort that can result in reciprocal, irreversible plutonium disposition actions by Russia. This disposition strategy signals a strong U.S. commitment to reducing its stockpile of surplus plutonium, thereby effectively meeting the purpose of and need for the Proposed Action.

To accomplish the plutonium disposition mission, DOE will use, to the extent practical, new as well as modified existing buildings and facilities for portions of the disposition mission. DOE will analyze and compare existing and new buildings and facilities, and technology variations, in a subsequent, site-specific EIS. In addition, all disposition facilities will be designed or modified, as needed, to accommodate international inspection requirements consistent with the President's Nonproliferation and Export Control Policy. Accordingly, DOE has decided to pursue the following strategy and supporting actions for plutonium disposition:

- Immobilize plutonium materials using vitrification or ceramic immobilization at either Hanford or SRS, in new or existing facilities. Immobilization could be used for pure or impure forms of plutonium. In the subsequent EIS (referenced above), DOE anticipates that the preferred alternative for vitrification or ceramic immobilization will include the can-in-canister variant, utilizing the existing HLW and the DWPF at SRS (see below). Alternatively, new immobilization facilities could be built at Hanford or SRS. The immobilized material would be disposed of in a geologic repository. Pursuant to appropriate NEPA review, DOE will continue the research and development leading to the demonstration of the can-in-canister variant at the DWPF using surplus plutonium and the development of vitrification and ceramic formulations.
- Convert surplus plutonium materials into mixed oxide (MOX) fuel for use in existing reactors. Pure surplus plutonium materials including pits, pure metal, and oxides could be converted without extensive processing into MOX fuel for use in existing commercial reactors. Other, already separated forms of surplus plutonium would require additional purification. (This purification would not involve reprocessing of spent nuclear fuel.) The Government-produced MOX fuel (from plutonium declared surplus to defense needs) would be used in existing LWRs with a once-through fuel cycle, with no reprocessing or subsequent reuse of the spent fuel. In addition, DOE will explore appropriate contractual limits to ensure that any reactor license modification for use of the MOX fuel is limited to governmental purposes involving the disposition of surplus, weapons-usable plutonium, so as to discourage general civil use of plutonium-based fuel. The spent MOX fuel would be disposed of in a geologic repository. If partially completed LWRs were to be completed by other parties, they would be considered for this mission. The MOX fuel would be fabricated in a domestic, government-owned facility at one of four DOE sites (SRS, Hanford, INEL, or Pantex).

The Department reserves as an option the potential use of some MOX fuel in CANDU reactors in Canada in the event that a multilateral agreement to deploy this option is negotiated among Russia, Canada, and the United States. DOE will engage in a test and demonstration program for CANDU MOX fuel consistent with ongoing and potential future cooperative efforts with Russia and Canada.

The test and demonstration activities could occur at LANL and at sites in Canada, potentially beginning in 1997, and will be based on appropriate NEPA review. Fabrication of MOX fuel for CANDU reactors would occur in a DOE facility, as would be true in the case of domestic LWRs. Strict security and safeguards would be employed in the fabrication and transport of MOX fuel to CANDU reactors, as well as domestic reactors. Whether, and the extent to which, the CANDU option is implemented will depend on multi-national agreements and the results of the test and demonstration activities.

Due to technology, complexity, timing, cost, and other factors that would be involved in purifying certain plutonium materials to make them suitable for potential use in MOX fuel, approximately 30 percent of the total quantity of plutonium that has been or may be declared surplus to defense needs would require extensive purification for use in MOX fuel, and therefore will likely be immobilized. Of the plutonium that is currently surplus, DOE will immobilize at least 8 metric tons that it has determined are not suitable for use in MOX fuel.[26] DOE reserves the option of using the immobilization approach for all of the surplus plutonium.

The timing and extent to which either option is ultimately utilized will depend on the results of international agreements, future technology development and demonstrations, site-specific environmental review, detailed cost proposals, and negotiations with Russia and other nations. In the event both technologies are utilized, because the time required for plutonium disposition using reactors would be longer than that for immobilization, it is probable that some surplus plutonium would be immobilized initially, prior to completion of reactor irradiation for other surplus plutonium. Implementation of this strategy will involve some or all of the following supporting actions:

- Construct and operate a plutonium vitrification facility or ceramic immobilization facility at either Hanford or SRS. DOE will analyze alternative locations at these two sites for constructing new buildings or using modified existing buildings in subsequent, site-specific NEPA review. SRS has existing facilities (the DWPF) and infrastructure to support an immobilization mission, and at Hanford, DOE has proposed constructing and operating immobilization facilities for the wastes in Hanford tanks.[27] DOE will not create new infrastructure for immobilizing plutonium with HLW or cesium at INEL, NTS, ORR, or Pantex. Due to the substantial timing and cost advantages associated with the can-in-canister option, as discussed in the Technical Summary Report For Surplus Weapons-Usable Plutonium Disposition and summarized in section IV.A.2, above, DOE anticipates that the proposed action for immobilization in the follow-on plutonium disposition EIS will include the use of the can-in-canister option at the DWPF at SRS for immobilizing a portion of the surplus, non-pit plutonium material.[28]

[26] The S&D Final PEIS, for purposes of analysis of impacts of the preferred alternative (using both reactors and immobilization), assumed that about 30 percent (approximately 17 MT) of the surplus plutonium materials might be immobilized because they are impure. DOE's decision here that immobilization will be used for at least 8 MT currently located at SRS and RFETS is based on DOE's current assessment that that quantity of material is so low in quality that its purification for use in MOX fuel would not be cost-effective. This decision does not preclude immobilizing all of the surplus plutonium, but it does preclude using the MOX/reactor approach for all of the material.

[27] See Final Environmental Impact Statement for the Tank Waste Remediation System, Hanford Site, Richland, Washington (DOE/EIS–0189, August 1996); ROD expected early in 1997.

[28] DOE expects to issue a Notice of Intent to prepare the follow-on EIS shortly following this ROD. Reasonable alternatives for the proposed

• Construct and operate a plutonium conversion facility for non-pit plutonium materials at either Hanford or SRS. DOE will collocate the plutonium conversion facility with the vitrification or ceramic immobilization facility discussed above. In subsequent, site-specific NEPA review, DOE will analyze alternative locations at Hanford and SRS for constructing new buildings or using modified existing buildings for the plutonium conversion facility.

• Construct and operate a pit disassembly/conversion facility at Hanford, INEL, Pantex, or SRS (only one site). DOE will not introduce plutonium to sites that do not currently have plutonium in storage. Therefore, two sites analyzed in the S&D PEIS, NTS and ORR, will not be considered further for plutonium disposition activities. DOE will analyze alternative locations at Hanford, INEL, Pantex, and SRS for constructing new buildings or using modified existing buildings in subsequent, site-specific NEPA review. Based on appropriate NEPA review, DOE anticipates demonstrating the Advanced Recovery and Integrated Extraction System (ARIES) concept at LANL for pit disassembly/conversion beginning in fiscal year 1997.

• Construct and operate a domestic, government-owned, limited-purpose MOX fuel fabrication facility at Hanford, INEL, Pantex, or SRS (only one site). As noted above, NTS and ORR will not be considered further for plutonium disposition activities. In follow-on NEPA review, DOE will analyze alternative locations at Hanford, INEL, Pantex, and SRS, for constructing new buildings or using modified existing buildings. The MOX fuel fabrication facility will serve only the limited mission of fabricating MOX fuel from plutonium declared surplus to U.S. defense needs, with shut-down and decontamination and decommissioning of the facility upon completion of this mission. [29]

DOE's program for surplus plutonium disposition will be subject to the highest standards of safeguards and security for storage, transportation, and processing (particularly during operations that involve the greatest proliferation vulnerability, such as during MOX fuel preparation and transportation), and will include International Atomic Energy Agency verification as appropriate. Transportation of all plutonium-bearing materials under this program, including the transportation of prepared MOX fuel to reactors, will be accomplished using the DOE Transportation Safeguards Division's ''Safe Secure Transports'' (SSTs), which affords these materials the same level of transportation safety, security, and safeguards as is used for nuclear weapons.

Pursuant to appropriate NEPA review(s), DOE will continue research and development and engage in further testing and demonstrations of plutonium disposition technologies which may include: dissolution of small quantities of plutonium in both glass and ceramic formulation; experiments with immobilization equipment and systems; fabrication of MOX fuel pellets for demonstrations of reactor irradiation at INEL; mechanical milling and mixing of plutonium and uranium feed; and testing of shipping and storage containers for certification, in addition to the testing and demonstrations previously described for the can-in-canister immobilization variant, the ARIES system, and other plutonium processes.

DOE has decided not to pursue several disposition alternatives that were evaluated in the S&D PEIS: two deep borehole alternatives, electrometallurgical treatment, evolutionary reactors, and partially-completed reactors (unless they were completed by others, in which case they would qualify as existing reactors). Although the deep borehole options are technically attractive, the institutional uncertainties associated with siting of borehole facilities make timely implementation of this alternative unlikely. To implement the borehole alternatives, new legislation and regulations, or clarification of existing regulations, may be necessary. DOE has decided not to pursue the electrometallurgical treatment option for immobilization because its technology is less mature than vitrification or ceramic immobilization. [30] DOE has decided not to pursue evolutionary reactors or partially-completed reactors because they offer no advantages over existing reactors for plutonium disposition and would involve higher costs, greater regulatory uncertainties, higher environmental impacts from construction, and less timely commencement of disposition actions.

VI. Conclusion

DOE has decided to implement a program to provide for safe and secure storage of weapons-usable fissile materials and for disposition of weapons-usable plutonium that is declared excess to national security needs (now or in the future), as specified in the Preferred Alternative in the S&D Final PEIS. DOE will consolidate the storage of weapons-usable plutonium by upgrading and expanding existing facilities at the Pantex Plant in Texas and SRS in South Carolina, continuing storage of surplus plutonium currently onsite at Hanford, LANL, and INEL pending disposition, and continuing storage of weapons-usable HEU at DOE's Y–12 Plant in Tennessee, in upgraded and, as surplus HEU is down-blended under the ROD for Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement, consolidated facilities. DOE will provide for disposition of surplus plutonium by pursuing a strategy that allows: (1) Immobilization of surplus plutonium for disposal in a repository pursuant to the Nuclear Waste Policy Act, and (2) fabrication of surplus plutonium into MOX fuel, for use in existing domestic commercial reactors (and potentially CANDU reactors, depending on future agreements with Russia and Canada). The timing and extent to which each of these disposition technologies is deployed will depend upon the results of future technology development and demonstrations, site-specific environmental review, detailed cost proposals, and the results of negotiations with Russia, Canada, and other nations. This programmatic decision is effective upon being made public, in accordance with DOE's regulations implementing NEPA (10 CFR 1021.315). The goals of this program are to support U.S. nuclear weapons nonproliferation policy by reducing global stockpiles of excess fissile materials so that they may never be used in weapons again. This program will demonstrate the United States'' commitment to its nonproliferation goals, as specified in the President's Nonproliferation and Export Control Policy of 1993, and provide an example for other nations, where stockpiles of surplus weapons-usable fissile materials may be less secure from potential theft or diversion than those in the United

action will be considered in the follow-on disposition EIS.

[29] DOE supports external regulation of its facilities, and in the Report of Department of Energy Working Group on External Regulation (DOE/UF–0001, December 1996), DOE proposed to seek legislation that would generally require NRC licenses for new DOE facilities. Therefore, DOE anticipates seeking an NRC license for the MOX fuel fabrication facility, which would be limited to a license to fabricate MOX fuel from plutonium declared surplus to defense needs. DOE may also seek legislation that would by statute limit the MOX fuel fabrication facility to disposition of surplus plutonium.

[30] An evaluation by the National Research Council in a recent report (see footnote 12, above) concluded that the electrometallurgical treatment process is not sufficiently mature to provide a reliable basis for timely plutonium disposition.

States, to encourage them to take similar actions.

The decision process reflected in this Notice complies with the requirements of the National Environmental Policy Act (42 U.S.C. § 4321 et seq.) and its implementing regulations at 40 CFR Parts 1500–1508 and 10 CFR Part 1021.

Issued in Washington, D.C., January 14, 1997.

Hazel R. O'Leary,

Secretary.

[FR Doc. 97–1355 Filed 1–17–97; 8:45 am]

BILLING CODE 6450–01–P

Energy Information Administration

Agency Information Collection Activities: Proposed Collection; Comment Request

SUMMARY: The Energy Information Administration (EIA) is soliciting comments concerning the proposed three-year extension of existing form DOE–887, ''Department of Energy Customer Surveys.''

DATES: Written comments must be submitted on or before March 24, 1997. If you anticipate that you will be submitting comments, but find it difficult to do so within the period of time allowed by this notice, you should advise the contact listed below of your intention to do so as soon as possible.

ADDRESSES: Send comments to Herbert T. Miller, Office of Statistical Standards, EI–73, Forrestal Building, U.S. Department of Energy, Washington, D.C. 20585, (Phone 202–426–1103, FAX 202-426–1081, or e-mail hmiller@eia.doe.gov).

FOR FURTHER INFORMATION: Requests for additional information should be directed to Herbert Miller at the address listed above.

SUPPLEMENTARY INFORMATION:

I. Background
II. Current Actions
III. Request for Comments

I. Background

In order to fulfill its responsibilities under the Federal Energy Administration Act of 1974 (Pub. L. No. 93–275) and the Department of Energy Organization Act (Pub. L. No. 95–91), the Energy Information Administration is obliged to carry out a central, comprehensive, and unified energy data and information program. As part of this program, EIA collects, evaluates, assembles, analyzes, and disseminates data and information related to energy resource reserves, production, demand, and technology, and related economic and statistical information relevant to the adequacy of energy resources to meet demands in the near and longer term future for the Nation's economic and social needs.

The Energy Information Administration, as part of its continuing effort to reduce paperwork and respondent burden (required by the Paperwork Reduction Act of 1995 (Pub. L. 104–13)), conducts a presurvey consultation program to provide the general public and other Federal agencies with an opportunity to comment on proposed and/or continuing reporting forms. This program helps to ensure that requested data can be provided in the desired format, reporting burden is minimized, reporting forms are clearly understood, and the impact of collection requirements on respondents can be properly assessed. Also, EIA will later seek approval by the Office of Management and Budget (OMB) for the collections under Section 3507(h) of the Paperwork Reduction Act of 1995 (Pub. L. No. 104–13, Title 44, U.S.C. Chapter 35).

On September 11, 1993, the President signed Executive Order No. 12862 aimed at ''* * * ensuring the Federal government provides the highest quality service possible to the American people.'' The Order discusses surveys as a means for determining the kinds and qualities of service desired by Federal Government customers and for determining satisfaction levels for existing services. These voluntary customer surveys will be used to ascertain customer satisfaction with the Department of Energy in terms of services and products. Respondents will be individuals and organizations that are the recipients of the Department's services and products. Previous customer surveys have provided useful information to the Department for assessing how well the Department is delivering its services and products and for making improvements. The results are used internally and summaries are provided to the Office of Management and Budget on an annual basis, and are used to satisfy the requirements and the spirit of Executive Order No. 12862.

II. Current Actions

The request to OMB will be for a three-year extension of the expiration date of approval for DOE to conduct customer surveys. During the past clearance cycle, over 20 customer surveys have been conducted by telephone and mail. (Examples of previously conducted customer surveys are available upon request.) Our planned activities in the next 3 fiscal years reflect our increased emphasis on and expansion of these activities, including an increased use of electronic means for obtaining customer input (CD–ROM and World Wide Web).

III. Request for Comments

Prospective respondents and other interested parties should comment on the actions discussed in item II. The following guidelines are provided to assist in the preparation of responses.

General Issues

A. Is the proposed collection of information necessary, taking into account its accuracy, adequacy, and reliability, and the agency's ability to process the information it collects in a useful and timely fashion?

B. What enhancements can EIA make to the quality, utility, and clarity of the information to be collected?

As a Potential Respondent

A. Average public reporting burden for a customer survey is estimated to be .25 hours per response (8,333 respondents per year x 15 minutes per response = 2,083 hours annually). Burden includes the total time, effort, or financial resources expended to generate, maintain, retain, or disclose or provide the information including: (1) reviewing instructions; (2) developing, acquiring, installing, and utilizing technology and systems for the purposes of collecting, validating, verifying, processing, maintaining, disclosing and providing information; (3) adjusting the existing ways to comply with any previously applicable instructions and requirements; (4) training personnel to respond to a collection of information; (5) searching data sources; (6) completing and reviewing the collection of information; and (7) transmitting, or otherwise disclosing the information.

Please comment on (1) the accuracy of our estimate and (2) how the agency could minimize the burden of the collection of information, including the use of automated collection techniques or other forms of information technology.

B. EIA estimates that respondents will incur no additional costs for reporting other than the hours required to complete the collection. What is the estimated (1) total dollar amount annualized for capital and start-up costs and (2) recurring annual dollar amount of operation and maintenance and purchase of services costs associated with this data collection? The estimates should take into account the costs associated with generating, maintaining, and disclosing or providing the information.

A.2 NOTICE OF INTENT—SURPLUS PLUTONIUM DISPOSITION ENVIRONMENTAL IMPACT STATEMENT

collection on the respondents, including through the use of information technology.

Dated: May 16, 1997.

Gloria Parker,

Director, Information Resources Management Group.

Office of Management

Type of Review: New.

Title: Department of Education Federal Cash Award Certification Statement and Department of Education Federal Cash Quarterly Confirmation Statement.

Frequency: Annually.

Affected Public: Business or other for-profit; Not for Profit institutions; Federal Government; State, Local or Tribal Government, SEAs or LEAs.

Annual Reporting and Recordkeeping Hour Burden:

Responses: 12,000.

Burden Hours: 38,160.

Abstract: The collection of the Federal Cash Award Statement is necessary for the Agency to monitor cash advanced to grantees and to obtain expenditure information for each grant from grantees. Information collection is used to report total outlays to the Office of Management and Budget and the Department of the Treasury and is used to project the Federal government's and the Department's financial condition. This information collection also enables the Department to provide Treasury with outlay information to facilitate Treasury's estimation of future borrowing requirements. Respondents include over 12,000 State, local, college, university, proprietary school and non-profit grantees who draw funds from the Department.

The collection of Federal cash quarterly confirmation statement enables grantees to identify discrepancies in grant authorizations, and funds drawn and funds refunded. Action is required only if a grantee's records do not agree with the information contained on the statement. This information will be used to help grantees report and initiate resolution of discrepancies. Respondents include over 12,000 State, local, college, university, proprietary school and non-profit grantees who draw funds from the Department.

Office of Special Education and Rehabilitative Services

Type of Review: New.

Title: Grantee Reporting Form.

Frequency: Annually.

Affected Public: Business or other for-profit; Not-for-profit institutions; State, local or Tribal Gov't, SEAs or LEAs.

Annual Reporting and Recordkeeping Hour Burden:

Responses: 165.

Burden Hours: 330.

Abstract: Rehabilitation Services Administration (RSA) training grants provide stipends to ''RSA Scholars'' in order to train skilled rehabilitation personnel. Grantees are required to ''track'' scholars, relative to the ''payback'' provision in the Rehabilitation Act. Data collection is reported annually to RSA in order to monitor performance and report progress to Congress.

[FR Doc. 97–13413 Filed 5–21–97; 8:45 am]

BILLING CODE 4000–01–M

DEPARTMENT OF ENERGY

Surplus Plutonium Disposition Environmental Impact Statement

AGENCY: Department of Energy

ACTION: Notice of intent

SUMMARY: The Department of Energy (DOE) announces its intent to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) on the disposition of United States' weapons-usable surplus plutonium. This EIS is tiered from the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement (Storage and Disposition PEIS) (DOE/EIS–0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997.

The EIS will examine reasonable alternatives and potential environmental impacts for the proposed siting, construction, and operation of three types of facilities for plutonium disposition. The first is a facility to disassemble and convert pits (a nuclear weapons component) into plutonium oxide suitable for disposition. As explained in the January 1997 Record of Decision, this pit disassembly and conversion facility will be located at either DOE's Hanford Site, Idaho National Engineering and Environmental Laboratory (INEEL), Pantex Plant, or Savannah River Site (SRS). The second is a facility to immobilize surplus plutonium in a glass or ceramic form for disposition in a geologic repository pursuant to the Nuclear Waste Policy Act. This second facility will be located at either Hanford or SRS, and include a collocated capability to convert non-pit plutonium materials into a form suitable for immobilization. The EIS will discuss various technologies for immobilization. The third type of facility would fabricate plutonium oxide into mixed oxide (MOX) fuel. The MOX fuel fabrication facility would be located at either Hanford, INEEL, Pantex or SRS. MOX fuel would be used in existing commercial light water reactors in the United States, with subsequent disposal of the spent fuel in accordance with the Nuclear Waste Policy Act. Some MOX fuel could also be used in Canadian deuterium uranium (CANDU) reactors depending upon negotiation of a future international agreement between Canada, Russia, and the United States. The EIS will also discuss decommissioning and decontamination (D&D) of the three facilities.

This Notice of Intent describes the Department's proposed action, solicits public input, and announces the schedule for the public scoping meetings.

DATES: Comments on the proposed scope of the Surplus Plutonium Disposition EIS (SPD EIS) are invited from the public. To ensure consideration in the draft EIS, written comments should be postmarked by July 18, 1997. Comments received after that date will be considered to the extent practicable. DOE will hold interactive scoping meetings near sites that may be affected by the proposed action to discuss issues and receive oral and written comments on the scope of the EIS. The locations, dates and times for these public meetings are included in the Supplementary Information section of this notice and will be announced by additional appropriate means.

ADDRESSES: Comments and questions concerning the plutonium disposition program can be submitted by calling (answering machine) or faxing them to the toll free number 1–800–820–5156, or by mailing them to: Bert Stevenson, NEPA Compliance Officer, Office of Fissile Materials Disposition, U.S. Department of Energy, Post Office Box 23786, Washington, DC 20026–3786.

Comments may also be submitted electronically by using the Office of Fissile Materials Disposition's web site. The address is http://web.fie.com/fedix/fisl.html.

FOR FURTHER INFORMATION CONTACT: For general information on the DOE NEPA process, please contact: Carol Borgstrom, Director, Office of NEPA Policy and Assistance, U.S. Department of Energy 1000, Independence Avenue, S.W., Washington, DC 20585, 202–586–4600 or 1–800–472–2756.

SUPPLEMENTARY INFORMATION:

Background

The Storage and Disposition Programmatic Environmental Impact Statement (PEIS) analyzed the potential environmental consequences of alternatives for the long-term storage (up to 50 years) of weapons-usable fissile materials and the disposition of surplus plutonium. Surplus plutonium for disposition refers to that weapons-usable plutonium that the President has declared surplus to national security needs, as well as such plutonium that may be declared surplus in the future. As stated in the Record of Decision for the Storage and Disposition PEIS, the Department decided to pursue a hybrid approach that allows immobilization of surplus plutonium in glass or ceramic form and burning of some of the surplus plutonium as MOX fuel in existing, commercial light water reactors in the United States (and potentially in Canadian Deuterium Uranium (CANDU) reactors in Canada depending on future international agreement). The Department decided that the extent to which either or both of these disposition approaches would ultimately be deployed would depend in part upon future NEPA review, although the Department committed to immobilize at least 8 metric tons (tonnes) of currently declared surplus plutonium and reserved the option of immobilizing all surplus weapons plutonium. In the Record of Decision for the Storage and Disposition PEIS, the Department further decided to: (1) locate the immobilization facility (collocated with a plutonium conversion facility) at either Hanford or SRS; (2) locate a potential MOX fuel fabrication facility at either Hanford, INEEL, Pantex, or SRS; (3) locate a pit disassembly and conversion facility at either Hanford, INEEL, Pantex, or SRS; and (4) determine the specific technology for immobilization based in part on this follow-on disposition EIS.

The processes, materials and technologies involved in surplus plutonium disposition are depicted in Figure 1.

BILLING CODE 6450–01–P

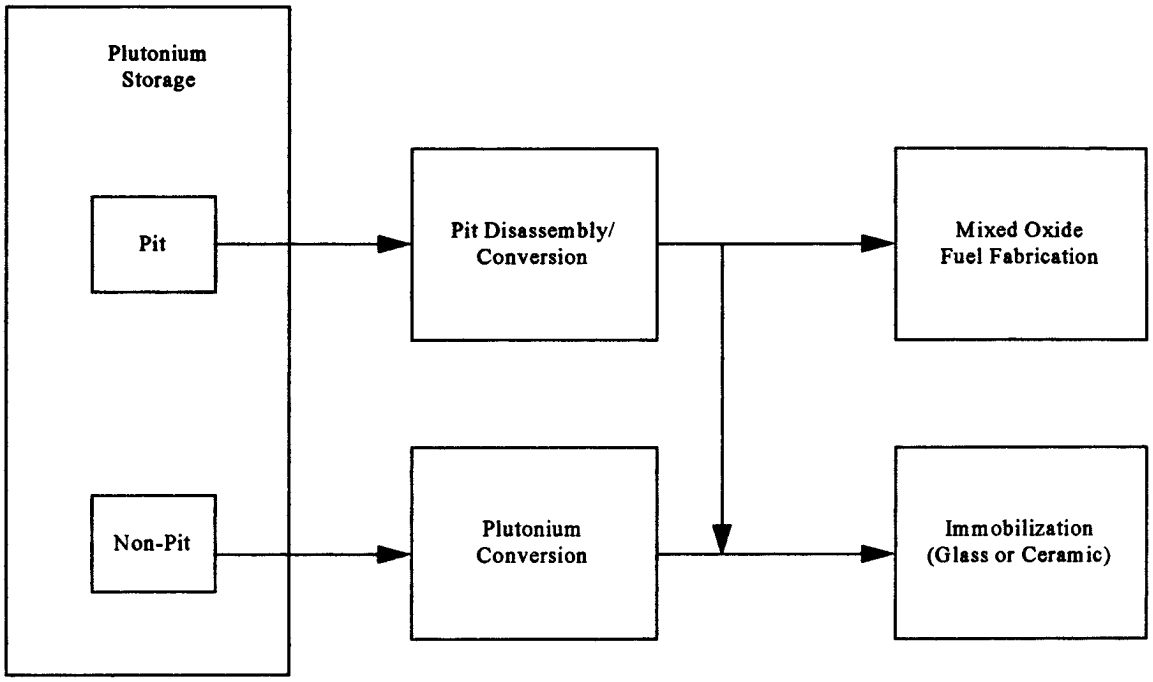

Figure 1. Plutonium Disposition Processes in DOE's Proposed Action

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Proposed Action

The Department proposes to determine whether to continue with both the immobilization and MOX approaches for surplus plutonium disposition and if so, to site, construct, and operate and ultimately D&D three types of facilities for plutonium disposition at one or more of four DOE sites, as follows:

- A collocated non-pit plutonium conversion and immobilization facility at either Hanford, near Richland, Washington, or SRS, near Aiken, South Carolina, with sub-alternatives for the technology and facilities used to form the immobilized plutonium.
- A pit disassembly/conversion facility at either Hanford; SRS; INEEL, near Idaho Falls, Idaho; or the Pantex Plant, near Amarillo, Texas.
- A MOX fuel fabrication facility at either Hanford, INEEL, Pantex, or SRS, with sub-alternatives for fabrication of Lead Test Assemblies for use in fuel qualification demonstrations.

Construction of these facilities would be on previously disturbed land and could include the modification of existing facilities where practicable, to reduce local environmental impacts, reduce costs, and shorten schedules. In the pit disassembly and conversion facility, the Department proposes to disassemble surplus pits and convert the plutonium in them to an unclassified oxide form suitable for disposition. The Department also proposes to convert most non-pit plutonium materials to plutonium oxide at the plutonium conversion facility, which will be collocated with the immobilization facility.

Plutonium Disposition Decisions

The Department expects to make the following decisions based upon the results of this EIS and other information and considerations:

- Whether to construct and operate collocated plutonium conversion and immobilization facilities, and if so, where (including selection of the specific immobilization technology).
- Whether to construct and operate a pit disassembly/conversion facility, and if so, where.
- Whether to construct and operate a MOX fuel fabrication facility, and if so, where (including selection of the site for fabrication of Lead Test Assemblies).

The exact extent to which the MOX approach would ultimately be deployed will depend on a number of factors, in addition to environmental impacts. These are likely to include cost, contract negotiations, and international agreements.

Alternatives

No Action

A No Action alternative will be analyzed (Alternative 1) in the SPD EIS. Implementation of the No Action alternative would mean that disposition would not occur, and surplus weapons-usable plutonium, including pits, metals and oxides, would remain in storage in accordance with the Storage and Disposition PEIS Record of Decision.

Plutonium Disposition Alternatives

The SPD EIS will analyze alternatives for the siting, construction and operation of the three facilities at various candidate sites as described in the Proposed Action. These facilities would be designed so that they could collectively disposition surplus plutonium (existing and future) over their operating lives. Although the exact quantity of plutonium that may be declared surplus over time is not known, for purposes of analysis a nominal 50 tonnes of surplus plutonium will be used for assessing the environmental impacts of plutonium disposition activities at the various candidate sites. Under alternatives involving the ''hybrid'' (immobilization and MOX) approach selected in the Storage and Disposition Record of Decision, the SPD EIS will analyze the same distribution of surplus plutonium that was analyzed in the Storage and Disposition PEIS, which is fabrication of pits and pure plutonium metal or oxide (approximately 33 tonnes) into MOX fuel, and immobilization of the remaining non-pit plutonium (approximately 17 tonnes). The Record of Decision on the Storage and Disposition PEIS states, ''DOE will immobilize at least eight tonnes of currently declared surplus plutonium materials that DOE has already determined are not suitable for use in MOX fuel.'' Since the issuance of that decision, the Department has further determined that a total of about 17 tonnes of surplus plutonium is not suitable for use in MOX fuel without extensive processing. Thus, an alternative for fabricating all surplus plutonium into MOX fuel will not be analyzed. However, converting the full 50 tonnes of surplus plutonium into an immobilized form will be analyzed as a reasonable alternative.

Under each disposition approach, DOE could in principle locate one, two, or all three facilities at a candidate site. However, locating one facility at each of three sites would mean conducting disposition activities at three widely separated locations around the country. This would substantially increase transportation cost, unnecessarily increase exposure of workers and the public, and increase transportation risks, without any apparent compensating benefit. Therefore, the Department is proposing to consider only alternatives that locate two or more facilities at one site, with the possibility of one facility at a separate site. Further, certain combinations of facilities and sites are not being considered as reasonable alternatives, because they would also substantially increase transportation cost, unnecessarily increase exposure to workers and the public, and increase transportation risks, without any apparent compensating benefit.

Based on the above considerations and the candidate site selections in the Storage and Disposition Record of Decision, the following alternatives have been developed in addition to the No Action alternative. Table 1 summarizes the alternatives by site. Alternatives 2 through 10 (see Table 1) would involve immobilization of approximately 17 tonnes of low purity (non-pit) plutonium, and fabrication of approximately 33 tonnes of high purity plutonium (pits and plutonium metal) into MOX fuel. The differences among alternatives 2 through 10 are the locations of the proposed facilities. Alternatives 11 and 12 would involve immobilization of all 50 tonnes of plutonium at either Hanford or SRS.

The Department has identified existing facilities that can be modified for use in plutonium disposition at various candidate sites. A summary of the existing and new facilities (shown in the parentheses in Table 1) to be used in the SPD EIS analyses is given in Table 1, where FMEF is the Fuel and Materials Examination Facility, FPF is the Fuel Processing Facility, and DWPF is the Defense Waste Processing Facility.

Lead Test Assemblies

With respect to the MOX alternatives, the Department would qualify MOX fuel forms for use in existing commercial reactors. DOE will analyze two sub-alternatives for the fabrication of the lead test assemblies needed to qualify the fuel. In one sub-alternative, the lead test assemblies would be fabricated in the United States. Fabrication in the United States would involve constructing a pilot capability in conjunction with the fuel fabrication facility. Therefore, the potential sites include the candidate sites for the fuel fabrication facility (i.e., Hanford, INEEL, Pantex, and SRS). The pilot capability could also be located in an existing small facility at the Los Alamos National Laboratory (LANL). The

second alternative would be for fabrication in existing European facilities; three potential fabrication sites exist (Belgium, France, and the United Kingdom) that would allow fabrication of the Lead Test Assemblies sooner than with any facility under the United States alternative.

TABLE 1.—DISPOSITION ALTERNATIVES

Alternative/Site/Disposition Facility				
Alt. No.	Pit disassembly	MOX plant	Plutonium conversion and immobilization	Amounts of plutonium
1	No Action			
2	Hanford (FMEF)	Hanford (FMEF)	Hanford (FMEF)	17t Immobilization / 33t MOX.
3	SRS (New)	SRS (New)	SRS (New, or Bldg 221F, and DWPF)	17t Immobilization / 33t MOX.
4	Pantex (New)	Hanford (FMEF)	Hanford (FMEF)	17t Immobilization / 33t MOX.
5	Pantex (New)	SRS (New)	SRS (New, or Bldg 221F, and DWPF)	17t Immobilization / 33t MOX.
6	Hanford (FMEF)	Hanford (FMEF)	SRS (New, or Bldg 221F, and DWPF)	17t Immobilization / 33t MOX.
7	INEEL (FPF)	INEEL (New)	SRS (New, or Bldg 221F, and DWPF)	17t Immobilization / 33t MOX.
8	INEEL (FPF)	INEEL (New)	Hanford (FMEF)	17t Immobilization / 33t MOX.
9	Pantex (New)	Pantex (New)	SRS (New, or Bldg 221F, and DWPF)	17t Immobilization / 33t MOX.
10	Pantex (New)	Pantex (New)	Hanford (FMEF)	17t Immobilization / 33t MOX.
11	Hanford (FMEF)	N/A	Hanford (FMEF)	50t Immobilization / 0t MOX.
12	SRS (New)	N/A	SRS (New, or Bldg 221F, and DWPF)	50t Immobilization / 0t MOX.

Immobilization Technology

The Record of Decision on the Storage and Disposition PEIS stated, ''Because there are a number of technology variations that could be used for immobilization, DOE will also determine the specific immobilization technology based upon the follow-on EIS * * *'' (i.e., the SPD EIS). The technologies to be considered are those identified as variants in the Storage and Disposition PEIS.

Preferred Alternative

For immobilization, the Department prefers to use the ''can-in-canister'' technology at the DWPF at SRS. Under the can-in-canister approach, cans containing plutonium in glass or ceramic form would be placed in DWPF canisters, which would be filled with borosilicate glass containing high-level waste.

Classified Information

The Department plans to prepare the SPD EIS as an unclassified document with a classified appendix. The classified information in the SPD EIS will not be available for public review. However, the classified information will be considered by DOE in reaching a decision on the disposition of surplus plutonium. DOE will provide as much information as possible in unclassified form to assist public understanding and comment.

Research and Development Activities

The Department recently announced its intent to prepare two environmental assessments (EAs) for proposed research and development activities that DOE would conduct prior to completion of the SPD EIS and ROD. One EA will analyze the potential environmental impacts of a proposed pit disassembly and conversion integrated systems test at LANL. In addition, to further the purposes of NEPA, this EA will describe other research and development activities currently on-going at various sites, including work related to immobilization and to MOX fuel fabrication. The other EA will be prepared for the proposed shipment of special MOX fuel to Canada for an experiment involving the use of United States and Russian fuel in a Canadian test reactor, for development of fuel for the CANDU reactors. This EA will analyze the prior and future fabrication and proposed shipment of the fuel pellets needed for the experiment.

Relationships With Other DOE NEPA Activities

In addition to the SPD EIS and the EAs discussed above, the Department is currently conducting NEPA reviews of other activities that have a potential relationship with the SPD EIS. They include:

1. *Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage and Disposal of Radioactive and Hazardous Waste* (DOE/EIS–0200D) (Draft issued: September 22, 1995; 60 FR 49264).

2. *Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site EIS* (Notice of Intent to Prepare an Environmental Impact Statement: November 19, 1996; 61 FR 58866).

Invitation To Comment

DOE invites comments on the scope of this EIS from all interested parties, including potentially affected Federal, State, and local agencies, and Indian tribes. Comments can be provided by any of the means listed in the Address Section of this notice and by providing oral and written comments at the scoping meetings.

The Department is requesting, by separate correspondence, that Federal agencies [1] desiring to be designated as cooperating agencies on the SPD EIS inform DOE by July 18, 1997.

Scoping Meetings

Public scoping meetings will be held near each site that may be affected by the proposed action. The interactive scoping meetings will provide the public with the opportunity to present comments, ask questions, and discuss concerns regarding plutonium disposition activities with DOE officials, and for the Department to receive oral and written comments on the scope of the EIS. Written and oral comments will be given equal weight in the scoping process. Input from the scoping meetings along with comments received by other means (phone, mail, fax, web-site) will be used by the Department in refining the scope of the EIS. The locations and dates for these public meetings are as shown below. All meetings will consist of two sessions (1:00 pm to 4:00 pm and 6:00 pm to 9:00 pm).

Hanford Site:

July 1, 1997
Shilo Inn
50 Comstock
Richland, WA 99352
509–946–4661

[1] Arms Control and Disarmament Agency; Department of Defense; Department of State; Environmental Protection Agency; and Nuclear Regulatory Commission.

Idaho National Engineering and Environmental Laboratory

June 10, 1997
Shilo Inn
780 Lindsay Boulevard
Idaho Fall, ID 83402
208–523–0088

Pantex Plant

June 12, 1997
Radisson Inn Airport
7909 I–40 East at Lakeside
Amarillo, TX 79104
806–373–3303

Savannah River Site

June 19, 1997
North Augusta Community Center
495 Brookside Avenue
North Augusta, SC 29841
803–441–4290

Advanced registration for the public meetings is requested but not required. Please call 1–800–820–5134 and leave your name and the location of the meeting(s) you plan to attend. This information will be used to determine the size and number of rooms needed for the meeting.

Scoping Meeting Format:

The Department intends to hold a plenary session at the beginning of each scoping meeting in which DOE officials will more fully explain the framework for the plutonium disposition program, the proposed action, preliminary alternatives for accomplishing the proposed action and public participation in the NEPA process. Following the plenary session, the Department intends to discuss relevant issues in more detail, answer questions, and receive comments. Each scoping meeting for the Surplus Plutonium Disposition EIS will have two sessions, with each session lasting approximately three to four hours.

Issued in Washington, DC this 16 day of May, 1997, for the United States Department of Energy.

Peter N. Brush,

Principal Deputy Assistant Secretary, Environment, Safety and Health.

[FR Doc. 97–13494 Filed 5–21–97; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. RP97–165–003]

Alabama-Tennessee Natural Gas Company; Notice of Compliance Filing

May 16, 1997.

Take notice that on May 12, 1997, Alabama-Tennessee Natural Gas Company (Alabama-Tennessee) tendered for filing the tariff sheets listed in Appendix A to the filing, to be effective June 1, 1997.

Alabama-Tennessee states that the tariff sheets are submitted in compliance with Order No. 587 and the Commission's order issued on May 1, 1997 FERC ¶ 61,117).

Any person desiring to protest said filing should file a protest with the Federal Energy Regulatory Commission, 888 First Street, NE., Washington, DC 20426, in accordance with Section 385.211 of the Commission's Regulations. All such protests must be filed as provided in Section 154.210 of the Commission's Regulations. Protests will be considered by the Commission in determining appropriate action to be taken, but will not serve to make protestants parties to the proceedings. Copies of this filing are on file with the Commission and are available for public inspection.

Lois D. Cashell,

Secretary.

[FR Doc. 97–13441 Filed 5–21–97; 8:45 am]

BILLING CODE 6717–01–M

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. ES97–32–000]

Citizens Utilities Company; Notice of Application

May 16, 1997.

Take notice that on May 9, 1997, Citizens Utilities Company (Applicant) filed an application with the Federal Energy Regulatory Commission under § 204 of the Federal Power Act requesting orders (a) extending the effectiveness of the order in Docket No. ES95–34–000 until the close of business on June 30, 1997, and (b) authorizing the issuance, from time to time, of up to 50,000,000 shares of common stock as stock dividends on shares of its outstanding common stock during a two-year period ending July 1, 1999.

Any person desiring to be heard or to protest said application should file a motion to intervene or protest with the Federal Energy Regulatory Commission, 888 1st Street, NE, Washington, D.C. 20426 in accordance with Rules 211 and 214 of the Commission's Rules of Practice and Procedure (18 CFR 385.211 and 385.214). All such motions or protests should be filed on or before May 20, 1997. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make the protestants parties to the proceeding. Any person wishing to become a party must file a motion to intervene. Copies of this filing are on file with the Commission and are available for public inspection.

Lois D. Cashell,

Secretary.

[FR Doc. 97–13437 Filed 5–21–97; 8:45 am]

BILLING CODE 6717–01–M

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. CP96–712–000]

Discovery Gas Transmission LLC; Notice of Site Visit

May 16, 1997.

On May 22, 1997, beginning at 9:30 a.m., the Office of Pipeline Regulation (OPR) staff will conduct a compliance inspection of the onshore facilities of the Discovery Gas Transmission LLC Pipeline Construction Project in Lafourche Parish, Louisiana, beginning at the Larose Gas Processing Plant site (off state highway 24) in Larose.

All parties may attend. Those planning to attend must provide their own transportation (an air boat is required for most of the pipeline route).

For further information, please contact Paul McKee at (202) 208–1088.

Warren C. Edmunds,

Acting Director, Office of Pipeline Regulation.

[FR Doc. 97–13434 Filed 5–21–97; 8:45 am]

BILLING CODE 6717–01–M

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. ER97–2846–000]

Florida Power Corporation; Notice of Filing

May 16, 1997.

Take notice that on May 5, 1997, Florida Power Corporation (Florida Power) filed an Application for an Order Approving Market-Based Rates for Sales Outside of Florida. In its Application, Florida Power requests authorization to engage in wholesale, bulk power sales outside of Florida at market-determined prices, including sales not involving Florida Power's generation or transmission. Florida Power requests an effective date of 60 days after this filing, or the date on which the Commission issues an order approving Florida Power's application for market-based rates, whichever is earlier.

A.3 AMENDED NOTICE OF AVAILABILITY—SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT, 45-DAY NEPA REVIEW PERIOD

Dated: July 16, 1998.

Richard D. Wilson,

Acting Assistant Administrator.

[FR Doc. 98–19832 Filed 7–23–98; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–5494–1]

Environmental Impact Statements and Regulations; Availability of EPA Comments

Availability of EPA comments prepared July 6, 1998 Through July 10, 1998 pursuant to the Environmental Review Process (ERP), under Section 309 of the Clean Air Act and Section 102(2)(c) of the National Environmental Policy Act as amended. Requests for copies of EPA comments can be directed to the Office of Federal Activities AT (202) 564–5076. An explanation of the ratings assigned to draft environmental impact statements (EISs) was published in FR dated April 10, 1998 (63 FR 17856).

Draft EISs

ERP No. D–FRC–J05078–MT Rating EO2, Missouri-Madison Hydroelectric (FERC No. 2188) Project, Issuing a New licence (Relicense) for Nine Dams and Associated Facilities, MT.

Summary: EPA expressed environmental objections regarding FERC's rejection of Section 10 (j) recommendations; inadequacies in the analysis of thermal issues; the potential for impairment to the beneficial uses; and the rejection of some State Clean Water Act 401 conditions. EPA believes FERC should ensure license conditions that require hydropower operations be done in the best practicable manner to minimize harm to beneficial uses. License conditions also need to incorporate thermal success criteria and appropriate language to reopen the license if success criteria are not adequately attained by proposed mitigation. EPA believes additional information is needed to fully assess and mitigate all potential impacts of the management actions.

ERP No. D–IBR–J28020–UT Rating EO2, Narrows Dam and Reservoir Project, Construction of Supplemental Water Supply for Agricultural and Municipal Water Use, Gooseberry Creek, Sanpete and Carbon Counties, UT.

Summary: EPA expressed environmental objections to the proposed project, and stated that it believes additional, less damaging alternatives are available which would reduce the project related impacts. EPA requested additional detail on mitigation, project impacts, and alternatives.

ERP No. D–IBR–K39045–CA Rating EC2, Programmatic EIS—Central Valley Project Improvement Act (CVPIA) of 1992 Implementation, Central Valley, Trinity, Contra Costa, Alameda, Santa Clara and San Benito Counties, CA.

Summary: EPA expressed strong support for the overall intent of CVPIA implementation; alternatives which provide a strong two-pronged commitment to ecosystem restoration and flexible, efficient use of developed water supplies; and use of CVPIA tools to provide efficient management of existing, developed water supplies. EPA requested additional information and explanation on the range of implementation, relationship between PEIS and subsequent rules and regulations, and to the relationship of the PEIS to interim implementation programs and the ''Garamendi process''

ERP No. DR–DOI–K40222–TT Rating EO2, Palau Compact Road Construction, Revision to Major Transportation and Communication Link on the Island of Babeldaob, Implementation, Funding, Republic of Palau, Babeldaob Island, Trust Territory of the Pacific Islands.

Summary: EPA expressed environmental objections because the RDEIS did not provide sufficient documentation that all practicable means have been undertaken by the Corps and the Republic of Palau to avoid and minimize adverse impacts associated with placing dredged or fill material in wetlands and other aquatic resources protected under CWA Section 404.

Final EISs

ERP No. F–AFS–L65285–AK, Chasina Timber Sale, Harvesting Timber and Road Construction, Tongass National Forest, Craig Ranger District, Ketchikan Administrative Area, AK.

Summary: Review of the Final EIS was not deemed necessary. No formal comment letter was sent to the preparing agency.

ERP No. F–AFS–L65300–AK, Canal Hoya Timber Sale, Implementation, Stikine Area, Tongass National Forest, Value Comparison Unit (VCU), AK.

Summary: Review of the Final EIS was not deemed necessary. No formal comment letter was sent to the preparing agency.

Dated: July 21, 1998.

William D. Dickerson,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 98–19884 Filed 7–23–98; 8:45 am]

BILLING CODE 6560–50–U

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–5493–9]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7167 OR (202) 564–7153.

Weekly receipt of Environmental Impact Statements

Filed July 13, 1998 Through July 17, 1998

Pursuant to 40 CFR 1506.9

EIS No. 980269, Draft EIS, AFS, ID, Eagle Bird Project Area, Timber Harvesting and Road Construction, Idaho Panhandle National Forests, St. Joe Ranger District, Shoshone County, ID, Due: September 07, 1998, Contact: Cameo Flood (208) 245–4517.

EIS No. 980270, Final EIS, FHW, NC, US 70 Improvements Project, I–40 to the Intersection of US 70 and US 70 Business, Funding and COE Section 404 Permit, Wake and Johnston Counties, NC, Due: August 24, 1998, Contact: Nicholas L. Graf, P.E. (919) 733–7842 ext. 260.

EIS No. 980271, Draft EIS, FHW, IN, US 231 Transportation Project, New Construction from CR–200 N to CR–1150′1, Funding, Right-of-Way Permit and COE Section 404 Permit, Spencer and Dubois Counties, IN, Due: October 15, 1998, Contact: Douglas N. Head (317) 226–7487.

EIS No. 980272, Draft EIS, NOA, MS, Grand Bay National Estuarine Research Reserve (NERR), Designation, To Conduct Research, Educational Project and Construction, East of the City of Biloxi, Jackson County, MS, Due: September 07, 1998, Contact: Stephanie Thornton (301) 713–3125 ext. 110

EIS No. 980273, Draft Supplement, FTA, PR, Tren Urbano Transit Project, Updated Information for the Minillas Extension, Construction and Operation, San Juan Metropolitan Area, Funding, NPDES Permit, US Coast Guard Bridge Permit and COE Section 10 and 404 Permits, PR, Due: September 07, 1998, Contact: Alex McNeil (404) 562–3511.

EIS No. 980274, Final EIS, FRC, NB, Kingsley Dam Project (FERC. No. 1417) and North Platte/Keystone Diversion Dam (FERC. No. 1835) Hydroelectric Project, Application for Licenses, Near the confluence of the North/South Platte Rivers, Keith, Lincoln, Garden, Dawson and Gasper Counties, NB, August 24, 1998, Contact: Frankie Green (202) 501–7704.

EIS No. 980275, Draft EIS, FAA, NC, Charlotte/Douglas International Airport, Construction and Operation, New Runway 17/35 (Future 18L/36R Associated Taxiway Improvements, Master Plan Development, Approval Airport Layout Plan (ALP) and COE Section 404 Permit, Mecklenburg County, NC, Due: September 07, 1998, Contact: Thomas M. Roberts (404) 305–7153.

EIS No. 980276, Draft EIS, BOP, PA, Greater Scranton Area, United States Penitentiary (USP) Construction and Operation, Site Selection, Lackawanna and Wayne Counties, PA, Due: September 8, 1998, Contact: David J. Dorworth (202) 514–6470.

EIS No. 980277, Draft EIS, DOE, ID, Advanced Mixed Waste Treatment Project, Construction and Operation, Site Selected, Idaho National Engineering and Environmental Laboratory (INEEL), Eastern Snake River Plain, ID, Due: September 11, 1998, Contact: John Medema (208) 526–1407.

EIS No. 980278, Final EIS, AFS, ID, North Round Valley Timber Sales and Road Construction, Implementation, Payette National Forest, New Meadows Ranger District, Adams County, ID, Due: August 24, 1998, Contact: Kimberly Brandel (208) 347–0300.

Amended Notices

EIS No. 980171, Draft EIS, COE, TX, Dallas Floodway Extension, Implementation, Trinity River Basin, Flood Damage Reduction and Environmental Restoration, Dallas County, TX, Due: August 14, 1998, Contact: Gene T. Rice, Jr. (817) 978–2110. Published FR 05–15–98—Review Period extended.

EIS No. 980267, Draft EIS, DOE, CA, NM, TX, ID, C, WA, Surplus Plutonium Disposition (DOE/EIS–0283) for Siting, Construction and Operation of three facilities for Plutonium Disposition, Possible Sites Hanford, Idaho National Engineering and Environmental Laboratory, Pantex Plant and Savannah River, CA, ID, NM, SC, TX and WA, Due: September 16, 1998, Contact: G. Bert Stevenson (202) 586–5368. This EIS was inadvertently omitted from the 07–17–98 Federal Register. The official 45 days NEPA review period is calculated from 07–17–98.

Dated: July 21, 1998.

William D. Dickerson,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 98–19885 Filed 7–23–98; 8:45 am]

BILLING CODE 6560–50–P

FEDERAL COMMUNICATIONS COMMISSION

Notice of Public Information Collection(s) Submitted to OMB for Review and Approval

July 17, 1998.

SUMMARY: The Federal Communications Commissions, as part of its continuing effort to reduce paperwork burden invites the general public and other Federal agencies to take this opportunity to comment on the following information collection, as required by the Paperwork Reduction Act of 1995, Public Law 104–13. An agency may not conduct or sponsor a collection of information unless it displays a currently valid control number. No person shall be subject to any penalty for failing to comply with a collection of information subject to the Paperwork Reduction Act (PRA) that does not display a valid control number. Comments are requested concerning (a) whether the proposed collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility; (b) the accuracy of the Commission's burden estimate; (c) ways to enhance the quality, utility, and clarity of the information collected; and (d) ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology.

DATES: Written comments should be submitted on or before August 24, 1998. If you anticipate that you will be submitting comments, but find it difficult to do so within the period of time allowed by this notice, you should advise the contact listed below as soon as possible.

ADDRESSES: Direct all comments to Les Smith, Federal Communications Commissions, Room 234, 1919 M St., N.W., Washington, DC 20554 or via internet to lesmith@fcc.gov.

FOR FURTHER INFORMATION CONTACT: For additional information or copies of the information collections contact Les Smith at 202–418–0217 or via internet at lesmith@fcc.gov.

SUPPLEMENTARY INFORMATION:

OMB Approval Number: 3060–0089.

Title: Application for Land Radio Station Authorization in the Maritime Services.

Form No.: FCC 503.

Type of Review: Revision of a currently approved collection.

Respondents: Individuals or households; Businesses or other for-profit entities; Not-for-profit institutions; State, Local or Tribal Government.

Number of Respondents: 700.

Estimated Time Per Response: 45 minutes.

Frequency of Response: On occasion reporting requirements.

Cost to Respondents: $76,224 ($115 application fee for a new station; $90 application fee to modify an existing land station; postage).

Total Annual Burden: 525 hours.

Needs and Uses: FCC Rules require that applicants file FCC Form 503 when applying for a new station or when modifying an existing land radio station in the Maritime Mobile Service or an Alaska Public Fixed Station. This form is required by the Communications Act of 1934, as amended, International Treaties, and FCC Rules—47 CFR Parts 1.922, 80.19, and 80.29. The data collected are necessary to evaluate a request for station authorization in the Maritime Services or an Alaska Public Fixed Station, to issue licenses, and to update the database to allow proper management of the frequency spectrum. FCC Form 503 is being revised to collect Antenna Structure Registration Number/or FCC Form 854 File Number, and Internet or E-mail address of the applicant. Due to changes in the antenna clearance procedures, we no longer need to collect certain antenna information, such as the name of the nearest aircraft landing area and the distance and the direction to the nearest runway. The instructions are being edited accordingly.

Federal Communications Commission.

Magalie Roman Salas,

Secretary.

[FR Doc. 98–19715 Filed 7–23–98; 8:45 am]

BILLING CODE 6712–01–P

FEDERAL COMMUNICATIONS COMMISSION

Notice of Public Information Collection(s) Submitted to OMB for Review and Approval

July 18, 1998.

SUMMARY: The Federal Communications Commission, as part of its continuing effort to reduce paperwork burden invites the general public and other Federal agencies to take this opportunity to comment on the following information collection, as required by the Paperwork Reduction Act of 1995, Pub. L. 104–13. An agency may not conduct or sponsor a collection of information unless it displays a currently valid control number. No person shall be subject to any penalty

A.4 AMENDED NOTICE OF AVAILABILITY—SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT, 60-DAY NEPA REVIEW PERIOD

Burden Statement: The annual burden for this collection of information is estimated to average fourteen work weeks of professional effort at $840 per week, and seven work weeks of clerical support at $360 per week for the government. Approximately 210 requests may be made annually with an average of one hour spent on each request by both entities. The total costs are attributed to labor hours and overhead since there is no capital investment required for this collection of information. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instruction; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instruction and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection information; and transmit or otherwise disclose the information.

Dated: August 3, 1998.

Robert Perciasepe,

Assistant Administrator for Air and Radiation.

[FR Doc. 98–21210 Filed 8–6–98; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[FRL–6139–8]

Agency Information Collection Activities: Comment Request Up for Renewal

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: In compliance with the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*), this document announces that EPA is planning to submit the following continuing Information Collection Request (ICR) to the Office of Management and Budget (OMB): EPA Worker Protection Standard for Hazardous Waste Operations and Emergency Response, EPA ICR #1426.03, OMB Control #2050–0105, Expiration 1/31/99. Before submitting ICR to OMB and Budget (OMB) for review and approval, EPA is soliciting comments on specific aspects of the collection as described below.

DATES: Comments must be submitted on or before October 3, 1998.

ADDRESSES: Office of Solid Waste and Emergency Response, 401 M. Street, SW, MS 5101, Washington, DC 20460.

Remit Comments to: Sella M. Burchette, S EPA/ERT, 2890 Woodbridge Ave., Blg 18, MS 101, Edison, NJ 08837–3679.

To obtain a copy at no charge, please contact Sella Burchette at (732) 321–6726/FAX: (732) 321–6724/or electronically at burchette.sella@epamail.epa.gov.

SUPPLEMENTARY INFORMATION:

Affected entities: Entities affected by this action are those State and local employees engaged in hazardous waste operations and emergency response in the 27 States that do not have Occupational Safety and Health Administration (OSHA) approved State plans.

Title: EPA Worker Protection Standard for Hazardous Waste Operations and Emergency Response, EPA ICR #1426.03, OMB Control #2050–0105, Expiration 1–31–99. This is a request for renewal, without change, of a currently approved collection.

Abstract: Section 126 (f) of the Superfund Amendments and Reauthorization Act of 1986 (SARA) require EPA to set worker protection standards for State and local employees engaged in hazardous waste operations and emergency response in the 27 States that do not have Occupational Safety and Health Administration approved State plans. The EPA coverage, required to be identical to the OSHA standards, extends to three categories of employees: those in clean-ups at uncontrolled hazardous waste sites, including corrective actions at Treatment, Storage and Disposal (TSD) facilities regulated under the Resource Conservation and Recovery Act (RCRA); employees working at routine hazardous waste operations at RCRA TSD facilities; and employees involved in emergency response operations without regard to location. This ICR renews the existing mandatory recordkeeping collection of ongoing activities including monitoring of any potential employee exposure at uncontrolled hazardous waste site, maintaining records of employee training, refresher training, medical exams, and reviewing emergency response plans.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR Chapter 15.

The EPA would like to solicit comments to:

(i) evaluate whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility;

(ii) evaluate the accuracy of the agency's estimates of the burden of the proposed collection of information;

(iii) enhance the quality, utility and clarity of the information to be collected; and

(iv) minimize the burden of the collection of information on those who are to respond, including though the use of appropriate automated electronic, mechanical, or other technology collection techniques or other forms of information technology, e.g. permitting electronic submission of responses.

Burden Statement: The annual recordkeeping burden for this collection is estimated to average 10.64 hours per site or event. The estimated number of respondents is approximated at 100 RCRA regulated TSD facilities or uncontrolled hazardous waste sites; 23,900 State and local police departments, fire departments or hazardous materials response teams. The estimated total burden hours on respondents: 255,427. The frequency of collection: continuous maintenance or records.

Send comments regarding these matters, or any other aspect of the information collection, including suggestions for reducing the burden, to the address listed above.

Dated: July 30, 1998.

Larry Reed,

Acting Office Director, Office of Emergency and Remedial Response.

[FR Doc. 98–21211 Filed 8–6–98; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–5494–3]

Environmental Impact Statements; Notice of Availability

RESPONSIBLE AGENCY: Office of Federal Activities, General Information (202) 564–7167 OR (202) 564–7153.

Weekly receipt of Environmental Impact Statements, Filed July 27, 1998 Through July 31, 1998, Pursuant to 40 CFR 1506.9.

EIS No. 980287, DRAFT EIS, COE, CA, Los Angeles County Drainage Area

(LACDA) Water Conservation and Supply and Santa Fe-Whittier Narrows Dams Feasibility Study, Implementation, Los Angeles County, CA, Due: September 21, 1998, Contact: Ms. Debbie Lamb (213) 452–3798.

EIS No. 980288, FINAL EIS, AFS, CA, Eight Eastside Rivers, Wild and Scenic River Study, Suitability or Nonsuitability, Tahoe National Forest and Lake Tahoe Management Unit, Land and Resource Management Plans, Alpine, El Dorado, Placer, Nevada and Sierra Counties, CA, Due: September 8, 1998, Contact: Phil Horning (530) 478–6210.

EIS No. 980289, FINAL EIS, FHW, TX, Loop 49 Southern Section Construction, TX–155 to TX–110, Funding, Tyler, Smith County, TX, Due: September 8, 1998, Contact: Walter C. Waidelich (512) 916–5988.

EIS No. 980290, DRAFT EIS, NPS, CA, Redwood National and State Parks General Management Plan, Implementation, Humboldt and Del Norte Counties, CA, Due: October 9, 1998, Contact: Alan Schmierer (414) 427–1441.

EIS No. 980291, DRAFT EIS, FHW, MN, TH–23 Reconstruction, MN-TH–22 in Richmond extending through the Cities of Richmond, Cold Spring and Rockville to I–94, Funding, Stearns County, MN, Due: September 22, 1998, Contact: Cheryl Martin (612) 291–6120.

EIS No. 980292, DRAFT EIS, FHW, MO, MO–63 Corridor Project, Transportation Improvement extending from south of the Phelps/Maries County Line and South of Route W near Vida, Funding and COE Section 404 Permit, City of Rolla, Phelps and Maries Counties, MO, Due: October 3, 1998, Contact: Don Neumann (573) 636–7104.

EIS No. 980293, FINAL EIS, FHW, TN, Shelby Avenue/Demonbreum Street Corridor, from I–65 North to I–40 West in Downtown Nashville, Funding, U.S. Coast Guard Permit and COE Section 404 Permit, Davidson County, TN, Due: September 8, 1998, Contact: James E. Scapellato (615) 736–5394.

EIS No. 980294, DRAFT EIS, NOA, MN, Minnesota's Lake Superior Costal Program, Approval and Implementation, St. Louis and Cook Counties, MN, Due: September 21, 1998, Contact: Joseph A. Uravitch (301) 713–3155.

EIS No. 980295, DRAFT EIS, BLM, WY, Carbon Basin Coal Project Area, Coal Lease Application for Elk Mountain/Saddleback Hills, Carbon County, WY, Due: October 6, 1998, Contact: Jon Johnson (307) 775–6116.

EIS No. 980296, FINAL EIS, BLM, AK, Northeast National Petroleum Reserve-Alaska (NPR-A), Integrate Activity Plan, Multiple-Use Management, for Land within the North Slope Borough, AK, Due: September 8, 1998, Contact: Gene Terland (907) 271–3344.

EIS No. 980297, FINAL SUPPLEMENT, AFS, MT, Helena National Forest and Elkhorn Mountain portion of the Deerlodge National Forest Land and Resource Management Plan, Updated Information on Oil and Gas Leasing, Implementation several counties, MT, Due: September 08, 1998, Contact: Tom Andersen (Ext 277) (406) 446–5201.

EIS No. 980298, FINAL EIS, COE, CA, Montezuma Wetlands Project, Use of Cover and Non-cover Dredged Materials to restore Wetland, Implementation, Conditional-Use-Permit, NPDES and COE Section 10 and 404 Permit, Suisum Marsh in Collinsville, Solano County, CA, Due: September 08, 1998, Contact: Liz Varnhagen (415) 977–8451.

EIS No. 980299, FINAL EIS, USA, MD, Aberdeen Proving Ground, Pilot Testing of Neutralization/Biotreatment of Mustard Agent (HD), Design, Construction and Operation, NPDES and COE Section 404 Permit, Harford County, MD, Due: September 08, 1998, Contact: Mr. Matt Hurlburt (410) 612–7027.

EIS No. 980300, DRAFT EIS, COE, AR, Grand Prairie Area Demonstration Project, Implementation, Water Conservation, Groundwater Management and Irrigation Water Supply, Prairie, Arkansas, Monroe and Lonoke Counties, AR, Due: September 21, 1998, Contact: Edward P. Lambert (901) 544–0707.

Amended Notices

EIS No. 980267, DRAFT EIS, DOE, CA, NM, TX, ID, SC, WA, Surplus Plutonium Disposition (DOE/EIS–0283) for Siting, Construction and Operation of three facilities for Plutonium Disposition, Possible Sites Hanford, Idaho National Engineering and Environmental Laboratory, Pantex Plant and Savannah River, CA, ID, NM, SC, TX and WA, Due: September 16, 1998, Contact: G. Bert Stevenson (202) 586–5368. The DOE granted a 60-Day review period for the above project.

EIS No. 980269, DRAFT EIS, AFS, ID, Eagle Bird Project Area, Timber Harvesting and Road Construction, Idaho Panhandle National Forests, St. Joe Ranger District, Shoshone County, ID, Due: September 07, 1998, Contact: Cameo Flood (208) 245–4517. Published FR–07–24–98—Due Date Correction.

Dated: August 4, 1998.

Joseph C. Montgomery,

Environmental Specialist, Office of Federal Activities.

[FR Doc. 98–21235 Filed 8–7–98; 8:45 am]

BILLING CODE 6560–50–U

ENVIRONMENTAL PROTECTION AGENCY

[FRL–6139–5]

Notice of Proposed CERCLA Section 122(h)(1) Administrative Cost Recovery Settlement

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposal of CERCLA section 106 abatement action and section 122(h)(1) administrative cost recovery settlement for the Cecil's Transmission Repair site.

SUMMARY: U.S. EPA proposes to address the potential liability of Buhl and Laura Smith (''Settling Parties'') under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (''CERCLA''), 42 U.S.C. 9601 *et seq.*, by providing for performance of removal actions to abate an imminent and substantial endangerment to the public health, welfare or the environment resulting from the actual or threatened release of hazardous substances at or from the Cecil's Transmission Repair Site (''the Site''), located at 197 and 209 Collier Road, Doylestown, Wayne County, Ohio. U.S. EPA proposes to address the potential liability of the Settling Parties by execution of a CERCLA section 122(h)(1) Administrative Order on Consent (''AOC''), prepared pursuant to 42 U.S.C. 9622(h)(1). The key terms and conditions of the AOC may be briefly summarized as follows: (1) The Settling Parties agree to remove and dispose of all hazardous waste located on the portion of the Site they own, including drums; (2) U.S. EPA provides the Settling Parties a covenant not to sue for recovery of response costs (past and oversight costs) pursuant to section 107(a) of CERCLA, 42 U.S.C. 9607(a), and contribution protection as provided by CERCLA sections 113(f)(2) and 122(h)(4), 42 U.S.C. 9613(f)(2) and 9622(h)(4), conditioned upon satisfactory completion of obligations under the AOC. The Site is not on the NPL, and no further response activities at the Site are anticipated at this time. The total response costs connected with

A.5 NOTICE OF AN AMENDED RECORD OF DECISION FOR THE STORAGE AND DISPOSITION OF WEAPONS-USABLE FISSILE MATERIALS

responsibilities are to (1) evaluate the standards of accreditation applied to applicant foreign medical schools; and (2) determine the comparability of those standards to standards for accreditation applied to United States medical schools.

For Further Information Contact: Bonnie LeBold, Executive Director, National Committee on Foreign Medical Education and Accreditation, 7th and D Streets, S.W., Room 3082, ROB #3, Washington, D.C. 20202–7563. Telephone: (202) 260–3636. Beginning September 28, 1998, you may call to obtain the identity of the countries whose standards are to be evaluated during this meeting.

Dated: August 6, 1998.

David A. Longanecker,

Assistant Secretary for Postsecondary Education.

[FR Doc. 98–21757 Filed 8–12–98; 8:45 am]

BILLING CODE 4000–01–M

DEPARTMENT OF ENERGY

Storage and Disposition of Weapons-Usable Fissile Materials

AGENCY: Department of Energy.

ACTION: Notice of an amended Record of Decision.

SUMMARY: The U.S. Department of Energy (DOE) prepared a final programmatic environmental impact statement, Storage and Disposition of Weapons-Usable Fissile Materials (Storage and Disposition PEIS) (DOE/EIS–0229, December 1996) in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality NEPA implementing regulations, and DOE implementing procedures. The Storage and Disposition PEIS, among other things, assesses the potential environmental impacts of alternatives and locations for storing weapons-usable fissile materials (plutonium and highly enriched uranium).

On January 14, 1997, DOE issued a Record of Decision (Storage and Disposition ROD), 62 FR 3014, (January 21, 1997), selecting weapons-usable fissile materials storage and surplus plutonium disposition strategies. For plutonium storage, DOE decided to consolidate part of its weapons-usable plutonium storage by upgrading and expanding existing and planned facilities at the Pantex Plant (Pantex) near Amarillo, Texas and the Savannah River Site (SRS) near Aiken, South Carolina. For plutonium currently stored at the Hanford Site (Hanford) near Richland, Washington, and other DOE sites, DOE decided that surplus weapons-usable plutonium would remain at these sites until disposition (or move to lag storage at a disposition facility). The weapons-usable plutonium stored at the Rocky Flats Environmental Technology Site (RFETS), near Golden, Colorado, would be moved to Pantex and the SRS. However, the plutonium destined for the SRS, i.e., non-pit, weapons-usable surplus plutonium, would be moved only if: (1) the plutonium had been stabilized under corrective actions in response to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94–1 and packaged to meet the DOE storage Standard 3013–96, Criteria for Safe Storage of Plutonium Metals and Oxides, (2) the construction and expansion of the Actinide Packaging and Storage Facility (APSF) at the SRS had been completed, and (3) the SRS had been selected in the upcoming Record of Decision for the Surplus Plutonium Disposition Environmental Impact Statement as the immobilization disposition site for surplus weapons-usable plutonium.

In order to support the early closure of the RFETS and the early deactivation of plutonium storage facilities at the Hanford site, DOE is modifying, contingent upon the satisfaction of certain conditions, some of the decisions made in its Storage and Disposition ROD associated with surplus plutonium storage pending disposition. Namely, DOE will take steps that allow: (1) the accelerated shipment of all non-pit surplus weapons-usable plutonium from the RFETS (about 7 metric tons) to the SRS beginning in about 2000, in advance of completion of the APSF in 2001, and (2) the relocation of all Hanford surplus weapons-usable plutonium (about 4.6 metric tons) to the SRS, between about 2002 and 2005, pending disposition. However, consistent with the Storage and Disposition PEIS ROD, DOE will only implement the movement of RFETS and Hanford non-pit, surplus weapons-usable plutonium inventories to the SRS if the SRS is selected as the immobilization disposition site. DOE is preparing the Surplus Plutonium Disposition Environmental Impact Statement (SPD EIS), draft issued July 1998, as part of the decision making process for determining an immobilization site.[1]

To accommodate the storage of Hanford surplus weapons-usable plutonium, DOE will expand the APSF as planned in the Storage and Disposition ROD. In addition, to accommodate the early receipt and storage of the RFETS surplus plutonium, the Department will prepare additional suitable storage space in Building 105–K (i.e., K–Reactor) in the K–Area at the SRS. Portions of Building 105–K will be modified to provide safe and secure plutonium storage. Safeguards and security features will be upgraded, criticality monitoring devices will be installed, structural features will be inspected and repaired, roof vents will be added, and doors will be modified. Several areas in the facility will be decontaminated and excess equipment will be removed to provide additional floor space.

Modifications will also include dismantling and removing unused process equipment in four building areas: Stack Area, Crane Maintenance Area, Crane Wash Area, and Process Room.

Security systems in the four building areas will be reactivated and upgraded to support using them for plutonium storage. Existing systems including the K-Area security perimeter, security control system and building water/power ventilation support systems will be used. Building modifications will provide for truck loading and unloading, material conformation, shipping accountability measurements, and storage. The Department will also declassify (process the metal to produce unclassified ''buttons'') some of the RFETS plutonium materials using SRS's FB-Line (in the F-Area) and after declassification, package this material in the APSF to meet the DOE storage Standard 3013–96, Criteria for Safe Storage of Plutonium Metals and Oxides.

All plutonium materials shipped to SRS will be stable and, except for classified metal and/or parts, will be packaged to meet the requirements of the DOE Standard 3013–96, Criteria for Safe Storage of Plutonium Metals and Oxides, before shipment. All shipments of plutonium to SRS will be by Safe Secure Transport (SST) in accordance with applicable DOE, U.S. Department of Transportation and U.S. Nuclear Regulatory Commission requirements and regulations. Some of the RFETS plutonium material packaged and shipped will be less than 50% plutonium by weight; as a result, there will be approximately 3% more total weight of material and a corresponding increase in the number of shipments than considered in the Storage and Disposition PEIS, although the total amount of plutonium in the material will remain about the same.

Under the previous ROD, a maximum of 10 metric tons of surplus plutonium, including plutonium from RFETS and existing onsite plutonium, would be

[1] SRS has been identified by DOE as the preferred site for the immobilization disposition facility.

stored at SRS in the APSF, pending disposition, provided that SRS is selected as the immobilization site following completion of the Surplus Plutonium Disposition EIS. Transfer of plutonium from RFETS to SRS would begin when the APSF is completed in 2001.

With this amended ROD, a total of approximately 11.6 metric tons of surplus weapons-usable plutonium from Hanford and RFETS (in addition to existing onsite SRS surplus plutonium, for a total of approximately 14 metric tons of surplus plutonium) could be stored at SRS in the APSF and Building 105–K, pending disposition, provided that SRS is selected as the immobilization site. Transfer of plutonium from RFETS to SRS would begin when the modifications to Building 105–K are completed, i.e., in about 2000; shipments of plutonium from Hanford to SRS would begin in about 2002.

This amended ROD only alters DOE's previous decision (Storage and Disposition ROD) for the storage of non-pit, surplus weapons-usable plutonium currently located at the RFETS and Hanford sites. No changes are being made to other storage decisions or any decisions associated with surplus fissile material disposition.

In accordance with 10 CFR 1021.314, DOE has prepared a Supplement Analysis to determine if these changes require a supplement to the Storage and Disposition PEIS under the Council on Environmental Quality Regulations at 40 CFR 1502.9(c). The Supplement Analysis shows that the new proposed action does not result in a substantial change to environmental concerns evaluated in the Storage and Disposition PEIS. Also, the Supplement Analysis shows that the proposed action does not present significant new circumstances or information relevant to the environmental concerns evaluated in the Storage and Disposition PEIS. Therefore, based on the Supplement Analysis, DOE has determined that a supplement to the Storage and Disposition PEIS is not required, and DOE has decided not to prepare such a supplement.

FOR FURTHER INFORMATION CONTACT: For further information on the long-term storage or the disposition of weapons-usable fissile materials, or to receive a copy of the final Storage and Disposition PEIS, the Storage and Disposition EIS ROD or the Supplement Analysis, contact: G. Bert Stevenson, NEPA Compliance Officer, Office of Fissile Materials Disposition (MD–4), U.S. Department of Energy, 1000 Independence Avenue, SW., 1Washington, DC 20585, (202) 586–5368.

For further information on the DOE NEPA process, contact: Carol M. Borgstrom, Director, Office of NEPA Policy and Assistance (EH–42), U.S. Department of Energy, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586–4600, or leave a message at (800) 472–2756.

SUPPLEMENTARY INFORMATION:

I. Background

A. Current Storage Program and Original Decision for Surplus Weapons-Usable Plutonium

DOE is currently phasing out the storage of all weapons-usable plutonium at RFETS. The phaseout involves shipping all RFETS pits to Pantex, and shipping all RFETS surplus non-pit, weapons-usable plutonium to the SRS (subject to certain conditions) starting in about 2001. As decided in the January 1997 Storage and Disposition PEIS ROD, the stabilized non-pit, surplus weapons-usable plutonium would not be moved unless and until: expansion of the APSF[2] at the SRS had been completed; the RFETS material had been stabilized and packaged to meet the Criteria for Safe Storage of Plutonium Metals and Oxides for long-term storage under corrective actions in response to the Defense Nuclear Facilities Safety Board Recommendation 94–1; and DOE had decided to immobilize plutonium at the SRS. The Department also decided to continue the current storage of surplus plutonium at Hanford, the Idaho National Engineering and Environmental Laboratory (INEEL), and Los Alamos National Laboratory (LANL) pending disposition (or movement to lag storage); and to pursue a strategy for plutonium disposition that would immobilize surplus weapons-usable plutonium in glass or ceramic forms and would allow the burning of some of the surplus weapons-usable plutonium (mostly from pits) as mixed oxide fuel in existing commercial light-water reactors.

B. Need to Change Storage Program

Recently, DOE has estimated that accelerating the closure of RFETS from 2010 to 2006 could save as much as $1.3 billion. Integral to achieving an accelerated closure of the site would be removal of the non-pit, surplus weapons-usable plutonium to SRS two years earlier than the current plan. Removal of the surplus plutonium at RFETS is only one of several steps to realize the savings. Other steps are proposed or ongoing pursuant to separate NEPA review. DOE also expects that the transfer of non-pit, surplus weapons-useable plutonium from Hanford to Savannah River could save as much as $150 million in upgrade and operating costs for plutonium storage facilities at the Hanford Site. As with the RFETS plutonium, the transfer would not be accomplished unless DOE decided to locate the plutonium immobilization facility at the Savannah River Site. The implementation cost for the proposed action is estimated to be approximately $93 million.

Closing RFETS by 2006 would, among other things, require the removal of non-pit, surplus weapons-usable plutonium metal and oxide from RFETS by 2002. In order to remove all the non-pit, surplus weapons-usable plutonium from RFETS by 2002, DOE would have to begin transferring the material to the SRS by January 2000, prior to completing the construction of the APSF.

DOE has also reevaluated plutonium storage operations at Hanford and determined that transferring all (about 4.6 metric tons) non-pit, surplus weapons-usable plutonium from that site for storage could save the Department as much as $150 million by avoiding upgrade and operating costs for plutonium storage facilities at the Hanford Site. DOE is considering the early transfer of plutonium from Hanford to the SRS as a means of achieving this savings.

These transfers would not occur unless DOE decides to immobilize plutonium at the SRS. A ROD to select the immobilization site is anticipated in early 1999 in the SPD EIS.

C. Proposed Action

The Department of Energy is proposing to accelerate the movement of all (about 7 metric tons) of non-pit, surplus weapons-usable plutonium at the RFETS and to move all (about 4.6 metric tons) of the surplus weapons-usable plutonium at Hanford to the SRS for storage pending disposition. The RFETS plutonium would be shipped to the SRS from about January 2000 through 2002. The Hanford plutonium would be shipped to the SRS from about 2002 through 2005.

The plutonium would not be moved to SRS unless the Department decides to disposition (immobilize) the non-pit,

[2] The APSF has been designed but not built. Construction is scheduled to start in October 1998 and the facility is scheduled to be in operation by October 2001. Expansion of the APSF refers to increasing the vault capacity of the facility to the current design of 5,000 storage positions (sufficient storage space for current SRS materials and RFETS materials).

surplus weapons-usable plutonium at SRS, after completion of the final Surplus Plutonium Disposition Environmental Impact Statement. In addition, the plutonium would not be shipped until it were stabilized and packaged to meet DOE Standard 3013–96, *Criteria for Safe Storage of Plutonium Metals and Oxides* in response to Defense Nuclear Facilities Safety Board Recommendation 94–1. This proposed action is consistent with DOE's objective, as explained in the ROD for the Storage and Disposition PEIS, to reduce over time the number of locations where plutonium is stored in the DOE complex.

Starting in about January 2000, all non-pit, surplus weapons-usable plutonium (except for classified plutonium) would be shipped to Building 105-K. At Building 105-K, the shipping containers [3] would be unloaded using a battery powered fork-lift truck. Material control and accountability measurements would be made at Building 105-K. The shipping containers would then be loaded onto metal pallets and transferred to a storage location in the building. DOE would not open any of the shipping containers in Building 105-K. While in storage, the containers would be inspected on a regular basis to assure external container integrity.[3] DOE has successfully used (and continues to use) shipping containers for plutonium storage at the SRS. No problems with a loss of material confinement have been experienced to date.

Portions of Building 105-K will be modified to facilitate plutonium storage. Safeguards and security features will be upgraded, criticality monitoring devices will be installed, structural features will be inspected and repaired, and roof vents will be added and doors will be modified. Several areas in the facility will be decontaminated and excess equipment will be removed to provide additional floor space.[4]

Modifications will include dismantling and removing unused process equipment in four building areas: Stack Area, Crane Maintenance Area, Crane Wash Area, and Process Room. These areas total approximately 30,000 square feet, are within the security areas that existed for reactor operations, and are adjacent to a currently active highly enriched uranium storage area. Security systems in the four building areas will be reactivated and upgraded to support using them for plutonium storage. Existing systems including the K-Area security perimeter, security control system and building water/power ventilation support systems will be used. Building modifications will provide for truck loading and unloading, material conformation, shipping accountability measurements, and storage.

Some of the RFETS plutonium is in a classified form, which would restrict the International Atomic Energy Agency (IAEA) from access to the material. DOE intends to make the APSF vault, and potentially Building 105-K, available for IAEA inspection. As a result, the RFETS plutonium needs to be declassified. To accomplish this objective, DOE would transfer the classified RFETS plutonium to F-Area for processing (declassifying) in the FB-Line facility at SRS. In the FB-Line facility, the plutonium would be melted using existing facilities and equipment that are part of the plutonium metal production process for which the FB-Line facility was designed. The declassification work would not be done on a continuous basis, but rather whenever processing capabilities were available. The RFETS plutonium would be fashioned into metal ''buttons'' that are the traditional FB-Line product. After the ''buttons'' are fabricated, the material would be transferred to the APSF and packaged to meet the requirements of DOE's plutonium storage standard. Then, the material would be placed in type B shipping containers and transported to Building 105-K for storage. Alternatively, the material could remain in the APSF vault, if space is available to allow for operational flexibility.

Some of the RFETS plutonium materials would be less than 50% plutonium by weight and would involve approximately 3% more total weight of material and a corresponding increase in the number of shipments than considered in the S&D PEIS.

Beginning in about 2002, SRS would begin to receive from Hanford stabilized plutonium packaged to meet DOE's long-term standard for placement in the APSF. Once APSF is operating, DOE could transfer a portion of the RFETS material from Building 105-K to the APSF in order to provide for operational flexibility. The plutonium from RFETS and Hanford would remain in storage at the APSF and Building 105-K pending disposition along with existing SRS surplus plutonium.

The plutonium would be transferred in type B shipping containers by truck using methods and routes described in the Storage and Disposition PEIS (i.e., the Department of Energy's Safe Secure Transport System).

If DOE decides to pursue the No Action alternative for the disposition of surplus plutonium in the SPD EIS Record of Decision, the SRS, RFETS, and Hanford materials would remain in storage at their current sites in accordance with the No Action alternative. If the DOE decides to immobilize surplus plutonium at Hanford, the SRS and RFETS materials would be shipped to Hanford in accordance with the decisions reached in the SPD EIS Record of Decision.

II. NEPA Process for Amending ROD

A. Supplement Analysis

Pursuant to DOE regulations in 10 CFR 1021.314, DOE has prepared a Supplement Analysis, Supplement Analysis for Storing Plutonium in the Actinide Packaging and Storage Facility and Building 105-K at the Savannah River Site (July 1998), to help determine whether a supplement to the Storage and Disposition PEIS is required under the Council on Environmental Quality Regulations, 40 CFR 1502.9(c). The Supplement Analysis compares the potential impacts of the new proposed action to the impacts discussed for the plutonium storage alternatives in the Storage and Disposition PEIS. The Supplement Analysis shows that the new proposed action does not make a substantial change to environmental concerns evaluated in the Storage and Disposition PEIS. Furthermore, the Supplement Analysis shows that there are no new significant circumstances or information relevant to environmental concerns and bearing on the proposed action or its impact.

B. Comparison of Potential Impacts

The facilities involved (i.e, Building 105-K and the APSF) are or will be located in existing industrial areas at the SRS.

- Land Resources, Site Infrastructure, Geology and Soils, Biology Resources and Cultural and Paleontological Resources. There are no aquatic habitats or wetlands in these areas nor are there any threatened or endangered species. None of the affected facilities have been nominated for inclusion in the National Register of Historic Places, and there are no plans for such nominations.

Based on evaluations in the Storage and Disposition PEIS and information

[3] To support the proposed action, DOE would purchase additional Type 9975 shipping containers, which are Type B containers and would also be used for storage. This would be done so that storing the RFETS materials in shipping containers pending disposition will not impact the Department's supply of Type B shipping containers.

[4] A portion of these activities could be completed as part of maintenance, clean-up, and decontamination activities at SRS that DOE has determined are categorically excluded from further NEPA review.

incorporated in the Supplement Analysis from the Final Environmental Impact Statements on the Interim Management of Nuclear Materials (DOE/EIS–0220, October, 1995)(IMNMS EIS) there would be little or no impact to land resources, site infrastructure, geology and soils, biology resources and cultural and Paleontological resources by the construction, operation and expansion of the APSF. This is equally true for Building 105-K since all storage operations would occur within the existing Building 105-K structure.

• It is expected that declassification of the RFETS material would require 100 Mw hrs/yr of electricity. This work would not require modification to the FB-line's electrical system and is well within the capacity of the facility and the site.

• Packaging and Transportation. The transportation routes to the SRS would be the same as those assumed in the Storage and Disposition PEIS (i.e., overland truck routes on interstate highways and state roads). Transportation operations would not change. DOE estimates that the total inter-site transportation impact associated with transferring plutonium from the RFETS and Hanford to the SRS would be 0.07 potential latent cancer fatalities, which would be approximately the same as for the Preferred Alternative in the Storage and Disposition PEIS.[5] DOE estimates that the intra-site transportation activities could add an additional 0.01 latent cancer fatalities to the worker population.[6]

• Air Quality and Noise. Storage: Accomplishing the proposed action, including the modifications to Building 105-K, would add no significant air quality and noise impacts above the existing site baseline. Therefore, air quality and noise impacts from the plutonium storage aspects of the proposed action would be essentially the same as the air quality and noise impacts from the Preferred Alternative of the Storage and Disposition PEIS (i.e., the Upgrade With RFETS Non-Pit Material alternative).

Declassification/Repackaging: DOE estimates there would be a small increase in non-radiological air emissions for declassification operations (i.e., metal conversion operations in FB-Line) above the non-radiological air emissions estimated for the No Action and the Upgrade alternatives in the Storage and Disposition PEIS. Non-radiological air emissions would be well within State and Federal regulatory limits. Repackaging activities are not expected to involve the use of chemicals, beyond a very small amount of decontamination liquid.

• Water Resources. *Storage:* The maximum impact to water resources, above existing site baseline usage and discharges, expected from plutonium storage aspects of DOE's proposed action would be about the same as presented in the Upgrade With RFETS and LANL Material alternative of the Storage and Disposition PEIS,[7] i.e., there would be a 0.01% increase in water use and a 0.1% increase in waste water discharges. The water impacts from the proposed action would have a negligible effect on site water or waste treatment capacity.

The impacts of radiological liquid discharges from Building 105-K are included as part of the No Action alternative in the Storage and Disposition PEIS. DOE expects there would be no significant increase above the No Action alternative discharge levels since, during normal operations, water is not in contact with plutonium storage containers.

Declassification/Repackaging: DOE estimates declassification operations would cause a small and insignificant increase in water usage beyond the water requirement estimated for other site operations.

Repackaging activities in the APSF are expected to have essentially no impact to water resources beyond the site base line operations presented in the No Action alternative of the Storage and Disposition PEIS.[8] Repackaging operations would not significantly increase the use of water resources beyond that required to operate the industrial systems associated with the APSF, e.g., chillers for air conditioning, sanitary sewer, potable water, etc., because additional water is not used in repackaging operations.

• Socioeconomics. *Storage:* The socioeconomic impact of operating Building 105–K for plutonium storage would be essentially the same as the impact described for the Preferred Alternative of the Storage and Disposition PEIS. The socioeconomic impact of modifying Building 105–K and operating both APSF and Building 105–K would be well within the impacts described for the Consolidation alternative of the Storage and Disposition PEIS.

The socioeconomic impacts at RFETS and Hanford of moving surplus plutonium to SRS were analyzed in the Storage and Disposition PEIS. The analysis concluded that this action would phase out plutonium storage at RFETS and Hanford. Approximately 200 direct job losses at Hanford, in addition to the 2000 at RFETS, would result. Compared to the total employment in those areas, the loss of these jobs and the impacts to the regional economies would not be significant. The proposed action would not change the magnitude of these impacts at RFETS, but cause them to occur sooner.

Declassification/Repackaging: DOE estimates there would be negligible additional socioeconomic effects due to operating the APSF for repackaging of RFETS plutonium or operating FB-Line for declassification purposes because the existing site workforce would be used.

• Public and Occupational Health and Safety (normal operations). *Storage. Public and Non-Involved Workers:* Plutonium storage operations in Building 105–K would not result in any additional air or water radiological impacts (beyond those currently associated with other operations in Building 105–K) because no shipping containers or storage containers would be opened in Building 105–K. Since air and water emissions create impacts that affect the non-involved workers and the public, there would be no significant additional radiological impact to the public or non-involved workers from normal operations in Building 105–K. Therefore, the impact from the proposed action to the public and non-involved workers would be essentially the same as the impact from the Preferred Alternative in the Storage and Disposition PEIS.

Involved Workers: DOE estimated that the potential health impact from 50 years of APSF storage to individual involved workers for the Preferred Alternative in the Storage and Disposition PEIS was a latent cancer fatality risk of $5x10^{-3}$ and that $1.5x10^{-1}$ latent cancer fatalities could occur in the involved worker population. DOE estimates that the potential health impacts from 10 years of operating Building 105–K to store plutonium could result in a risk of latent cancer

[5] The impact is the sum of the impact of transportation of RFETS non-pit plutonium under the Preferred Alternative in the Storage and Disposition PEIS and the incremental impact for shipping the Hanford plutonium.

[6] In inter-site transportation analyses, non-radiological accidents would be the greatest contributor to fatalities. In the case of intra-site transportation, impacts would be due primarily to radiation doses received from normal transportation operations. Effects from intra-site accidents, if any, would likely be negligible. Historically, certified containers maintain their integrity in accident situations.

[7] Table 4.2.6.4–1 of the Storage and Disposition PEIS.

[8] Table 4.2.6.4–1 of the Storage and Disposition PEIS.

fatality for the average Building 105–K involved worker of $1.5x10^{-3}$ and $2.6x10^{-2}$ latent cancer fatalities in the Building 105–K involved worker population. Since the Storage and Disposition PEIS bases health impacts on 50 years of storage, for comparison purposes, the impacts from 50 years of plutonium storage in the APSF are added to the impacts from 10 years of plutonium storage in Building 105–K. Using this approach, the health impacts from storing plutonium in the APSF and in Building 105–K would be 0.18 latent cancer fatalities in the involved worker population of both facilities.

Health impacts to involved workers for the plutonium storage aspects of the proposed action in this Supplement Analysis (0.18 latent cancer fatalities) would be essentially the same as the health impact estimated in the Preferred Alternative of the Storage and Disposition PEIS (0.15 latent cancer fatalities).

Declassification/Repackaging Radiological Impacts. Public, Non-involved Workers, Involved Workers: For declassification operations the potential health effect from the postulated radiation dose to the maximally exposed member of the public at the Site boundary would be $1.7x10^{-6}$ latent cancer fatalities. The potential health effect from the postulated radiation dose to the population surrounding the SRS and to workers would be 0.068 latent cancer fatalities and 0.078 latent cancer fatalities, respectively, above those predicted in the Preferred Alternative in the Storage and Disposition PEIS.

For repackaging operations (i.e., repackaging all plutonium from the RFETS in the APSF for 2 years) the potential health effect from the postulated radiation dose to the maximally exposed member of the public at the site boundary would be $7.5x10^{-12}$ latent cancer fatalities. The potential health effect from the postulated radiation dose to the population surrounding the SRS and to workers would be $1.5x10^{-7}$ latent cancer fatalities and $2.5x10^{-2}$ latent cancer fatalities, respectively, above those predicted in the Preferred Alternative in the Storage and Disposition PEIS. The impacts from repackaging, only the RFETS plutonium that would be declassified in the FB-Line would be less.

Building 105–K Modification. Public, Non-Involved Workers, Involved Workers: No impacts to non-involved workers or the public would be expected from the decontamination, modification, removal, and construction work because this work is not expected to generate significant air or water emissions. Work activities are confined to the interior of Building 105–K and airborne radioactivity levels are routinely monitored during work. Liquid sources would not be released from the building during normal decontamination, removal, or construction work. The potential health impact to workers, in the form of the risk of latent cancer fatality, would be $4x10^{-4}$ for 18 months of decontamination and construction work and the number of latent cancer fatalities that could be expected in the worker population was estimated to be $2x10^{-2}$. The risks associated with the modification of Building 105–K are approximately ten percent of the risks estimated for storage of the plutonium in the Preferred Alternative of the Storage and Disposition PEIS.

Summary

Public: In the Storage and Disposition PEIS, DOE estimated the potential health impact to the population surrounding the SRS from existing site operations and for the Upgrade Alternative over 50 years was 1.1 latent cancer fatalities. Accomplishing the new proposed action would slightly increase that potential health impact to about 1.2 latent cancer fatalities. Emissions would remain within the limits of the National Emission Standards for Hazardous Air Pollutants permits for the APSF and Building 105–K.

Workers: In the Storage and Disposition PEIS, DOE estimated that the potential health impact to the total site workforce from existing site operations over 50 years would be 5.3 latent cancer fatalities. Accomplishing the proposed action would increase the potential health impact to the site workforce by 0.3 to 5.6 latent cancer fatalities. This new estimate in total site workforce health impact is slightly greater than the health impact of 5.3 latent cancer fatalities estimated for the Preferred Alternative in the Storage and Disposition PEIS and is slightly lower than the health impact of 5.7 latent cancer fatalities that DOE estimated for the Consolidation alternative in the Storage and Disposition PEIS.

Storage Chemical Impacts. There would be no significant impact to the public or workers from hazardous chemicals due to plutonium storage operations in Building 105–K. There are no industrial systems or other operations involved in the plutonium storage operations that would add to existing Building 105–K chemical impacts.

- Waste Management. Modifications to Building 105–K: DOE estimates that decontamination and removal activities which would make Building 105–K available for storage operations would generate 750 cubic meters of low level waste, which is less than 1% of the low-level waste DOE expects to be generated by SRS activities as described in the No Action alternative of the Storage and Disposition PEIS. DOE does not expect to generate any significant quantities of other wastes in order to modify Building 105–K. No high-level radioactive waste would be generated.

Storage: DOE estimated that storing plutonium in the APSF, as described in the Preferred Alternative of the Storage and Disposition PEIS, would not generate any of the following radioactive wastes: high-level, transuranic, mixed transuranic, low-level, mixed low-level or hazardous (other than minor quantities). DOE estimates that storing plutonium in Building 105–K would not significantly change the estimate for the Preferred Alternative in the Storage and Disposition PEIS.

Declassification/Repackaging: DOE estimates that declassifying RFETS plutonium would generate about: 88 m^3 of transuranic waste; 4 m^3 of mixed waste; and 44 m^3 of low-level radioactive waste. No high-level waste is expected. These additional amounts of waste represent a small fraction of these types of waste that are generated at the site by other operations. The site has sufficient capacity to accommodate this increase in waste volume.

- Accidents. *Storage:* For the Building 105–K design basis accidents, DOE estimated that the maximum impact to the population surrounding the SRS could be 0.34 latent cancer fatalities in the unlikely event that plutonium were released to the 105–K Building as a result of corrosion of a storage container. This risk is greater than the risk estimated for storage of plutonium in the Preferred Alternative and other alternatives of the S&D PEIS; however, the risk would be comparable to the same type of accident for the storage of plutonium at SRS in existing storage vaults as analyzed in the Continuing Storage Alternative for the Storage of Plutonium and Uranium in the IMNM EIS. (The IMNM accident analysis showed 0.31 latent cancer fatalities for the population surrounding SRS.) DOE will implement administrative controls (including scheduled surveillances) to limit actions or conditions that might lead to a release of radioactive materials under accident conditions. The risk to the maximally exposed member of the public and non-involved worker would also be greater than the risk for storage

of plutonium estimated in the Preferred Alternative and other alternatives of the Storage and Disposition PEIS but would be low (less than $3x10^{-3}$ latent cancer fatalities).

For the postulated beyond design basis accidents, DOE estimated that the maximum impact to the population could be $2.7x10^{-4}$ latent cancer fatalities in the event of a vault fire. This risk is greater than the risk estimated for storage of plutonium in the Preferred Alternative of the Storage and Disposition PEIS, but low. The risks to the maximally exposed public and the non-involved worker would also be greater than the risks for the storage of plutonium estimated in the Preferred Alternative of the Storage and Disposition PEIS but would be extremely small (less than $2x10^{-8}$ latent cancer fatalities). DOE estimated that the involved worker may be subject to injury and, in some cases, fatality as a result of potential beyond design basis accidents.

Declassification/Repackaging: DOE estimates that for declassification operation in the FB-Line, the risk to the public would be $1.2x10^{-3}$ latent cancer fatalities, $2.6x10^{-4}$ latent cancer fatalities to the maximally exposed off-site individual and $4.5x10^{-3}$ latent cancer fatalities/yr to the non-involved worker. These risks are slightly greater than the risks for storage of plutonium estimated in the Upgrade Alternative of the Storage and Disposition PEIS, but are low. For repackaging operations in the APSF, the risks are low and similar to the impacts presented for storage of plutonium in the Preferred Alternative of the Storage and Disposition PEIS (less than $2x10^{-4}$ latent cancer fatalities).

• *Environmental Justice.* For environmental justice impacts to occur, there must be significant and adverse human health or environmental impacts that disproportionately affect minority populations and/or low-income populations. The Supplement Analysis shows that accomplishing the proposed action would be within regulatory limits and the impacts would be very low during routine operations.

The same Supplement Analyses also shows that accidents would not result in a significant risk of adverse human health or environmental impacts to the population who reside within 80 kilometers of the SRS. Therefore, such accidents would not have disproportionately high or adverse risk of impacts on minority or low-income populations.

Based on the analysis in this supplement analysis, no disproportionate, high or adverse impact would be expected on minority or low-income populations.

C. Environmentally Preferable Alternative

The environmental analyses in Chapter 4 of the Storage and Disposition PEIS indicate that the environmentally preferable alternative (the alternative with the lowest environmental impacts over the 50 years considered in the PEIS) for storage of weapons-usable fissile materials would be the Storage and Disposition PEIS Preferred Alternative, which consists of No Action at Hanford, Idaho National Engineering and Environmental Laboratory, Los Alamos National Laboratory, Argonne National Laboratory, and Nevada Test Site (NTS) (no fissile materials are or would be stored at the NTS) pending disposition, phaseout of storage at RFETS, and upgrades at the Oak Ridge Reservation, SRS, and Pantex. The proposed action as modified by this amended decision is still the environmentally preferred alternative.

III. Non-Environmental Considerations

A. Economic Analysis

DOE has estimated that accelerating the closure of RFETS from 2010 to 2006 in accordance with the DOE Closure 2006 Rocky Flats Closure Project Management Plan could save as much as $1.3 billion. Closing RFETS by 2006 would require the removal of non-pit, surplus weapons-usable plutonium metal and oxide from RFETS by 2002. The early removal of the RFETS non-pit, surplus weapons-usable plutonium supports the early deactivation, decontamination, and decommissioning of the RFETS plutonium storage and packaging facilities.

DOE also expects that the transfer of non-pit, surplus weapons-usable plutonium from Hanford to the SRS, could save as much as $150 million in upgrade and operating costs for plutonium storage facilities at the Hanford Site. As with the RFETS plutonium, the transfer would not be accomplished unless DOE decided to locate the plutonium immobilization disposition facility at the SRS.

The implementation cost for the proposed action is estimated to be approximately $93 million.

B. Nonproliferation

From a nonproliferation standpoint, the highest standards for safeguards and security will be employed during transportation and storage. There is no change in this regard from the original PEIS ROD.

IV. Amended Decision

Consistent with the Preferred Alternative in the Storage and Disposition PEIS, and the Supplement Analysis, Storing Plutonium in the Actinide Packaging and Storage Facility and Building 105–K at the Savannah River Site (July 1998), the Department has decided to reduce, over time, the number of locations where the various forms of plutonium are stored, through a combination of storage alternatives in conjunction with a combination of disposition alternatives.

The Department has decided to modify those aspects of the Storage and Disposition ROD (62 FR 3014) concerning the storage of weapons-usable plutonium at RFETS and Hanford, pending disposition. Other aspects of the Storage and Disposition ROD remain unaltered. DOE has decided to:

• Modify an existing building (105–K) at SRS to allow the receipt and storage of RFETS non-pit, surplus weapons-usable plutonium.

If the Department decides to select SRS as the immobilization site in the SPD EIS ROD, then the Department will:

• Ship all RFETS non-pit, surplus weapons-usable plutonium (about 7 MT) to SRS beginning in about 2000 through about 2002;

• Store RFETS non-classified plutonium metal and/or parts in shipping containers in Building 105–K at SRS beginning in about 2000;

• For RFETS classified surplus metal and/or parts, declassify the material in the FB-Line facility and repackage the material in the APSF (after construction of the APSF in about 2001). In the FB-Line, the plutonium will be melted using existing facilities and equipment that are part of the plutonium metal production process for which FB-Line was designed;

• Store the declassified material in Building 105–K in shipping containers or the APSF vault if space is available;

• Ship all Hanford non-pit, surplus weapons-usable plutonium (approximately 4.6 metric tons) from about 2002 through 2005 and store this material in the APSF;

• Before shipment, all plutonium transported from RFETS (except for the classified metal and/or parts) and Hanford will be stabilized[9] and packaged in accordance with DOE Standard-3013–96, Criteria for Safe Storage of Plutonium Metals and Oxides for long-term storage. All shipments of plutonium, including the classified metal and parts, will be by SST in

[9] Hanford plutonium fuel that is stable would not need to be stabilized.

accordance with applicable DOE, U.S. Department of Transportation and U.S. Nuclear Regulatory Commission requirements and regulations. Plutonium will be packaged in certified Type B accident resistant packages for transport; and

- The RFETS and Hanford Material stored at SRS may be moved between Building 105–K and the APSF to allow for operational flexibility.

Some of the surplus plutonium at RFETS and Hanford, approximately 1 metric ton at each site, is currently under International Atomic Energy Agency (IAEA) safeguards as a component of the United States nonproliferation policy to remove weapons-usable fissile materials from use for defense purposes. DOE has designed the APSF for IAEA safeguards and intends that plutonium stored in the APSF will be available for IAEA safeguards. Surplus plutonium under IAEA safeguards at RFETS and Hanford that may be shipped to the SRS, will remain available for IAEA safeguards in the APSF. Since plutonium that may be stored in Building 105-K will remain in shipping containers and not be accessible for full IAEA safeguards controls (e.g., physical sampling, destructive analyses), DOE is considering, with the IAEA, the application of IAEA verification controls to ensure the plutonium stored in Building 105–K is not diverted for defense purposes. In addition, DOE intends, as indicated in the Storage and Disposition ROD, that DOE's program for surplus plutonium disposition will include IAEA verification as appropriate.

If the DOE decides to pursue the No Action alternative for the disposition of surplus plutonium, the SRS, RFETS, and Hanford materials would remain in storage at their current sites in accordance with the No Action alternative in the Storage and Disposition PEIS ROD. If the DOE decides to immobilize surplus plutonium at Hanford, the SRS and RFETS materials would be shipped to Hanford in accordance with the decisions reached in the SPD EIS ROD.

V. Conclusion

Under the previous ROD, a maximum of 10 metric tons of surplus plutonium, including plutonium from RFETS and existing onsite plutonium, would be stored at SRS in the APSF, pending disposition, provided that SRS is selected as the immobilization site following completion of the SPD EIS. Transfer of plutonium from RFETS to SRS would begin when the APSF is completed in 2001.

With this amended ROD, a total of approximately 11.6 metric tons of surplus plutonium from both Hanford and RFETS (in addition to existing onsite SRS surplus plutonium, for a total of approximately 14 metric tons of surplus plutonium) would be stored at SRS in the APSF and Building 105–K, pending disposition, provided SRS is selected as the immobilization site. Transfer of plutonium from RFETS to SRS would begin when the modifications to Building 105–K are completed, i.e., in about 2000; shipments of plutonium from Hanford to SRS would begin in about 2002.

DOE has decided to implement a revised program to provide for safe and secure storage of weapons-usable fissile materials. DOE will prepare to advance the consolidation of the storage of weapons-usable plutonium by modifying existing facilities at the SRS in South Carolina, and phasing out surplus plutonium storage at RFETS in Colorado and Hanford in Washington. Consistent with the Storage and Disposition PEIS ROD, this Amended ROD supports the Department's objectives to phase out the storage of all weapons-usable plutonium at the RFETS and Hanford as soon as possible and to reduce the number of sites where surplus weapons-usable plutonium is stored.

The decision process reflected in this Notice complies with the requirements of the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*) and its implementing regulations in 40 CFR Parts 1500–1508 and 10 CFR Part 1021.

Issued in Washington, D.C., August 6, 1998.

Laura S. H. Holgate,

Director, Office of Fissile Materials Disposition.

[FR Doc. 98–21744 Filed 8–12–98; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Environmental Management Site-Specific Advisory Board, Pantex Plant, Amarillo, Texas

AGENCY: Department of Energy.

ACTION: Notice of open meeting.

SUMMARY: Pursuant to the provisions of the Federal Advisory Committee Act (Pub. L. No. 92–463, 86 Stat. 770) notice is hereby given of the following Advisory Committee meeting: Environmental Management Site-Specific Advisory Board (EM SSAB), Pantex Plant, Amarillo, Texas.

DATE AND TIME: Tuesday, August 25, 1998: 1:30 p.m.–5:30 p.m.

ADDRESSES: Amarillo Association of Realtors, Amarillo, Texas.

FOR FURTHER INFORMATION CONTACT: Jerry S. Johnson, Assistant Area Manager, Department of Energy, Amarillo Area Office, P.O. Box 30030, Amarillo, TX 79120 (806) 477–3125.

SUPPLEMENTARY INFORMATION: *Purpose of the Committee:* The Board provides input to the Department of Energy on Environmental Management strategic decisions that impact future use, risk management, economic development, and budget prioritization activities.

Tentative Agenda

1:30 p.m. Welcome—Agenda Review—Approval of Minutes
1:45 p.m. Co-Chair Comments
2:00 p.m. Immobilization
3:00 p.m. Break
3:15 p.m. Updates—Occurrence Reports—DOE
3:45 p.m. Ex-Officio Reports
4:00 p.m. Low-Level Waste Seminar Update
5:00 p.m. Task Force/Subcommittee Minutes
5:30 p.m. Closing Remarks/Adjourn

Public Participation: The meeting is open to the public, and public comment will be invited throughout the meeting. Written statements may be filed with the Committee either before or after the meeting. Written comments will be accepted at the address above for 15 days after the date of the meeting. Individuals who wish to make oral statements pertaining to agenda items should contact Jerry Johnson's office at the address or telephone number listed above. Requests must be received 5 days prior to the meeting and reasonable provision will be made to include the presentation in the agenda. The Designated Federal Official is empowered to conduct the meeting in a fashion that will facilitate the orderly conduct of business. Each individual wishing to make public comment will be provided a maximum of 5 minutes to present their comments at any time throughout the meeting.

Minutes: The minutes of this meeting will be available for public review and copying at the Pantex Public Reading Rooms located at the Amarillo College Lynn Library and Learning Center, 2201 South Washington, Amarillo, TX phone (806) 371–5400. Hours of operation are from 7:45 am to 10:00 pm, Monday through Thursday; 7:45 am to 5:00 pm on Friday; 8:30 am to 12:00 noon on Saturday; and 2:00 pm to 6:00 pm on Sunday, except for Federal holidays. Additionally, there is a Public Reading Room located at the Carson County Public Library, 401 Main Street,

A.6 NOTICE OF INTENT—SUPPLEMENT TO THE DRAFT SURPLUS PLUTONIUM DISPOSITION ENVIRONMENTAL IMPACT STATEMENT

Dated: March 30, 1999.

Judith Johnson,

Acting Assistant Secretary, Elementary and Secondary Education.

[FR Doc. 99–8394 Filed 4–5–99; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF ENERGY

Office of Arms Control and Nonproliferation Policy; Proposed Subsequent Arrangement

AGENCY: Department of Energy.

ACTION: Subsequent arrangement.

SUMMARY: This notice is being issued under the authority of Section 131 of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2160). The Department is providing notice of a ''subsequent arrangement'' under the Agreement for Cooperation in the Peaceful Uses of Nuclear Energy Between the United States of America and the European Atomic Energy Community (EURATOM) and the Agreement for Cooperation Between the Government of the United States of America and the Government of Canada Concerning the Civil Uses of Atomic Energy.

This subsequent arrangement concerns the transfer of 90,552,300 grams of natural uranium in the form of hexafluoride from Cameco Corporation in Canada to Urenco Limited in the United Kingdom for toll enrichment. The enrichment will not exceed 20%. The material will then be transferred to Northern States Power in Minneapolis, MN for use in their commercial power reactor.

In accordance with Section 131 of the Atomic Energy Act of 1954, as amended, we have determined that this subsequent arrangement will not be inimical to the common defense and security.

This subsequent arrangement will take effect no sooner than fifteen days after the date of publication of this notice.

Dated: March 30, 1999.

For the Department of Energy.

Edward T. Fei,

Deputy Director, International Policy and Analysis Division, Office of Arms Control and Nonproliferation.

[FR Doc. 99–8451 Filed 4–5–99; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Office of Arms Control and Nonproliferation Policy; Proposed Subsequent Arrangement

AGENCY: Department of Energy.

ACTION: Subsequent Arrangement.

SUMMARY: This notice is being issued under the authority of Section 131 of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2160). The Department is providing notice of a ''subsequent arrangement'' under the Agreement for Cooperation in the Peaceful Uses of Nuclear Energy Between the United States of America and the European Atomic Energy Community (EURATOM) and the Agreement for Cooperation Between the Government of the United States of America and the Government of Canada Concerning the Civil Uses of Atomic Energy.

This subsequent arrangement concerns the transfer of 3,078,600 grams of natural uranium in the form of hexafluoride from Cameco Corporation in Canada to Urenco Limited in the United Kingdom for toll enrichment. The enrichment will not exceed 20%. The material will then be transferred to Wolf Creek Nulcear Operation Corporation in Burlington, KS for use in their commercial power reactor.

In accordance with Section 131 of the Atomic Energy Act of 1954, as amended, we have determined that this subsequent arrangement will not be inimical to the common defense and security.

This subsequent arrangement will take effect no sooner than fifteen days after the date of publication of this notice.

Dated: March 30, 1999.

For the Department of Energy.

Edward T. Fei,

Deputy Director, International Policy and Analysis Division Office of Arms Control and Nonproliferation.

[FR Doc. 99–8452 Filed 4–5–99; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement

AGENCY: Department of Energy.

ACTION: Notice of Intent.

SUMMARY: The Department of Energy (DOE) announces its intent to prepare a supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement (SPD EIS) pursuant to the National Environmental Policy Act (NEPA). The SPD Draft EIS (DOE/EIS–0283D) was issued for public comment in July 1998. The Supplement will update the SPD Draft EIS by examining the potential environmental impacts of using mixed oxide (MOX) fuel in six specific commercial nuclear reactors at three sites for the disposition of surplus weapons-grade plutonium. DOE identified these reactors through a competitive procurement process. The Department is planning to issue the Supplement to the SPD Draft EIS in April 1999. DOE will publish a separate Notice of Availability in the Federal Register at that time. This Notice of Intent describes the content of the Supplement to the SPD Draft EIS, solicits public comment on the Supplement, and announces DOE's intention to conduct a public hearing. Consistent with 40 CFR 1502.9(c)(4) and 10 CFR 1021.314(d), DOE has determined not to conduct scoping for the Supplement.

ADDRESSES: Requests for information concerning the plutonium disposition program can be submitted by calling (answering machine) or faxing them to the toll free number 1–800–820–5156, or by mailing them to: Bert Stevenson, NEPA Compliance Officer, Office of Fissile Materials Disposition, U.S. Department of Energy, Post Office Box 23786, Washington, DC 20026–3786.

FOR FURTHER INFORMATION CONTACT: For general information on the DOE NEPA process, please contact: Carol Borgstrom, Director, Office of NEPA Policy and Assistance, U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585, 202–586–4600 or leave a message at 1–800–472–2756.

Additional information regarding the DOE NEPA process and activities is available on the Internet through the NEPA Home Page at http://www.eh.doe.gov/nepa.

SUPPLEMENTARY INFORMATION:

Background

In October 1994, the Secretary of Energy and the Congress created the Office of Fissile Materials Disposition (MD) within the Department of Energy (DOE) to focus on the elimination of surplus highly enriched uranium (HEU) and plutonium surplus to national defense needs. As one of its major responsibilities, MD is tasked with determining how to disposition surplus weapons—usable plutonium. In January 1997, DOE issued a Record of Decision (ROD) for the Storage and Disposition of Weapons—Usable Fissile Materials Final Programmatic Environmental Impact Statement (S&D PEIS) (DOE/EIS–

0229; December 1996). In that ROD, DOE decided to pursue a strategy that would allow for the possibility of both the immobilization of surplus plutonium and the use of surplus plutonium as mixed oxide (MOX) fuel in existing domestic, commercial reactors. DOE is in the process of completing the Surplus Plutonium Disposition Environmental Impact Statement (SPD Draft EIS) (DOE/EIS–0283D; July 1998) to choose a site(s) for plutonium disposition activities and to determine the technology(ies) that will be used to support this effort.

Related Procurement Action

To support the timely undertaking of the surplus plutonium disposition program, DOE initiated a procurement action to contract for MOX fuel fabrication and reactor irradiation services. The services requested in this procurement process include design, licensing, construction, operation, and eventual deactivation of a MOX facility, as well as irradiation of the MOX fuel in three to eight existing domestic, commercial reactors, should the decision be made by DOE to go forward with the MOX program.

On May 19, 1998, DOE issued a Request for Proposal (RFP) (Solicitation Number DE–RP02–98CH10888) that defined limited activities that may be performed prior to issuance of the SPD EIS ROD. These activities include non-site-specific work primarily associated with the development of the initial conceptual design for the fuel fabrication facility, and plans (paper studies) for outreach, long lead-time procurements, regulatory management, facility quality assurance, safeguards, security, fuel qualifications, and deactivation. No construction would be started on a MOX fuel fabrication facility until the SPD EIS ROD is issued. The MOX facility, if built, would be DOE-owned, licensed by the Nuclear Regulatory Commission, and located at one of four candidate DOE sites. DOE has designated the Savannah River Site as the preferred alternative for the MOX fuel fabrication facility.

Based on a review of proposals received in response to the RFP, DOE determined in January 1999 that one proposal was in the competitive range. Under this proposal, MOX fuel would be fabricated at a DOE site and then irradiated in one of six domestic commercial nuclear reactors.

Environmental Review During Procurement Action

An environmental critique was prepared in accordance with DOE's National Environmental Policy Act (NEPA) regulations at 10 CFR 1021.216. Because an EIS is in progress on this action, DOE required offerors to submit reasonably available environmental data and analyses as a part of their proposals. DOE independently evaluated and verified the accuracy of the data provided by the offeror in the competitive range, and prepared an environmental critique for consideration before the selection was made. The Environmental Critique was used by DOE to determine:

(1) if there are any important environmental issues in the offeror's proposal that may affect the selection process; and

(2) if the potential environmental impacts of the offeror's proposal were bounded by impacts presented in the S&D PEIS and SPD Draft EIS or whether additional analysis was required in the SPD Final EIS.

As required by Section 216, the Environmental Critique included a discussion of the purpose of the procurement; the salient characteristics of the offeror's proposal; any licenses, permits or approvals needed to support the program; and an evaluation of the potential environmental impacts of the offer. The Environmental Critique is a procurement-sensitive document and subject to all associated restrictions. DOE then prepared a synopsis, which summarizes the Environmental Critique and reduces business-sensitive information to a level that will not compromise the procurement process. The Synopsis will be filed with the Environmental Protection Agency and made available to the public.

Contract Award

As a result of the procurement process described above, in March 1999, the Department of Energy contracted with Duke Engineering & Services, COGEMA, Inc., and Stone & Webster to provide mixed oxide fuel fabrication and reactor irradiation services. The team, known as DUKE COGEMA STONE & WEBSTER or DCS, has its corporate headquarters in Charlotte, NC. Subcontractors to DCS include Duke Power Company, Charlotte, NC and Virginia Power Company, Richmond, VA, who will provide the reactor facilities in which mixed oxide fuel will be used upon receipt of Nuclear Regulatory Commission license amendments. Other major subcontractors include Nuclear Fuel Services, Inc., Erwin, TN; Belgonucleaire, Brussels, Belgium; and Framatome Cogema Fuels of Lynchburg, VA. Under the contract, the team will also modify six existing U.S. commercial light water reactors at three sites to irradiate mixed oxide fuel assemblies. These reactors sites are Catawba in York, SC; McGuire in Huntersville, NC; and North Anna in Mineral, VA. The team will be responsible for obtaining a license to operate the fuel fabrication facility and the license modifications for the reactors from the Nuclear Regulatory Commission. Full execution of this contract is contingent on DOE's completion of the SPD EIS, as provided by 40 CFR 1021.216(i).

Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement

The purpose of the Supplement to the SPD Draft EIS is to update the Draft by including specific information available as a result of the award of the DCS contract. The Supplement to the SPD Draft EIS will contain background information on the SPD Draft EIS; changes made to the SPD Draft EIS (Section 1.7.2); a description of the reactor sites (Section 3.7); impacts of irradiating mixed oxide fuel in existing light water reactors (Section 4.28); Facility Accidents (Appendix K); Analysis of Environmental Justice (Appendix M); and the Environmental Synopsis (Appendix O).

DOE anticipates that the Supplement to the SPD Draft EIS will be available in April. DOE intends to hold an interactive hearing in Washington, DC in May 1999 to discuss issues and receive oral and written comments on the Supplement to the Draft SPD EIS. The Notice of Availability will provide specific information concerning the date, time and location for the public hearing.

Issued in Washington, DC this 31st day of March 1999, for the United States Department of Energy.

David Michaels,

Assistant Secretary, Environment, Safety and Health.

[FR Doc. 99–8455 Filed 4–5–99; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Office of Science; Biological and Environmental Research Advisory Committee

AGENCY: Department of Energy.

ACTION: Notice of open meeting.

SUMMARY: This notice announces a meeting of the Biological and Environmental Research Advisory Committee. Federal Advisory Committee Act (Public Law 92–463, 86 Stat. 770) requires that public notice of

A.7 NOTICE OF AVAILABILITY—SUPPLEMENT TO THE SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT

technological collection techniques or other forms of information technology, e.g., permitting electronic submission of responses.

Burden Statement: The annual public reporting and recordkeeping burden for this collection of information is estimated to average 3.03 hours per response. It is estimated that any individual may respond to synopses or market research questions 5 times per year. EPA anticipates publicizing approximately 260 contract actions per year, and conducting 3790 market research inquiries. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

Dated: May 7, 1999.

Lawrence G. Wyborski,

Acting Manager, Policy Service Center.

[FR Doc. 99–12249 Filed 5–13–99; 8:45 am]

BILLING CODE 6560–50–U

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–6242–6]

Environmental Impact Statements and Regulations; Availability of EPA Comments

Availability of EPA comments prepared April 19, 1999 Through April 23, 1999 pursuant to the Environmental Review Process (ERP), under Section 309 of the Clean Air Act and Section 102(2)(c) of the National Environmental Policy Act as amended. Requests for copies of EPA comments can be directed to the Office of FEDERAL ACTIVITIES AT (202) 564–7167.

An explanation of the ratings assigned to draft environmental impact statements (EISs) was published in FR dated April 09, 1999 (64 FR 17362).

Draft EISs

ERP No. D–AFS–L65207–OR Rating *LO, Young'n Timber Sales, Implementation, Willamette National Forest Land and Resource Management Plan, Middle Fork Ranger District, Lane County, OR.

Summary: EPA used a screening tool to conduct a limited review of this action. Based upon the screen, EPA does not foresee having any environmental objections to the proposed project. Therefore, EPA will not be conducting a detailed review.

ERP No. D–AFS–L65304–OR Rating EC2, Moose Subwatershed Timber Harvest and Other Vegetation Management Actions, Central Cascade Adaptive Management (CCAMA), Willamette National Forest, Sweet Home Ranger District, Linn County, OR.

Summary: EPA expressed environmental concerns with the proposed timber harvest due to entry into roadless area and the potential for impact to water quality and recommended that the Forest Service continue to monitor for water quality impacts.

ERP No. D–COE–J36050–ND Rating EO2, Maple River Dam and Reservoir, Construction and Operation, Flood Control, Cass County Joint Water Resource District, Cass County, ND.

Summary: EPA expressed environmental objections to the project on the basis of: (1) the lack of adequate provisions to identify and protect aquatic habitats, (2) exceedances of water quality standards, (3) the uncertainty of the mitigation, restoration and conservation efforts, (4) the lack of information on future flood control activities, (5) future growth and development impacts in the lower watershed area, (6) a cumulative impacts analysis that was limited to water chemistry, (7) a substantial need to address the watershed as a unit.

Final EISs

ERP No. F–AFS–L65255–AK, Control Lake Timber Sale, Implementation, Prince of Wales Island, Tongass National Forest, AK.

Summary: Review of the Final EIS was not deemed necessary. No formal comment letter was sent to the preparing agency.

ERP No. F–BLM–L65294–OR, Beaty Butte Allotment Management Plan, Implementation, Lakeview District, Hart Mountain National Antelope Refuge, Lake and Harney Counties, OR.

Summary: The Final EIS has addressed the issues EPA raised in the draft EIS.

ERP No. FS–COE–G32054–00, Red River Waterway, Louisiana, Texas, Arkansas and Oklahoma and Related Projects, New and Updated Information, Red River Below Denison Dam Levee Rehabilition, Implementation, Hempstead, Lafayette and Miller Counties, AR.

Summary: EPA has no objection to the selection of the preferred alternative described in the FSEIS.

Dated: May 11, 1999.

William D. Dickerson,

Director, Office of Federal Activities.

[FR Doc. 99–12265 Filed 5–13–99; 8:45 am]

BILLING CODE 6560–50–U

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–6242–5]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7167 or (202) 564–7153.

Weekly receipt of Environmental Impact Statements

Filed May 03, 1999 Through May 07, 1999.

Pursuant to 40 CFR 1506.9.

EIS No. 990148, Final Supplement, AFS, CO, Lakewood Raw Water Pipeline for Continued Operation, Maintenance, Reconstruction and/or Replacement, Application for Easement, Roosevelt National Forest, Boulder Ranger District, in the City of Boulder, CO, Due: June 07, 1999, Contact: Jean Thomas (970) 498–1267. The above DOA EIS should have appeared in the 05/07/99 Federal Register. The 30–day Comment Period is Calculated from 05/07/99.

EIS No. 990149, Draft EIS, AFS, MT, Bridger Bowl Ski Area, Permit Renewal and Master Development Plan Update, Implementation, Special Use Permit and COE Section 404 Permit, Gallatin National Forest, in the City of Bozeman, MT, Due: June 28, 1999, Contact: Nancy Halstom (406) 587–6920.

EIS No. 990150, Final EIS, NPS, TX, Lyndon B. Johnson National Historical Park, Package 227, General Management Plan, Implementation, Blanco and Gillespie Counties, TX, Due: June 14, 1999, Contact: Leslie Starhart (830) 868–7128.

EIS No. 990151, Final EIS, FHW, MO, IA, US 61, US 218 and IA–394 Highway Improvements, Construction, Funding, US Army COE Section 404 Permit, Lewis and Clark Counties, MO and Lee and Henry Counties, IA , Due: June 14, 1999, Contact: Donald Neumann (573) 636–7104.

EIS No. 990152, Draft EIS, FTA, VA, Norfolk-Virginia Beach Light Rail Transit System East/West Corridor

Project, Transportation Improvements, Tidewater Transportation District Commission, COE Section 404 Permit, City of Norfolk and City of Virginia Beach, VA, Due: June 28, 1999, Contact: Michael McCollum (215) 656–7100.

EIS No. 990153, Legislative Final EIS, USA, AK, Alaska Army Lands Withdrawal Renewal for Fort Wainwright and Fort Greely West Training Area, Approval of Permits and Licenses, City of Fairbanks, City of North Pole and City of Delta Junction, North Star Borough, AK , Due: June 14, 1999, Contact: Cindy Herdrich (970) 491–5347.

EIS No. 990154, Draft Supplement, DOE, CA, NM, TX, ID, SC, WA, Surplus Plutonium Disposition (DOE/EIS–0283–S) for Siting, New and Revised Information, Construction and Operation of three facilities for Plutonium Disposition, Possible Sites Hanford, Idaho National Engineering and Environmental Laboratory, Pantex Plant and Savannah River, CA, ID, NM, SC, TX and WA, Due: June 28, 1999, Contact: G. Bert Stevenson (202) 586–5368.

EIS No. 990155, Draft EIS, BLM, WY, Wyodak Coal Bed Methane Project, Road Construction, Drilling Operation, Electrical Distribution Line, Powder River Basin, Campbell and Converse Counties, WY, Due: June 28, 1999, Contact: Richard Zander (307) 684–1161.

EIS No. 990156, Final EIS, UAF, ND, Minuteman III Missile System Dismantlement, Intercontinental Ballistic Missile (ICBM) Launch Facilities (LFs) and Missile Alert Facilities (MAFs), Deployment Areas, Grand Forks Air Forces Base, ND , Due: June 14, 1999, Contact: Jonathan D. Farthing (210) 536–3069.

Amended Notices

EIS No. 990103, Draft Supplement, FHW, CA, CA–125 South Route Location, Adoption and Construction, between CA–905 on Otay Mesa to CA–54 in Spring Valley, Updated and Additional Information, Funding and COE Section 404 Permit, San Diego County, CA, Due: May 24, 1999, Contact: C. Glenn Clinton (916) 498–5037. Published FR–04–09–99—Due Date Correction.

EIS No. 990108, Draft Supplement EIS, AFS, ID, Grade-Dukes Timber Sale, Proposal to Harvest and Regenerate Timber, Implementation, Cuddy Mountain Roadless Area, Payette National Forest, Weiser Ranger District, Washington County, Idaho, Due: June 01, 1999, Contact: Dautis Pearson (208) 253–0134. Published FR 04–09–99 Review Period Extended.

EIS No. 990143, Draft EIS, TPT, CA, Presidio of San Francisco General Management Plan, Implementation, New Development and Uses within the Letterman Complex, Golden Gate National Recreation Area, City and County of San Francisco, CA, Due: June 14, 1999, Contact: John Pelka (415) 561–5300. Published FR–04–30–99—Correction to Document Status from a Draft Supplement to Draft.

Dated: May 11, 1999.

William D. Dickerson,

Director, Office of Federal Activities.

[FR Doc. 99–12264 Filed 5–13–99; 8:45 am]

BILLING CODE 6560–50–U

ENVIRONMENTAL PROTECTION AGENCY

[FRL–6342–1]

RIN 2060–AH52

Public Meetings To Discuss Air Quality Modeling and Infrastructure Issues Associated With Alternative-Fueled Vehicles

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of public meetings.

SUMMARY: The Environmental Protection Agency intends to hold two public workshops to discuss issues associated with alternative fuel vehicles (AFVs) (i.e., vehicles powered by fuels other than gasoline). The first workshop (which EPA will hold May 26, 1999, in Louisville, Kentucky), will focus on issues associated with air quality modeling of AFVs. The purpose of this workshop is to facilitate an exchange of information that will help EPA determine which areas of its modeling, if any, should be enhanced to better estimate the air quality impacts of alternative-fueled vehicles. The second workshop will focus on issues related to infrastructure development and creating a sustainable market for AFVs.

DATES: The first workshop (on modeling and AFVs) will be held on May 26, 1999, in Louisville, Kentucky, following the Department of Energy's National Clean Cities Conference. The date for the second workshop (on infrastructure development and creating a sustainable market for AFVs) will be announced later. Members of the public are invited to attend as observers.

ADDRESSES: Questions about the workshop should be addressed to: Barry Garelick (202–564–9028; garelick.barry@epa.gov) or Christine Hawk (202–564–9672; hawk.christine@epa.gov), 401 M Street, S.W. (6406J), Washington, D.C. (20460). The workshop will be held at the Sellbach Hilton Hotel, 500 4th St, Louisville, Kentucky 40202, 800 333–3399 or 502–585–3200.

FOR FURTHER INFORMATION CONTACT: Barry Garelick (202) 564–9028.

SUPPLEMENTARY INFORMATION: As this Administration has long recognized, one of the keys to moving forward environmentally is moving forward technologically. Progress towards sustainable reductions in emissions from the mobile source sector is inextricably linked to technological advancement. Motor vehicles are significant contributors to ground-level ozone, the principal harmful ingredient in smog. They also emit other pollutants, including particulate matter and air toxics. Motor vehicle emissions contribute to public health problems such as asthma and other respiratory problems, especially in children.

History has shown that the rise in vehicle sales and vehicle miles traveled every year has consistently led to increases in the aggregate emissions from the mobile source sector, despite progress in reducing emissions from gasoline-powered, conventional motor vehicles. This places increasing importance on technological developments, including vehicles powered by fuels other than gasoline. There is particular interest in the creation of vehicles whose emissions do not increase as the vehicle ages. There are a number of types of alternative fuel vehicles (AFVs) in production and under development. In the United States, manufacturers are already selling various types of AFVs, including vehicles powered by electricity, compressed natural gas, methanol, and ethanol. The last year has also seen dramatic developments in hybrid-electric vehicle and fuel cell technology.

Congress and the Administration have already recognized that they have an important role to play regarding AFVs. As part of the 1990 Amendments to the Clean Air Act, Congress included sections promoting increased numbers of clean fuel fleet vehicles. The Clean Fuel Fleet program, which began on September 1, 1998, requires certain nonattainment areas to adopt and implement a program requiring certain centrally-fueled fleets to include a specified percentage of clean-fuel vehicles in their new fleet vehicle purchases. Additionally, Congress passed the Energy Policy Act of 1992 (EPAct), which includes numerous provisions designed to increase the

A.8 JOINT STATEMENT OF PRINCIPLES FOR MANAGEMENT AND DISPOSITION OF PLUTONIUM DESIGNATED AS NO LONGER REQUIRED FOR DEFENSE PURPOSES

AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF THE RUSSIAN FEDERATION ON SCIENTIFIC AND TECHNICAL COOPERATION IN THE MANAGEMENT OF PLUTONIUM THAT HAS BEEN WITHDRAWN FROM NUCLEAR MILITARY PROGRAMS

The Government of the United States of America and the Government of the Russian Federation, hereafter referred to as the Parties,

Taking into account:

- The January 14, 1994, Declaration of the Presidents of the United States and the Russian Federation on "Nonproliferation of Weapons of Mass Destruction and the Means of Their Delivery";
- The Declaration of the April 19-20, 1996, Summit on Nuclear Safety and Security in Moscow;
- The Conclusions of the International Meeting of Experts in Paris, on October 28-31, 1996, concerning the safe and efficient management of fissile materials designated as no longer required for defense purposes;
- The statement regarding fissile materials in the June 22, 1997, Final Communiqué of the Denver Summit of the Eight;
- The statement of the President of the United States on March 1, 1995, that 200 tons of fissile material will be withdrawn from the U.S. nuclear stockpile and directing that these materials will never again be used to build a nuclear weapon; and
- The message of the President of the Russian Federation to the participants of the 41st General Conference of the IAEA, September 26, 1997, on step by step removal from nuclear defense programs of up to 500 tonnes of highly enriched uranium and up to 50 tonnes of plutonium released in the process of nuclear disarmament;

Have agreed as follows:

ARTICLE 1

The purposes of this Agreement are to:

a) Provide the scientific and technical basis for decisions on how plutonium, subject to this Agreement, shall be managed; and

b) Establish a framework for continued and expanded scientific and technical cooperation for the accomplishment of the objective in paragraph a.

ARTICLE 2

For purposes of this Agreement:

1. "Plutonium" means plutonium that has been withdrawn from nuclear military programs and is no longer required for defense purposes.

2. "Management of plutonium" means the transformation of plutonium into spent fuel or other forms equally unusable for nuclear weapons or other nuclear explosive devices, and may include conversion of plutonium and its manufacture into MOX fuel, use of MOX fuel in nuclear reactors, and immobilization of plutonium in various forms.

ARTICLE 3

1. The Parties shall:

   a) Continue to cooperate with small-scale tests and demonstrations relating to management of plutonium; and

   b) As soon as is practicable, also proceed to pilot-scale demonstrations of technologies for plutonium management.

2. The principal subject areas for the Parties' cooperative efforts shall be:

   a) Conversion of metallic plutonium into oxide suitable for the manufacture of MOX fuel for nuclear power reactors of various types;

   b) Stabilization of unstable forms of plutonium;

   c) Use of plutonium in the form of MOX fuel in various types of nuclear power reactors;

   d) Immobilization of plutonium, including wastes and hard-to-process forms; and

   e) Disposal of immobilized forms of materials containing plutonium in deep geological formations.

ARTICLE 4

1. The Parties shall designate Executive Agents to carry out the provisions of this Agreement. The Executive Agent for the United States of America shall be the U.S. Department of Energy and the Executive Agent for the Russian Federation shall be the Russian Ministry for Atomic Energy.

2. The Parties shall have the right, consistent with their respective laws and regulations, and following written notification to the other Party, to obtain participation, as necessary, in the implementation of this Agreement, by other agencies, departments, and units of their respective governments.

3. To accomplish the objectives of this Agreement, the Parties shall establish a U.S.-Russian Joint Steering Committee on Plutonium Management, which shall coordinate and agree upon work undertaken under this Agreement. Each Party shall designate its members on the Joint Steering Committee. Decisions of the Joint Steering Committee shall be taken by consensus.

4. The tasks of the Joint Steering Committee shall include:

   a) Development of overall work programs and areas of cooperation within the scope of this Agreement;

   b) Prioritization, coordination, review and approval of the cooperative projects under this Agreement within the resources made available by the Parties;

   c) Resolution of any disputes that may arise with respect to the scientific and technical work performed under this Agreement; and

   d) Such other matters, as the Parties may agree, that are within the scope of this Agreement.

5. When agreement is reached on the performance of joint research, projects, or experiments under this Agreement, detailed procedures for performing the activities involved shall be officially drawn up in the form of implementing arrangements, to be reviewed and approved by the Joint Steering Committee.

ARTICLE 5

Cooperation between the Parties within the framework of this Agreement may include the following:

a) Sharing of scientific and technical information;

b) Development of conceptual approaches;

c) Research, experiments and small-scale demonstrations of technological solutions;

d) Design, construction, and operation of pilot-scale facilities for demonstrating and testing technological solutions obtained as a result of research;

e) Transfer of equipment and non-nuclear materials;

f) Meetings, seminars, conferences, personnel assignments, and workshops for the sharing of information;

g) Feasibility studies; and

h) Such other forms of cooperation within the scope of this Agreement as the Executive Agents may agree upon in writing.

ARTICLE 6

1. In the implementation of this Agreement, only unclassified information shall be exchanged.

2. In order to prevent access to it by people and organizations not participating in the implementation of this Agreement, information provided by the Parties pursuant to, or produced as a result of, this Agreement which is considered sensitive by the Parties is to be held in confidence and must be clearly designated and marked. The Party transmitting the information will designate information as sensitive in accordance with its internal laws and regulations. The Party receiving this information shall assign it a designation that provides a degree of protection at least equivalent to that required by the Party that furnished the information.

3. Sensitive information shall be handled in accordance with the laws and regulations of the Party receiving the information, and shall not be disclosed or transmitted to a third party not participating in implementation of this Agreement without the written consent of the Party transmitting the information. According to the regulations of the United States, such information shall be treated as foreign government information provided in confidence and shall be protected appropriately. According to the norms and regulations of the Russian Federation, such information shall be treated as official information with limited distribution and shall be protected appropriately.

4. The Parties shall assure effective protection and allocation of rights to intellectual property transmitted or created under this Agreement, as set forth in this Article and in the Annex to this Agreement, which forms an integral part of this Agreement.

5. Information transmitted under this Agreement must be used solely in accordance with this Agreement.

6. The number of people having access to sensitive information must be limited to the number necessary to implement this Agreement and other programs associated with this Agreement, and shall be determined by the Parties' Executive Agents.

ARTICLE 7

1. Materials, equipment and technologies, transferred under the terms of this Agreement, shall not be used for the production of nuclear weapons, any nuclear explosive devices, or for research or development of such devices or for the furtherance of any military purpose.

2. Materials, equipment and technologies, transferred under the terms of this Agreement, shall not be exported, re-exported, or transferred from the jurisdiction of the recipient without the written consent of the Parties.

3. Prior to the export under the terms of this Agreement to a third party of any equipment, materials or technologies, the Parties by mutual agreement in writing shall define the conditions in accordance with which such items shall be exported, re-exported, or transferred from the jurisdiction of the third party.

4. The Parties' Executive Agents shall take all measures necessary to ensure adequate physical protection of nuclear materials, equipment, installations, and nuclear technologies in its jurisdiction, and shall apply criteria and levels of physical

protection not lower than those identified in the Convention on the Physical Protection of Nuclear Material and in recommendations of the IAEA.

ARTICLE 8

Equipment, supplies, materials, services and activities provided or acquired by the United States of America, its contractors, subcontractors, and their personnel for the implementation of this Agreement are free technical assistance and are thus exempt from customs duties and taxes. The Russian Federation shall take all necessary measures to exempt this equipment, shipments, materials, services, and work from all taxes, tariffs, customs duties, and levies of the Russian Federation and its instrumentalities.

ARTICLE 9

1. With the exception of claims for damage or injury against individuals arising from their premeditated actions, the Government of the Russian Federation shall bring no claims or other legal proceedings against the Government of the United States of America and its personnel or its contractors, sub-contractors, consultants, suppliers or subsuppliers of equipment or services at any tier and their personnel, in any court or forum, for any damage, including indirect, direct or consequential damage, arising from activities undertaken pursuant to this Agreement, to property owned by the Russian Federation. This paragraph shall not apply to legal actions brought by the Government of the Russian Federation to enforce the provisions of contracts to which it or a Russian national or other legal entity is a party.

2. With the exception of claims for damage or injury against individuals arising from their premeditated actions, the Government of the Russian Federation shall provide for the adequate defense of, shall indemnify, and shall bring no claims or other legal proceedings against, the Government of the United States of America and its personnel or its contractors, sub-contractors, consultants, suppliers or subsuppliers of equipment or services at any tier and their personnel, in connection with third-party claims, in any court or forum, for any injury or damage, including indirect, direct, or consequential injury or damage, arising from activities undertaken pursuant to this Agreement, occurring within or outside the territory of the Russian Federation. Nothing in this paragraph shall be construed as acknowledging the jurisdiction of any court or forum over third-party claims to which this paragraph applies, nor shall it be construed as waiving the sovereign immunity of either Party with respect to third-party claims that may be brought against it.

3. The Parties may, as necessary, conduct consultations regarding claims and legal proceedings concerning this Article.

4. The provisions of this Article shall not prevent the Parties from providing compensation in accordance with their national laws.

5. Nothing in this Article shall be interpreted to prevent legal proceedings or claims against nationals of the Russian Federation or permanent residents of the Russian Federation.

ARTICLE 10

1. Joint activities under this Agreement shall be supported by funds and in-kind contributions of equipment, material, and labor provided on a non-reimbursable basis for these purposes by the United States of America and the Russian Federation.

Joint activities may also be supported, in whole or in part, from funds directly from other sources, including non-government funds and funds from the private sector.

2. In all cases, the activities of, and financial support provided by, the United States of America under this Agreement are subject to the availability of appropriated funds. In all cases, the activities of, and financial support provided by, the Russian Federation under this Agreement are subject to the availability of appropriated funds.

ARTICLE 11

In the event that a Party awards contracts for the acquisition of articles and services, including construction, to implement this Agreement, such contracts shall be awarded in accordance with the laws and regulations of that Party.

ARTICLE 12

1. Representatives of the U.S. Department of Energy shall have the right upon reasonable notice to examine and audit the use of any support or assistance provided by the U.S. Government in connection with cooperation under this Agreement during the life of this Agreement and for three years thereafter. Such examinations may be conducted at sites or locations as agreed to by the Parties' Executive Agents.

2. The Parties' Executive Agents shall develop appropriate arrangements for conducting audits and examinations for all work performed within the framework of this Agreement.

ARTICLE 13

All questions regarding the interpretation or application of this Agreement shall be resolved by means of consultation between the Parties.

ARTICLE 14

1. This Agreement shall enter into force on the date of signature, and shall remain in force for five years. The Agreement may be extended for successive five-year periods with the written consent of both Parties after joint review before the end of each five-year period. The Agreement may be amended by written agreement of the Parties.

2. This Agreement may be terminated by either Party by sending written notice through diplomatic channels of its intent to terminate the Agreement, in which case the Agreement shall terminate six months from the date of the notification.

3. In the event that either Party exercises its right to terminate this Agreement, the Parties may agree upon the implementation of existing contracts and projects until their completion, and will settle any outstanding costs by mutual agreement. If this Agreement is terminated or expires, the Parties agree that all sensitive information and intellectual property that was made available in the course of the Agreement shall continue to be treated in conformance with Article 6 of this Agreement, unless other arrangements are made by written agreement of the Parties.

Done at Moscow this twenty-fourth day of July, 1998, in duplicate in the English and Russian languages, both texts being equally authentic.

FOR THE GOVERNMENT OF THE UNITED STATES OF AMERICA:

FOR THE GOVERNMENT OF THE RUSSIAN FEDERATION:

ANNEX
TO THE
AGREEMENT
BETWEEN
THE GOVERNMENT
OF THE UNITED STATES OF AMERICA
AND
THE GOVERNMENT
OF THE RUSSIAN FEDERATION
ON SCIENTIFIC AND TECHNICAL COOPERATION
IN THE MANAGEMENT OF PLUTONIUM
THAT HAS BEEN WITHDRAWN
FROM NUCLEAR MILITARY PROGRAMS

INTELLECTUAL PROPERTY

Pursuant to Article 6 of this Agreement:

The Parties shall ensure adequate and effective protection of intellectual property created or furnished under this Agreement and relevant implementing agreements. The Parties agree to notify one another in a timely fashion of any inventions or copyrighted works resulting from scientific and technological work performed under this Agreement and to seek protection for such intellectual property in a timely fashion. Rights to such intellectual property shall be allocated as provided in this Annex.

I. Scope

A. This Annex is applicable to all cooperative activities undertaken pursuant to this Agreement, except as otherwise specifically agreed by the Parties or their Executive Agents.

B. For purposes of this Agreement, "intellectual property" shall have the meaning found in Article 2 of the Convention Establishing the World Intellectual Property Organization, done at Stockholm, July 14, 1967.

C. This Annex addresses the allocation of rights and interests between the Parties. Each Party shall ensure that the other Party can obtain the rights to intellectual property allocated in accordance with this Annex, by obtaining those rights from its own participants through contracts, license agreements or other legal documents, if necessary. This Annex does not otherwise alter or prejudice the allocation between a Party and its nationals or other legal entities, which shall be determined by that Party's laws and practices.

D. Disputes concerning intellectual property arising under this Agreement should be resolved through discussions between the concerned participating institutions, or, if necessary, the Parties or their Executive Agents. Upon mutual agreement of the Parties, a dispute shall be submitted to an arbitral tribunal for binding arbitration in accordance with the Agreement and with the applicable rules of international law.

E. Termination or expiration of this Agreement shall not affect rights or obligations under this Annex.

II. Allocation of Rights

A. Each Party shall be entitled to a non-exclusive, irrevocable, royalty-free license in all countries to translate, reproduce, and publicly distribute scientific and technical journal articles, papers, reports, and books directly arising from cooperation under this Agreement. All publicly distributed copies of a copyrighted work prepared under this provision shall indicate the names of the authors of the work unless an author explicitly declines to be named.

B. Rights to all forms of intellectual property, other than those rights described in Paragraph II.A above, shall be allocated as follows:

(1) Visiting researchers shall receive intellectual property rights under the policies of the host institution. In addition, each visiting researcher named as an inventor or author shall be entitled to awards, bonuses, benefits, or any other rewards in accordance with the policies of the host institution.

(2) (a) For intellectual property created during joint research, for example, when the Parties, participating institutions, or participating personnel have agreed in advance on the scope of work, each Party shall be entitled to obtain all rights and interests in its own country. Rights and interests in third countries will be determined in implementing agreements. If research is not designated as "joint research" in the relevant implementing agreement, rights to intellectual property arising from the research will be allocated in accordance with paragraph II.B.(1) above. In addition, each person named as an inventor or author shall be entitled to receive awards in accordance with the policies of the participating institutions.

(b) Notwithstanding paragraph II.B.(2)(a) above, if a type of intellectual property is available under the laws of one Party but not the other Party, the Party whose laws provide for this type of protection shall be entitled to all rights and interests worldwide. Persons named as inventors or authors of the property shall nonetheless be entitled to awards, bonuses, benefits, or any other rewards in accordance with the policies of the participating institution of the Party obtaining rights.

III. Business Confidential Information

In the event that information identified in a timely fashion as business-confidential is furnished or created under this Agreement, each Party and its participants shall protect such information in accordance with applicable laws, regulations, and administrative practices. Information may be identified as "business-confidential" if a person having the information may derive an economic benefit from it or may obtain a competitive advantage over those who do not have it, the information is not generally known or publicly available from other sources, and the owner has not previously made the information available without imposing in a timely manner an obligation to keep it confidential.

СОГЛАШЕНИЕ

между Правительством Соединенных Штатов Америки и Правительством Российской Федерации о научно-техническом сотрудничестве в области обращения с плутонием, изъятым из ядерных военных программ

Правительство Соединенных Штатов Америки и Правительство Российской Федерации, именуемые в дальнейшем Сторонами,

Принимая во внимание:

Заявление Президентов Соединенных Штатов Америки и Российской Федерации от 14 января 1994 года « О нераспространении оружия массового уничтожения и средств его доставки»;

Декларацию встречи на высшем уровне в Москве по ядерной безопасности 19-20 апреля 1996 года;

Заключения Международной встречи экспертов в Париже 28-31 октября 1996 года о безопасном и эффективном обращении с делящимися материалами, определенными как более не требующиеся для военных целей;

Положение, касающееся делящихся материалов, Заключительного Коммюнике Встречи на высшем уровне в Денвере стран Большой Восьмерки от 22 июня 1997 года;

Заявление Президента Соединенных Штатов Америки от 1 марта 1995 года о том, что 200 тонн делящихся материалов будут выведены из ядерного арсенала США и никогда более не будут использованы для создания ядерного оружия; и

Обращение Президента Российской Федерации к участникам 41-ой сессии Генеральной конференции МАГАТЭ 26 сентября 1997 года о поэтапном изъятии из ядерных военных программ до 500 тонн высокообогащенного урана и до 50 тонн плутония, высвобождаемых в процессе ядерного разоружения;

Согласились о нижеследующем:

Статья 1

Целью настоящего Соглашения является:

а). выработка научно-технического обоснования для принятия решения об использовании плутония, являющегося предметом данного Соглашения.

б). определение основных направлений продолжения и расширения научно-технического сотрудничества для выполнения положения параграфа а).

Статья 2

Для целей настоящего Соглашения:

1. Термин «плутоний» означает плутоний, изъятый из ядерных военных программ и более не требуемый для военных целей,
2. Термин «обращение с плутонием» означает перевод плутония в отработавшее топливо или в другие формы, в равной степени не пригодные для использования в ядерном оружии или других ядерных взрывных устройствах и может включать конверсию плутония, производство из плутония смешанного оксидного топлива (МОКС-топлива), использование МОКС-топлива в ядерных реакторах и иммобилизацию плутония в различных формах.

Статья 3

1. Стороны будут:

а) продолжать сотрудничество в области маломасштабных испытаний и демонстраций в области обращения с плутонием; а также

б) так скоро, как это представляется практически возможным, переходить к опытно-промышленным демонстрациям технологий по обращению с плутонием.

2. Основными направлениями сотрудничества Сторон будут:

а) конверсия металлического плутония в оксид, пригодный для изготовления МОКС-топлива для энергетических ядерных реакторов различных типов;

б) стабилизация нестабильных форм плутония;

в) использование плутония в виде МОКС-топлива в энергетических ядерных реакторах различных типов;

г) иммобилизация плутония, включая отходы и трудно перерабатываемые формы; и

д) захоронение иммобилизованных материалов, содержащих плутоний, в глубоких геологических формациях.

Статья 4

1. Для выполнения положений настоящего Соглашения Стороны назначают исполнительные органы. От Соединенных Штатов Америки - Министерство энергетики Соединенных Штатов Америки, в Российской Федерации исполнительным органом является Министерство Российской Федерации по атомной энергии.

2. В соответствии с законодательством и правилами Сторон и после письменного уведомления другой Стороны, каждая Сторона при необходимости имеет право привлекать к осуществлению данного Соглашения другие правительственные агентства, департаменты и организации своей страны.

3. Для выполнения целей настоящего Соглашения Стороны создают российско-американский Объединенный Координационный Комитет по обращению с плутонием, который координирует и согласовывает работы, проводимые в рамках настоящего Соглашения. Каждая Сторона назначает своих представителей в Объединенном Координационном Комитете. Решения Объединенного Координационного Комитета принимаются на основе консенсуса.

4. Задачами Объединенного Координационного Комитета являются:

а) Определение областей сотрудничества и разработка общего плана работ в рамках настоящего Соглашения;

б) Определение приоритетов, координация, рассмотрение и одобрение совместных проектов, осуществляемых в рамках настоящего Соглашения и в пределах ресурсов, предоставленных Сторонами;

в) Разрешение любых споров, которые могут возникнуть в процессе научно-технической работы в рамках настоящего Соглашения; и

г) Рассмотрение иных вопросов по согласию Сторон, находящихся в рамках настоящего Соглашения.

5. При достижении договоренности о проведении совместных исследований, проектов или экспериментов в рамках настоящего Соглашения, детальный план выполнения этих работ официально составляется в виде исполнительных договоренностей, подлежащих рассмотрению и одобрению Объединенным Координационным Комитетом.

Статья 5

Сотрудничество Сторон в рамках настоящего Соглашения может включать следующие направления:

а) Обмен научной и технической информацией;

б) Разработка концептуальных подходов;

в) Исследовательские, экспериментальные работы и маломасштабные демонстрации технологических решений;

г) Проектирование, создание и эксплуатация опытно-промышленных установок с целью демонстрации и проверки технологических решений, полученных в результате исследований;

д) Передачу оборудования и неядерных материалов;

е) Встречи, семинары, конференции, командировки и рабочие совещания с целью обмена информацией;

ж) Технико-экономические обоснования;

з) Другие формы сотрудничества в рамках настоящего Соглашения по совместному согласию исполнительных органов, выраженному в письменном виде.

Статья 6

1.В рамках настоящего Соглашения осуществляется обмен только несекретной информацией.

2. С целью предотвращения доступа лиц и организаций, не участвующих в выполнении настоящего Соглашения, к информации, передаваемой Сторонами в рамках настоящего Соглашения или полученной в результате его осуществления, и считающейся Сторонами конфиденциальной, с этой информацией следует обращаться как с конфиденциальной информацией. Такая информация должна быть четко определена и обозначена. Определение информации в качестве конфиденциальной осуществляется Стороной, передающей информацию, в соответствии с ее законами и правилами. Сторона, принимающая эту информацию, присваивает ей классификацию, обеспечивающую ей такую степень защищенности, которая, по крайней мере, равноценна защищенности, требуемой Стороной, которая предоставила эту информацию.

3.Обращение с конфиденциальной информацией осуществляется в соответствии с законами и правилами Стороны, получающей информацию, причем эта информация не разглашается и не передается третьей стороне, не участвующей в реализации настоящего Соглашения, без письменного согласия Стороны, передавшей информацию. В соответствии с нормами и правилами Соединенных Штатов Америки, с такой информацией обращаются как с информацией, принадлежащей иностранному правительству, переданной конфиденциально. Эта информация обеспечивается соответствующей защитой. В соответствии с нормами и правилами Российской Федерации с этой информацией обращаются как со служебной информацией ограниченного распространения, и эта информация обеспечивается соответствующей защитой.

4.Стороны обеспечивают эффективную защиту интеллектуальной собственности и распределение прав на интеллектуальную собственность, переданную или созданную в рамках настоящего Соглашения, как это указано в настоящей Статье и в Приложении к настоящему Соглашению, которое является неотъемлемой частью настоящего Соглашения.

5.Информация, передаваемая в рамках настоящего Соглашения, должна использоваться исключительно в целях, установленных настоящим Соглашением.

6.Число лиц, имеющих доступ к конфиденциальной информации, должно быть ограничено числом, необходимым для реализации настоящего Соглашения и других связанных с ним программ и определяется исполнительными органами Сторон.

Статья 7

1. Материалы, оборудование и технологии, передаваемые по настоящему Соглашению, не будут использоваться для производства ядерного оружия, любых ядерных взрывных устройств или для исследований или разработки таких устройств, а также для использования в военных целях.

2. Материалы, оборудование и технологии, передаваемые по настоящему Соглашению, не являются предметом экспорта, реэкспорта или передачи из-под юрисдикции получателя без письменного согласия Сторон.

3. До начала экспортных поставок третьей стороне какого-либо оборудования, материалов или технологий в рамках настоящего Соглашения, Стороны по взаимному согласию в письменном виде определяют условия, в соответствии с которыми эти предметы экспорта могут экспортироваться, реэкспортироваться или передаваться из-под юрисдикции третьей стороны.

4. Исполнительные органы Сторон должны предпринимать все необходимые меры для обеспечения соответствующей физической защиты ядерных материалов, оборудования, установок и ядерных технологий, находящихся под их юрисдикцией, а также применяют такие критерии и уровни физической защиты, которые не ниже критериев и уровней,

определенных в Конвенции по физической защите ядерных материалов и в рекомендациях МАГАТЭ.

Статья 8

Оборудование, поставки, материалы, услуги и работы, предоставляемые или приобретаемые Соединенными Штатами Америки, их подрядчиками, субподрядчиками и их персоналом в целях реализации настоящего Соглашения, являются безвозмездной технической помощью, в отношении которых применяется освобождение от уплаты таможенных пошлин и налогов. Российская Федерация предпринимает все необходимые меры для освобождения такого оборудования, поставок, материалов, услуг и работ от всех налогов, тарифов, таможенных пошлин и сборов Российской Федерации и ее органов.

Статья 9

1.За исключением претензий к отдельным лицам за ущерб или телесное повреждение, явившихся результатом их преднамеренных действий, Правительство Российской Федерации не предъявляет претензий и не возбуждает судебных разбирательств в связи с деятельностью, осуществляемой во исполнение настоящего Соглашения, против Правительства Соединенных Штатов Америки и его персонала или его подрядчиков, субподрядчиков, консультантов, поставщиков или субпоставщиков оборудования или услуг на любом уровне и их персонала за любой ущерб, включая косвенный, прямой или вторичный ущерб имуществу, принадлежащему Российской Федерации. Настоящий пункт не применяется к правовым действиям, осуществляемым Правительством Российской Федерации для обеспечения выполнения положений контрактов, стороной которых является оно, российский гражданин или юридическое лицо.

2.За исключением претензий к отдельным лицам за ущерб или телесное повреждение, явившихся результатом их преднамеренных действий, Правительство Российской Федерации обеспечивает надлежащую защиту, освобождает от материальной ответственности, не предъявляет

претензий и не возбуждает судебных разбирательств против Правительства Соединенных Штатов Америки и его персонала, подрядчиков, субподрядчиков, консультантов, поставщиков или субпоставщиков оборудования или услуг на любом уровне и их персоналу по претензиям третьих сторон в связи с деятельностью во исполнение настоящего Соглашения в любом суде за телесное повреждение или ущерб, включая косвенное, прямое или вторичное телесное повреждение или ущерб, причиненные в пределах и за пределами территории Российской Федерации. Ничто в настоящем пункте не истолковывается как признание юрисдикции любого суда над претензиями третьих сторон, к которым применяется настоящий пункт, ни как отказ от иммунитета государства любой из Сторон в отношении возможных претензий к ним третьих сторон.

3. Стороны могут в случае необходимости проводить консультации в связи с претензиями и судебными разбирательствами, касающимися настоящей Статьи.

4. Положения настоящей Статьи не исключают возможности предоставления Сторонами компенсации в соответствии с их национальным законодательством.

5. Ничто в настоящей Статье не истолковывается как препятствующее судебным разбирательствам или претензиям к гражданам Российской Федерации или лицам, постоянно проживающим на территории Российской Федерации.

Статья 10

1. Совместная деятельность в рамках данного Соглашения финансируется из фондов, выделенных на эти цели Соединенными Штатами Америки и Российской Федерацией и в виде предоставления ими материалов, оборудования и услуг экспертов на безвозмездной основе. Совместная деятельность также может быть профинансирована частично или полностью непосредственно из других источников, включая неправительственные фонды и частный сектор.

2. . Во всех случаях деятельность в рамках настоящего соглашения и ее финансовая поддержка Соединенными Штатами Америки зависит от наличия ассигнованных средств. Во всех случаях деятельность в рамках

настоящего Соглашения и ее финансовая поддержка Российской Федерацией зависит от наличия ассигнованных средств

Статья 11

В случае заключения контракта со Стороной на приобретение предметов и услуг, включая строительство, с целью выполнения настоящего Соглашения, эти контракты заключаются в соответствии с законами и правилами этой Стороны.

Статья 12

1. Представители Министерства энергетики США имеют право при уведомлении в разумные сроки проводить проверки и ревизию использования любой помощи и содействия, представленной Правительством Соединенных Штатов Америки в рамках сотрудничества, предусмотренного настоящим Соглашением, в течение всего срока действия настоящего Соглашения и трех лет по истечении его срока действия. Подобные проверки могут проводиться на территории или местах Сторон, определенных по взаимной договоренности между исполнительными органами Сторон.

3. Исполнительные органы сторон разрабатывают соответствующие процедуры для проведения проверок и ревизий всех работ, выполняемых в рамках настоящего Соглашения.

Статья 13

Все вопросы, относящиеся к толкованию или применению положений данного Соглашения, решаются путем проведения консультаций между Сторонами.

Статья 14

1. Настоящее Соглашение вступает в силу с даты подписания и действует в течение 5 лет. Срок его действия может быть продлен на очередные 5-летние периоды с письменного согласия обеих Сторон после совместного рассмотрения до окончания каждого 5-летнего периода. Настоящее Соглашение может быть изменено по взаимному согласию Сторон в письменном виде.

2. Действие настоящего Соглашения может быть прекращено любой из Сторон путем направления письменного уведомления о таком намерении по дипломатическим каналам. В этом случае настоящее Соглашение прекращает действие по истечении шести месяцев со дня направления уведомления.

3.В случае прекращения действия данного Соглашения по инициативе одной из Сторон, Стороны могут договориться о выполнении существующих контрактов и проектов в полном объеме и по взаимной договоренности урегулировать вопрос о неоплаченных счетах. Стороны согласны, что в случае прекращения или окончания срока действия настоящего Соглашения, обращение со всей конфиденциальной информацией и интеллектуальной собственностью, полученной в ходе осуществления настоящего Соглашения, будет и впредь осуществляться в соответствии со Статьей 6 настоящего Соглашения, если Сторонами не будет достигнуто иных договоренностей в письменной форме.

СОВЕРШЕНО в_____199 г., в двух экземплярах, каждый на английском и русском языках, причем оба текста имеют одинаковую силу.

ЗА ПРАВИТЕЛЬСТВО СОЕДИНЕННЫХ ШТАТОВ АМЕРИКИ

ЗА ПРАВИТЕЛЬСТВО РОССИЙСКОЙ ФЕДЕРАЦИИ

ПРИЛОЖЕНИЕ

к Соглашению
между Правительством Соединенных Штатов Америки и Правительством Российской Федерации о научно-техническом сотрудничестве в области обращения с плутонием, изъятым из ядерных военных программ

Интеллектуальная собственность

В соответствии со Статьей 6 настоящего Соглашения:

Стороны обеспечивают адекватную и эффективную защиту интеллектуальной собственности, создаваемой или предоставленной в рамках настоящего Соглашения и соответствующих исполнительных соглашений.

Стороны договорились своевременно уведомлять друг друга о всех изобретениях, результатах научно-технической, научно-информационной деятельности и работах, выполняемых в рамках настоящего Соглашения, на которые распространяются авторские права, а также стремиться к своевременной защите объектов интеллектуальной собственности. Распределение прав на такую интеллектуальную собственность осуществляется в соответствии с положениями настоящего Приложения.

I. Область применения

А. Настоящее Приложение распространяется на всю совместную деятельность, осуществляемую в соответствии с Соглашением, если Стороны или их исполнительные органы не договорились иначе.

Б. Для целей настоящего Соглашения "интеллектуальная собственность" имеет значение, определенное в Статье 2 Конвенции, учреждающей Всемирную организацию интеллектуальной собственности, заключенной в Стокгольме 14 июля 1967 г.

В. Настоящее Приложение касается распределения прав и учета интересов Сторон. Каждая Сторона обеспечивает получение другой Стороной прав на интеллектуальную собственность, переданную в соответствии с настоящим Приложением, путем приобретения этих прав от

ее собственных участников посредством заключения контрактов, лицензионных договоров или составления при необходимости иных юридических документов. Настоящее Приложение никоим иным образом не изменяет и не наносит ущерба порядку в распределении прав на интеллектуальную собственность между Стороной и ее гражданами или юридическими лицами, который определяется законами и практикой этой Стороны.

Г. Спорные вопросы относительно интеллектуальной собственности, возникающие в рамках настоящего Соглашения, должны разрешаться путем проведения обсуждений между соответствующими участвующими в его выполнении учреждениями либо, если это необходимо, между Сторонами или их исполнительными органами. По взаимному согласию Сторон спорный вопрос передается на рассмотрение арбитражного суда для его разрешения, обязательного для Сторон, в соответствии с Соглашением и применяемыми положениями международного права.

Д. Прекращение или окончание срока действия настоящего Соглашения не влияет на права или обязательства, вытекающие из настоящего Приложения.

II. Распределение прав

А. Каждой Стороне предоставляется неисключительная, безотзывная, безвозмездная лицензия во всех странах на перевод, воспроизведение и публичное распространение научных и технических журнальных статей, докладов, отчетов и книг, непосредственно подготовленных в результате совместной работы в рамках настоящего Соглашения. Во всех публично распространяемых экземплярах охраняемых авторским правом работ, подготовленных в соответствии с настоящим положением, указываются имена их авторов, за исключением тех случаев, когда автор определенно выразил желание остаться анонимным.

Б. Права на все виды интеллектуальной собственности, помимо тех прав, которые изложены выше в параграфе II.А, распределяются следующим образом:

(1) Приглашенные исследователи получают права на интеллектуальную собственность в соответствии с правилами принимающей их организации. В дополнение к этому, каждый приглашенный

исследователь, признанный как изобретатель или автор, имеет право на получение вознаграждений, премий, прибыли или любых иных вознаграждений в соответствии с правилами принимающей организации.

(2) (а) В отношении интеллектуальной собственности, созданной в ходе совместных исследований, если Стороны, участвующие организации или сотрудники предварительно согласовали объем работ, каждой Стороне предоставляются права и выгоды в ее стране. Права и выгоды в третьих странах определяются в исполнительных соглашениях. Если исследовательская работа не определена как "совместные исследования" в соответствующем исполнительном соглашении, то права на интеллектуальную собственность, созданную в рамках такой исследовательской работы, распределяются в соответствии с приведенным выше параграфом II.Б (1). В дополнение к этому, каждое лицо, признанное как изобретатель или автор, имеет право на вознаграждения в соответствии с правилами участвующих организаций.

(б) Несмотря на положения приведенного выше параграфа 2а), если право на какой-либо вид интеллектуальной собственности действительно согласно законодательству государства одной Стороны, но не действительно согласно законодательству государства другой Стороны, то Сторона, законодательство которой обеспечивает такую защиту, получает все права и выгоды во всех странах мира. Тем не менее, лица, признанные как изобретатели или авторы интеллектуальной собственности, имеют право на получение вознаграждений, премий, прибыли или любых иных вознаграждений в соответствии с правилами участвующих организаций.

III. Деловая конфиденциальная информация

В том случае, если в рамках настоящего Соглашения предоставляется или создается информация, своевременно определенная как деловая конфиденциальная, то каждая Сторона и ее участники осуществляют защиту такой информации в соответствии с применимыми законами, правилами и административной практикой. Информация может определяться как "деловая конфиденциальная", если какое-либо лицо, располагающее информацией, может извлечь из нее экономическую выгоду или получить конкурентные преимущества перед теми, кто такой информацией не обладает, если информация широко не известна либо не доступна из других источников и если владелец ранее не предоставлял эту информацию без своевременного введения обязательства сохранять ее конфиденциальность.

Appendix B
CONTRACTOR DISCLOSURE STATEMENT

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF EIS FOR DOE SURPLUS PLUTONIUM DISPOSITION

The Council on Environmental Quality (CEQ) Regulations at 40 CFR 1506.5(c), which have been adopted by the the U.S. Department of Energy (DOE) (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 18026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offerer and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure of your proposal).

(a) X Offerer and any proposed subcontractors have no financial or other interest in the outcome of the project.

(b) ___ Offerer and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

_____
Signature

Casey Koontz
Name

Contract Representative
Title

Science Applications International Corporation
Company

August 14, 1997
Date

Appendix C
Adjunct Melter Vitrification Process

C.1 ADJUNCT MELTER AS AN IMMOBILIZATION TECHNOLOGY VARIANT

The adjunct melter vitrification process was identified in the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement (Storage and Disposition PEIS)* (DOE 1996) as a possible technology variant for immobilizing surplus plutonium. It is a homogenous immobilization approach similar to the new, stand-alone vitrification facility evaluated in the *Storage and Disposition PEIS*, except that the approach would use some existing facilities and infrastructure at the Savannah River Site (SRS).

In the adjunct melter approach, plutonium would be immobilized, using modified facilities in Building 221–F, into a borosilicate glass frit that would be temporarily stored in individual cans. This frit would be mixed in the new adjunct melter facility with high-level waste (HLW) supplied from the Defense Waste Processing Facility (DWPF). The blended feed would be melted and poured into DWPF canisters to produce a radiation field in the final product that would meet the Spent Fuel Standard (UC 1996).

C.2 EVALUATION OF IMMOBILIZATION TECHNOLOGY VARIANTS

The U.S. Department of Energy (DOE) examined six immobilization technology variants to determine the more promising variants for further development. The six variants were divided into two categories—the external radiation barrier approach and internal radiation barrier approach—as follows:

I. External barrier (Can-in-canister variants)	1. Ceramic immobilization in existing facilities 2. Glass immobilization in existing facilities
II. Internal barrier (Homogenous variants)	3. Vitrification in new, stand-alone facilities 4. Vitrification with an adjunct melter in existing (DWPF at SRS) and new facilities 5. Ceramic immobilization in new, stand-alone facilities 6. Electrometallurgical treatment in existing and new facilities

Nine evaluation criteria, similar to those used in the screening of alternatives for analysis in the *Storage and Disposition PEIS*, were used to qualitatively evaluate the six immobilization technology variants:

1. Resistance to theft and diversion by unauthorized parties
2. Resistance to retrieval, extraction, and reuse by host nation
3. Technical viability
4. Environmental, safety, and health compliance
5. Cost effectiveness
6. Timeliness
7. Fostering progress and cooperation with Russia and other countries
8. Public and institutional acceptance
9. Additional benefits

The evaluation concluded that the external barrier variants would be superior to the internal barrier variants in terms of timeliness, higher technical viability, much lower costs, and, to a lesser extent, slightly lower

environmental and health risks (UC 1997). As a result of this evaluation, the can-in-canister variants (1 and 2) were considered reasonable alternatives for analysis in the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) and are compared with the homogenous vitrification and ceramic immobilization facilities (3 and 5) evaluated in the *Storage and Disposition PEIS*. DOE decided, in the Record of Decision for the *Storage and Disposition PEIS*, not to pursue the electrometallurgical treatment option (6) because its technology is less mature than vitrification or ceramic immobilization. Although use of the adjunct melter (4) may be viable from a technical standpoint, it would cost twice as much as the can-in-canister approach and would take 1 to 5 years longer to implement. Based on the relative sizes of the facilities, their use of existing facilities and infrastructure, and the processing steps associated with their operation, specific environmental impacts associated with the adjunct melter approach would be expected to result in environmental impacts ranging between those of the new facility (homogenous) variants and the two can-in-canister variants. The adjunct melter's lack of an environmental advantage combined with its timeliness, cost, and technical shortcomings make it less reasonable than the can-in-canister approach. Thus, it is not included as a reasonable alternative for detailed environmental analysis in the SPD EIS. For completeness, a description of the vitrification process using the adjunct melter with DWPF at SRS is provided below.

C.3 ADJUNCT MELTER VITRIFICATION PROCESS

A simplified flow diagram using a new adjunct melter at SRS is shown in Figure C–1. The disposition process would begin with the conversion of feed materials to plutonium oxide at Building 221–F. This oxide would be blended by a dry feed preparation process to prepare a consistent feedstock and fed into a melter along with glass frit to initiate the first stage of vitrification. The first-stage melter would dissolve the plutonium oxide into the borosilicate glass and convert the mixture to a frit containing about 10 percent plutonium by weight. The assumed nominal feed of plutonium over the life of the adjunct melter vitrification process would be 50 t (55 tons) over a 10-year period.

The plutonium glass frit would then be stored in small steel cans and transported as needed to the new adjunct melter facility adjacent to DWPF. Standard DWPF operations receive two main feedlines from the SRS HLW tank farms to be vitrified—a washed tank sludge and an aqueous HLW precipitate that contains highly radioactive cesium 137. In the adjunct melter process, some of the aqueous HLW precipitate would be diverted from the DWPF, via an interarea pipeline, to the adjunct melter facility. At the adjunct melter facility, the plutonium glass frit would be mixed with DWPF frit and the aqueous HLW precipitate in a melter feed tank, and slurry fed to the melter, producing a homogenous glass melt that would then be poured into DWPF canisters. The surplus plutonium contained in the canisters would be dissolved in the glass and uniformly integrated with fission products. The canisters would then be stored on the site awaiting final disposal at a geologic repository pursuant to the Nuclear Waste Policy Act.

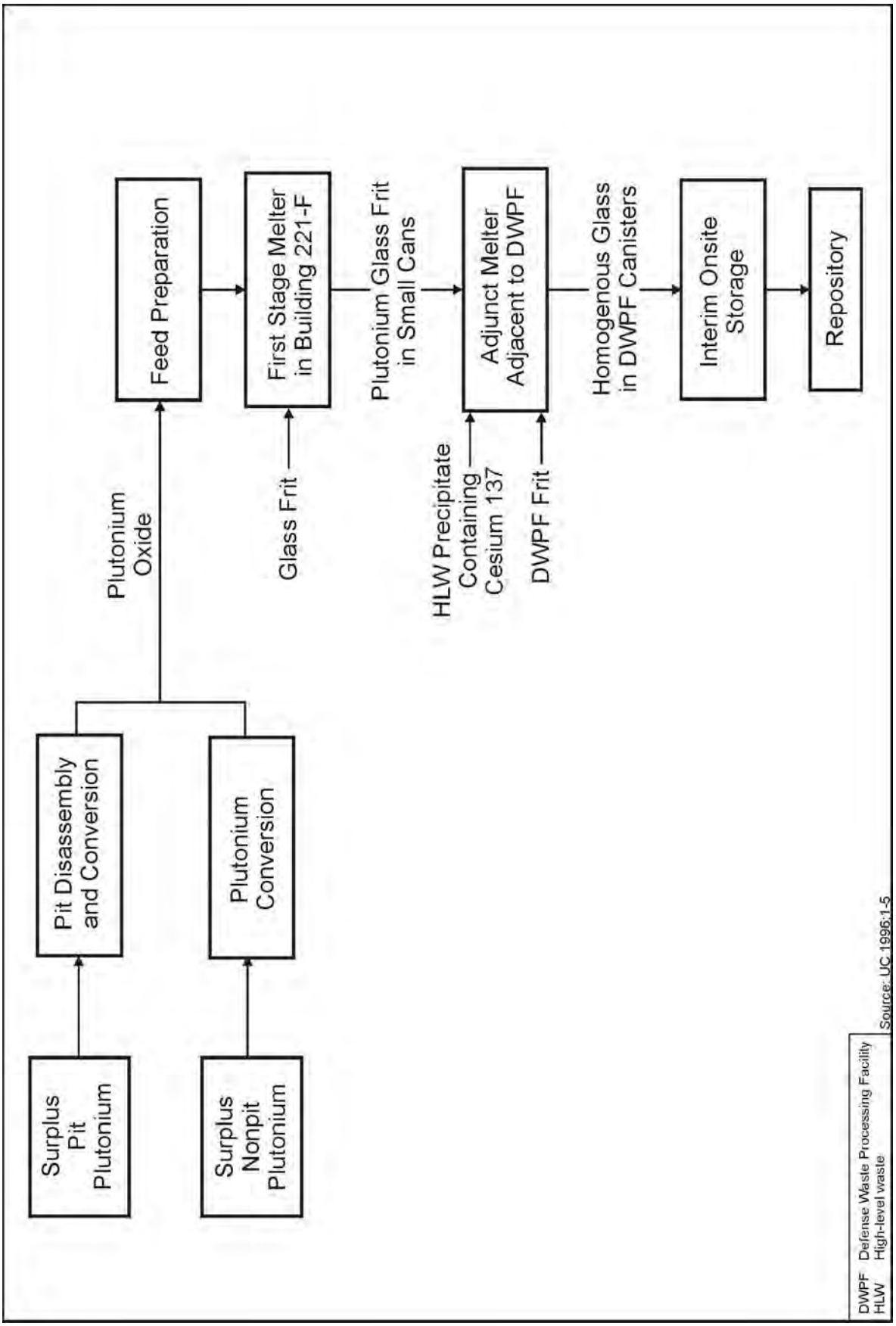

Figure C–1. Adjunct Melter Vitrification Process

C.4 REFERENCES

DOE (U.S. Department of Energy), 1996, *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement*, DOE/EIS-0229, Office of Fissile Materials Disposition, Washington, DC, December.

UC (Regents of the University of California), 1996, *Alternative Technical Summary Report: Vitrification Adjunct Melter to DWPF Variant*, UCRL-ID-122660, L-120217-1, Lawrence Livermore National Laboratory, Livermore, CA, August 26.

UC (Regents of the University of California), 1997, *Immobilization Technology Down-Selection Radiation Barrier Approach*, UCRL-ID-127320, Lawrence Livermore National Laboratory, Livermore, CA, May 23.

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Appendix E
Facility Data

This appendix presents predesign data on the construction and operations requirements for the proposed surplus plutonium disposition facilities. Tables E–1 through E–24 present data on schedule, construction area requirements, operation area requirements, construction employment requirements, major construction resource requirements, operation employment requirements, and operation resource requirements for each of the four candidate U.S. Department of Energy sites (the Hanford Site [Hanford], Idaho National Engineering and Environmental Laboratory [INEEL], the Pantex Plant [Pantex], and the Savannah River Site [SRS]). For the candidate lead assembly fabrication facilities at Argonne National Laboratory–West, Hanford, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and SRS, the schedule, operation employment requirements, and operation resource requirements are presented in Tables E–25 through E–28.

The alternatives addressed in the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) provide options for the collocation of facilities at Hanford in the Fuels and Materials Examination Facility. Resource requirements for the pit conversion facility are the same whether the facility is collocated with the other facilities or is installed alone. There are differences, however, in such requirements for the immobilization and mixed oxide (MOX) facilities as indicated in Tables E–8 through E–24.

E.1 PIT CONVERSION FACILITY

Table E–1. Pit Conversion Facility Schedule

Activity	Calendar Year
Research and development	1995–2002
Integrated-process demonstrations	1998–2002
Facility design	1999–2001
Construction	2001–2003
Permitting and licensing	1999–2004
Startup and operation	2004–2014
Deactivation and stabilization	2015–2017

Note: Schedule dates are approximate based on latest information. Actual timing may cause some activities to start later in the reference year and end sometime past the end year shown here.
Source: UC 1998a–d.

Table E–2. Pit Conversion Facility Construction Area Requirements

Function	Hanford	INEEL	Pantex	SRS
Laydown area, ha (acres) (including spoils, topsoils, etc.)	2 (4.94)	2 (4.94)	2 (4.94)	2 (4.94)
Warehouse area, ha (acres)	0 (0)	0 (0)	0 (0)	0 (0)
Staging area, ha (acres)	0 (0)	0 (0)	0 (0)	0 (0)
Temporary parking, ha (acres)	0 (0)	0 (0)	0 (0)	0 (0)
New roads, km (mi)	0.13 (0.08)	1.3 (0.81)	3.1 (1.93)	1.8 (1.12)

Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values.
Source: UC 1998a–d.

Table E–3. Pit Conversion Facility Operation Area Requirements

Land-Use Area	Hanford	INEEL	Pantex	SRS
New process facilities, ha (acres)	0 (0)	0 (0)	1.1 (2.72)	1.1 (2.72)
New support facilities, ha (acres)	0.09 (0.22)	0.09 (0.22)	1.5 (3.71)	1.5 (3.71)
Security area, ha (acres)	0 (0)	0 (0)	0 (0)	0 (0)
New parking lots, ha (acres)	0.4 (0.99)	0.4 (0.99)	0.4 (0.99)	0.4 (0.99)

Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values.
Source: UC 1998a–d.

Table E–4. Pit Conversion Facility Construction Employment Requirements (2001–2003)

Employees	Hanford	INEEL	Pantex	SRS
Craft workers	220	290	853	853
Management and administrative	44	58	171	171
Total employment	264	348	1,024	1,024

Note: Includes construction staff data provided in the data reports.
Source: UC 1998a–d.

Table E–5. Pit Conversion Facility Major Construction Resource Requirements (2001–2003)

Resource Requirements	Hanford	INEEL	Pantex	SRS
Electricity (MWh)	5,100	5,100	5,100	5,100
Fuel, l (gal)	260,000 (68,684)	330,000 (87,176)	990,000 (261,528)	990,000 (261,528)
Water, l (gal)	6,000,000 (1,585,020)	12,000,000 (3,170,040)	36,000,000 (9,510,120)	36,000,000 (9,510,120)
Concrete, m^3 (yd^3)	4,200 (5,494)	5,700 (7,456)	18,000 (23,544)	18,000 (23,544)
Steel, t (tons)	140 (154)	190 (209)	1,900 (2,094)	1,900 (2,094)

Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values.
Source: UC 1998a–d.

Table E–6. Pit Conversion Facility Annual Employment Operation Requirements

Employees	Hanford	INEEL	Pantex	SRS
Officials and managers	6	6	6	6
Professionals	65	65	65	65
Technicians	179	179	179	179
Office and clerical	14	14	14	14
Craft workers	42	42	42	42
Operatives	22	22	22	22
Laborers	5	5	5	5
Service workers	67	25	67	67
Total employment	400	358	400	400

Source: UC 1998a–d.

Table E–7. Pit Conversion Facility Annual Operation Resource Requirements

Resource Requirements	Hanford	INEEL	Pantex	SRS
Electricity (MWh)	28,000	15,000	16,000	16,000
Coal, t (tons)	NA	2,100 (2,315)	NA	2,400 (2,646)
Natural gas, m^3 (ft^3)	NA	NA	1,300,000 (45,909,500)	NA
Fuel oil,[a] l (gal)	38,000 (10,038)	38,000 (10,038)	38,000 (10,038)	38,000 (10,038)
Water, l (gal)	62,000,000 (16,378,540)	49,000,000 (12,944,330)	48,000,000 (12,680,160)	48,000,000 (12,680,160)
Hydrogen, m^3 (ft^3)	450 (15,892)	450 (15,892)	450 (15,892)	450 (15,892)
Nitrogen, m^3 (ft^3)	2,200 (77,693)	2,200 (77,693)	2,200 (77,693)	2,200 (77,693)
Oxygen, m^3 (ft^3)	330 (11,654)	330 (11,654)	330 (11,654)	330 (11,654)
Argon, m^3 (ft^3)	14,000 (494,410)	14,000 (494,410)	14,000 (494,410)	14,000 (494,410)
Chlorine, m^3 (ft^3)	62 (2,190)	63 (2,225)	62 (2,190)	62 (2,190)
Helium, m^3 (ft^3)	4,800 (169,512)	4,800 (169,512)	4,800 (169,512)	4,800 (169,512)
Sulfuric acid, kg (lb)	570 (1,257)	100 (220)	470 (1,036)	470 (1,036)
Phosphoric acid, kg (lb)	240 (529)	240 (529)	240 (529)	240 (529)
Oils and lubricants, kg (lb)	1,600 (3,527)	1,600 (3,527)	1,600 (3,527)	1,600 (3,527)
Cleaning solvents, kg (lb)	140 (309)	140 (309)	140 (309)	140 (309)
Polyphosphate, kg (lb)	67 (148)	0 (0)	70 (154)	0 (0)
Polyelectrolyte, kg (lb)	240 (529)	240 (529)	240 (529)	240 (529)
Liquid nitrogen, kg (lb)	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)
Aluminum sulfate, kg (lb)	940 (2,072)	970 (2,138)	960 (2,116)	960 (2,116)
Bentonite, kg (lb)	470 (1,036)	490 (1,080)	480 (1,058)	480 (1,058)

[a] Fuel oil includes gasoline, diesel, and lube oil.

Key: NA, not applicable.

Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values. Resource requirements less than 50 kg/yr (110 lb/yr) are not listed.

Source: UC 1998a–d.

E.2 IMMOBILIZATION FACILITY

Table E–8. Ceramic or Glass Immobilization Facility Schedule

Activity	Calendar Year
Research and development	1995–2002
Integrated-process demonstrations	1997–2003
Design and construction	1999–2005
Permitting and licensing	1999–2005
Startup and operation	2005–2016
Deactivation and stabilization	2016–2019

Note: Schedule dates are approximate based on latest information. Actual timing may cause some activities to start later in the reference year and end sometime past the end year shown here.
Source: UC 1999a–d.

Table E–9. Ceramic or Glass Immobilization Facility Construction Area Requirements

	Hanford			SRS
		Collocation		
Function	Alone	with PDCF	with MOX	New
Laydown area, ha (acres) (including spoils, topsoils, etc.)	1.8 (4.45)	4.5 (11.1)	4.5 (11.1)	9.7 (24.0)
Warehouse area, ha (acres)	2.6 (6.4)	2.6 (6.4)	2.6 (6.4)	2.6 (6.4)
Staging area, ha (acres)	0 (0)	0 (0)	0 (0)	0 (0)
Temporary parking, ha (acres)	0 (0)	0 (0)	0 (0)	0 (0)
Waste storage area, ha (acres)	0.1 (0.25)	0.1 (0.25)	0.1 (0.25)	0.1 (0.25)
New roads, km (mi)	0 (0)	0.25 (0.16)	0.3 (0.19)	0.6 (0.37)

Key: MOX, mixed oxide fuel fabrication facility; PDCF, pit disassembly and conversion facility.
Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values.
Source: UC 1999a–d.

Table E–10. Ceramic or Glass Immobilization Facility Operation Area Requirements

	Hanford			SRS
		Collocation		
Land-Use Area	**Alone**	**with PDCF**	**with MOX**	**New**
New process facilities, ha (acres)	0 (0)	0 (0)	0 (0)	0.55 (1.36)
New support facilities, ha (acres)	0 (0)	0.23 (0.57)	0.34 (0.84)	0.16 (0.40)
Security area, ha (acres)	0 (0)	0 (0)	0 (0)	0 (0)
New parking, ha (acres)	0 (0)	0.6 (1.5)	0.72 (1.8)	2 (4.94)

Key: MOX, mixed oxide fuel fabrication facility; PDCF, pit disassembly and conversion facility.
Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values.
Source: UC 1999a–d.

Table E–11. Ceramic or Glass Immobilization Facility Construction Employment Requirements (2001–2005)

	Hanford			SRS
		Collocation		
Employees	**Alone**	**with PDCF**	**with MOX**	**New**
Craft workers	1,049	1,063	1,306	2,564
Management and administrative	174	176	218	428
Total employment	1,223	1,239	1,524	2,992

Key: MOX, mixed oxide fuel fabrication facility; PDCF, pit disassembly and conversion facility.
Source: UC 1999a–d.

Table E–12. Ceramic or Glass Immobilization Facility Major Construction Resource Requirements (2001–2005)

	Hanford			SRS
		Collocation		
Resource Requirements	**Alone**	**with PDCF**	**with MOX**	**New**
Electricity (MWh)	91,000	74,000	77,000	32,000
Fuel, 1 (gal)	290,000 (76,609)	750,000 (198,128)	960,000 (253,603)	4,700,000 (1,241,599)
Coal, t (tons)	NA	NA	NA	1,800 (1,984)
Water, 1 (gal)	220,000,000 (58,117,400)	230,000,000 (60,759,100)	250,000,000 (66,042,500)	330,000,000 (87,176,100)
Concrete, m^3 (yd^3)	1,900 (2,485)	17,000 (22,236)	22,000 (28,776)	77,000 (100,716)
Steel, t (tons)	420 (463)	3,100 (3,417)	4,000 (4,409)	25,000 (27,558)

Key: MOX, mixed oxide fuel fabrication facility; NA, not applicable; PDCF, pit disassembly and conversion facility.
Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values.
Source: UC 1999a–d.

Table E–13. Ceramic or Glass Immobilization Facility Annual Employment Operation Requirements

	Hanford					SRS	
			Collocation				
	Alone		with PDCF		with MOX	New	
Employees	**17 t**	**50 t**	**17 t**	**50 t**	**17 t**	**17 t**	**50 t**
Officials and managers	14	14	16	16	16	14	14
Professionals	29	29	33	33	33	29	29
Technicians	188	220	200	232	200	196	212
Office and clerical	12	12	15	15	15	12	12
Craft workers	32	32	36	36	36	32	32
Service workers	60	60	80	80	80	52	52
Total employment	335	367	380	412	380	335	351

Key: MOX, mixed oxide fuel fabrication facility; PDCF, pit disassembly and conversion facility.
Source: UC 1999a–d.

Table E–14. Immobilization Facility Annual Operation Resource Requirements at Hanford

	Ceramic		Glass	
Resource Requirements	**17 t**	**50 t**	**17 t**	**50 t**
Electricity (MWh)	28,000	29,000	28,000	29,000
Coal, t (tons)	NA	NA	NA	NA
Natural gas, m^3 (ft^3)	NA	NA	NA	NA
Fuel oil,[a] l (gal)	69,000 (18,228)	69,000 (18,228)	69,000 (18,228)	69,000 (18,228)
Water, l (gal)	58,000,000 (15,321,860)	62,000,000 (16,378,540)	55,000,000 (14,529,350)	60,000,000 (15,850,200)
Hydrogen, m^3 (ft^3)	290 (10,241)	320 (11,301)	290 (10,241)	320 (11,301)
Oxygen, m^3 (ft^3)	350 (12,360)	400 (14,126)	350 (12,360)	400 (14,126)
Nitrogen,[b] m^3 (ft^3)	990,000 (34,961,850)	1,400,000 (49,441,000)	990,000 (34,961,850)	1,400,000 (49,441,000)
Argon,[b] m^3 (ft^3)	200,000 (7,063,000)	330,000 (11,653,950)	130,000 (4,590,950)	130,000 (4,590,950)
Helium,[b] m^3 (ft^3)	8,600 (303,709)	10,000 (353,150)	8,600 (303,709)	10,000 (353,150)
[Text deleted.]				
Process water, l (gal)	110 (29)	110 (29)	110 (29)	110 (29)
Precursor, kg (lb)	11,000 (24,251)	31,000 (68,343)	NA	NA
Binder, kg (lb)	350 (772)	960 (2,116)	NA	NA
[Text deleted.]				
Frit, kg (lb)	NA	NA	29,000 (63,933)	55,000 (121,253)
Stainless steel canisters, kg (lb)	50,000 (110,230)	140,000 (308,644)	62,000 (136,685)	170,000 (374,782)
Absorbents, kg (lb)	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)
Hydraulic fluid, l (gal)	400 (106)	400 (106)	400 (106)	400 (106)
Oil,[c] l (gal)	1,400 (370)	1,400 (370)	1,400 (370)	1,400 (370)
Sodium hypochlorite, kg (lb)	57 (126)	57 (126)	57 (126)	57 (126)
Polyphosphate, kg (lb)	84 (185)	84 (185)	84 (185)	84 (185)
Corrosion inhibitor, kg (lb)	100 (220)	100 (220)	100 (220)	100 (220)

[a] Fuel oil includes gasoline, diesel, and oil.
[b] Includes process and nonprocess chemicals.
[c] Includes cutting oil and lubricating oil.
Key: NA, not applicable.
Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values. Resource requirements less than 50 kg/yr (110 lb/yr) are not listed, except for lubricants.
Source: UC 1999a, 1999b.

Table E–15. Immobilization Facility Annual Operation Resource Requirements Collocated With Pit Conversion Facility at Hanford

	Ceramic		Glass	
Resource Requirements	**17 t**	**50 t**	**17 t**	**50 t**
Electricity (MWh)	23,000	24,000	23,000	24,000
Coal, t (tons)	NA	NA	NA	NA
Natural gas, m^3 (ft^3)	NA	NA	NA	NA
Fuel oil,[a] l (gal)	100,000 (26,417)	100,000 (26,417)	100,000 (26,417)	100,000 (26,417)
Water, l (gal)	68,000,000 (17,963,560)	72,000,000 (19,020,240)	68,000,000 (17,963,560)	72,000,000 (19,020,240)
Hydrogen, m^3 (ft^3)	290 (10,241)	320 (11,301)	290 (10,241)	320 (11,301)
Oxygen, m^3 (ft^3)	350 (12,360)	400 (14,126)	350 (12,360)	400 (14,126)
Nitrogen,[b] m^3 (ft^3)	990,000 (34,961,850)	1,400,000 (49,441,000)	990,000 (34,961,850)	1,400,000 (49,441,000)
Argon,[b] m^3 (ft^3)	200,000 (7,063,000)	330,000 (11,653,950)	130,000 (4,590,950)	130,000 (4,590,950)
Helium,[b] m^3 (ft^3)	8,600 (303,709)	10,000 (353,150)	8,600 (303,709)	10,000 (353,150)
[Text deleted.]				
Process water, l (gal)	110 (29)	110 (29)	110 (29)	110 (29)
Precursor, kg (lb)	11,000 (24,251)	31,000 (68,343)	NA	NA
Binder, kg (lb)	350 (772)	960 (2,116)	NA	NA
[Text deleted.]				
Frit, kg (lb)	NA	NA	29,000 (63,933)	55,000 (121,253)
Stainless steel canisters, kg (lb)	50,000 (110,230)	140,000 (308,644)	62,000 (136,685)	170,000 (374,782)
Absorbents, kg (lb)	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)
Hydraulic fluid, l (gal)	400 (106)	400 (106)	400 (106)	400 (106)
Oil,[c] l (gal)	1,400 (370)	1,400 (370)	1,400 (370)	1,400 (370)
Sodium hypochlorite, kg (lb)	74 (163)	74 (163)	74 (63)	74 (63)
Polyphosphate, kg (lb)	110 (243)	110 (243)	110 (243)	110 (243)
Corrosion inhibitor, kg (lb)	130 (287)	130 (287)	130 (287)	130 (287)

[a] Fuel oil includes gasoline, diesel, and oil.
[b] Includes process and nonprocess chemicals.
[c] Includes cutting oil and lubricating oil.

Key: NA, not applicable.

Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values. Resource requirements less than 50 kg/yr (110 lb/yr) are not listed, except for lubricants.

Source: UC 1999a, 1999b.

Table E–16. Immobilization Facility Annual Operation Resource Requirements Collocated With MOX Facility at Hanford

	17 t	
Resource Requirements	**Ceramic**	**Glass**
Electricity (MWh)	24,000	24,000
Coal, t (tons)	NA	NA
Natural gas, m^3 (ft^3)	NA	NA
Fuel oil,[a] l (gal)	100,000 (26,417)	100,000 (26,417)
Water, l (gal)	70,000,000 (18,491,900)	70,000,000 (18,491,900)
Hydrogen, m^3 (ft^3)	290 (10,241)	290 (10,241)
Oxygen, m^3 (ft^3)	350 (12,360)	350 (12,360)
Nitrogen,[b] m^3 (ft^3)	990,000 (34,961,850)	990,000 (34,961,850)
Argon,[b] m^3 (ft^3)	200,000 (7,063,000)	130,000 (4,590,950)
Helium,[b] m^3 (ft^3)	8,600 (303,709)	8,600 (303,709)
[Text deleted.]		
Process water, l (gal)	110 (29)	110 (29)
Precursor, kg (lb)	11,000 (24,251)	NA
Binder, kg (lb)	350 (772)	NA
[Text deleted.]		
Frit, kg (lb)	NA	29,000 (63,933)
Stainless steel canisters, kg (lb)	50,000 (110,230)	62,000 (136,685)
Absorbents, kg (lb)	1,100 (2,425)	1,100 (2,425)
Hydraulic fluid, l (gal)	400 (106)	400 (106)
Oil,[c] l (gal)	1,400 (370)	1,400 (370)
Sodium hypochlorite, kg (lb)	81 (179)	81 (179)
Polyphosphate, kg (lb)	120 (265)	120 (265)
Corrosion inhibitor, kg (lb)	140 (309)	140 (309)

[a] Fuel oil includes gasoline, diesel, and oil.
[b] Includes process and nonprocess chemicals.
[c] Includes cutting oil and lubricating oil.

Key: NA, not applicable.

Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values. Resource requirements less than 50 kg/yr (110 lb/yr) are not listed, except for lubricants.

Source: UC 1999a, 1999b.

Table E–17. Immobilization Facility Annual Operation Resource Requirements at SRS

	Ceramic		Glass	
Resource Requirements	**17 t**	**50 t**	**17 t**	**50 t**
Electricity (MWh)	23,000	24,000	23,000	23,000
Coal, t (tons)	1,200 (1,323)	1,200 (1,323)	1,200 (1,323)	1,200 (1,323)
Natural gas, m^3 (ft^3)	NA	NA	NA	NA
Fuel oil,[a] l (gal)	69,000 (18,228)	69,000 (18,228)	69,000 (18,228)	69,000 (18,228)
Water, l (gal)	100,000,000 (26,417,000)	110,000,000 (29,058,700)	100,000,000 (26,417,000)	110,000,000 (29,058,700)
Hydrogen, m^3 (ft^3)	290 (10,241)	320 (11,301)	290 (10,241)	320 (11,301)
Oxygen, m^3 (ft^3)	350 (12,360)	400 (14,126)	350 (2,360)	400 (14,126)
Nitrogen,[b] m^3 (ft^3)	990,000 (34,961,850)	1,400,000 (49,441,000)	990,000 (34,961,850)	1,400,000 (49,441,000)
Argon,[b] m^3 (ft^3)	200,000 (7,063,000)	330,000 (11,653,950)	130,000 (4,590,950)	130,000 (4,590,950)
Helium,[b] m^3 (ft^3)	8,600 (303,709)	10,000 (353,150)	8,600 (303,709)	10,000 (353,150)
[Text deleted.]				
Process water, l (gal)	110 (29)	110 (29)	110 (29)	110 (29)
Precursor, kg (lb)	11,000 (24,251)	31,000 (68,343)	NA	NA
Binder, kg (lb)	350 (772)	960 (2,116)	NA	NA
[Text deleted.]				
Frit, kg (lb)	NA	NA	29,000 (63,933)	55,000 (121,253)
Stainless steel canisters, kg (lb)	50,000 (110,230)	140,000 (308,644)	62,000 (136,685)	174,000 (383,600)
Absorbents, kg (lb)	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)
Hydraulic fluid, l (gal)	400 (106)	400 (106)	400 (106)	400 (106)
Oil,[c] l (gal)	1,400 (370)	1,400 (370)	1,400 (370)	1,400 (370)
Sodium hypochlorite, kg (lb)	130 (287)	130 (287)	130 (287)	130 (287)
Polyphosphate, kg (lb)	190 (419)	190 (419)	190 (419)	190 (419)
Corrosion inhibitor, kg (lb)	230 (507)	230 (507)	230 (507)	230 (507)

[a] Fuel oil includes gasoline, diesel, and oil.
[b] Includes process and nonprocess chemicals.
[c] Includes cutting oil and lubricating oil.

Key: NA, not applicable.

Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values. Resource requirements less than 50 kg/yr (110 lb/yr) are not listed, except for lubricants.

Source: UC 1999c, 1999d.

E.3 MOX FACILITY

Table E–18. MOX Facility Schedule

Activity	Calendar Year
MOX team selection and contract negotiation	1999
Design	2000–2001
Permitting and licensing	2000–2006
Construction	2002–2004
Cold startup	2005
Hot startup	2006
Operation	2006–2015
Deactivation and stabilization	2015–2019 (nominal 3 years)

Note: Schedule dates are approximate based on latest information. Actual timing may cause some activities to start later in the reference year and end sometime past the end year shown here.
Source: UC 1998e–h.

Table E–19. MOX Facility Construction Area Requirements

	Hanford				
Function	FMEF	New	INEEL	Pantex	SRS
Laydown area, ha (acres) (including spoils, topsoils, etc.)	2 (4.94)	2 (4.94)	2 (4.94)	2 (4.94)	2 (4.94)
Warehouse area, ha (acres)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Staging area, ha (acres)	0.65 (1.61)	0.65 (1.61)	0.65 (1.61)	0.65 (1.61)	0.65 (1.61)
Temporary parking, ha (acres)	2 (4.94)	2 (4.94)	2 (4.94)	2 (4.94)	2 (4.94)
Waste storage area, ha (acres)	1 (2.47)	1 (2.47)	1 (2.47)	1 (2.47)	1 (2.47)
New roads, km (mi)	1 (0.62)	1 (0.62)	1 (0.62)	2 (1.24)	2 (1.24)

Key: FMEF, Fuels and Materials Examination Facility.
Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values.
Source: UC 1998e–h.

Table E–20. MOX Facility Operation Area Requirements

	Hanford				
Land-Use Area	FMEF	New	INEEL	Pantex	SRS
New process facilities, ha (acres)	0 (0)	1.0 (2.47)	1.0 (2.47)	1.0 (2.47)	1.0 (2.47)
New support facilities, ha (acres)	0.47 (1.16)	0.24 (0.59)	0.24 (0.59)	0.24 (0.59)	0.24 (0.59)
Security area, ha (acres)	3 (7.41)	3 (7.41)	3 (7.41)	3 (7.41)	3 (7.41)
New parking, ha (acres)	2 (4.94)	2(4.94)	2 (4.94)	2 (4.94)	2 (4.94)

Key: FMEF, Fuels and Materials Examination Facility.
Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values.
Source: DOE 1999; UC 1998e–h.

Table E–21. MOX Facility Construction Employment Requirements (2002–2004)

Employees	Hanford FMEF	Hanford New	INEEL	Pantex	SRS
Craft workers	1,263	1,471	1,471	1,471	1,471
Management and administrative	641	679	679	679	679
Total employment	1,904	2,150	2,150	2,150	2,150

Key: FMEF, Fuels and Materials Examination Facility.
Note: Total employment includes construction workers during cold and hot startup years.
Source: DOE 1999; ORNL 1998.

Table E–22. MOX Facility Major Construction Resource Requirements (2002–2004)

Resource Requirements	Hanford FMEF	Hanford New	INEEL	Pantex	SRS
Electricity (MWh)	74,000	6,000	6,000	6,000	6,000
[Text deleted.]					
Fuel, l (gal)	330,000 (87,176)	1,000,000 (264,170)	1,000,000 (264,170)	1,000,000 (264,170)	1,000,000 (264,170)
Water, l (gal)	50,000,000 (13,208,500)	69,000,000 (18,227,730)	69,000,000 (18,227,730)	69,000,000 (18,227,730)	69,000,000 (18,227,730)
Concrete, m^3 (yd^3)	6,300 (8,240)	15,000 (19,620)	15,000 (19,620)	15,000 (19,620)	15,000 (19,620)
Steel, t (tons)	2,400 (2,646)	6,100 (6,724)	6,100 (6,724)	6,100 (6,724)	6,100 (6,724)

[Text deleted.]
Key: FMEF, Fuels and Materials Examination Facility.
Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values. Resource requirements less than 50 kg/yr (110 lb/yr) are not listed.
Source: DOE 1999; ORNL 1998.

Table E–23. MOX Facility Annual Employment Operation Requirements

Employees	Hanford FMEF	Hanford New	INEEL	Pantex	SRS
Office managers and professionals	86	86	86	86	86
Technicians, operatives, laborers, and service workers	268	268	268	268	268
Office and clerical	12	12	12	12	12
Craft workers	19	19	19	19	19
Total employment	385	385	385	385	385

Key: FMEF, Fuels and Materials Examination Facility.
Note: Total employment during normal operations, after cold and hot startup years.
Source: DOE 1999; ORNL 1998; UC 1998e–h.

Table E–24. MOX Facility Annual Operation Resource Requirements

Resource Requirements	Hanford FMEF	Hanford New	INEEL	Pantex	SRS
Electricity (MWh)	46,000	46,000	30,000	30,000	30,000
Coal, t (tons)	NA	NA	2,100 (2,315)	NA	890 (983)
Natural gas, m^3 (ft^3)	NA	NA	NA	1,100,000 (38,846,500)	NA
Fuel oil,[a] l (gal)	63,000 (16,643)	63,000 (16,643)	63,000 (16,643)	63,000 (16,643)	63,000 (16,643)
Water, l (gal)	68,000,000 (17,963,560)	68,000,000 (17,963,560)	68,000,000 (17,963,560)	68,000,000 (17,963,560)	68,000,000 (17,963,560)
Hydrogen, m^3 (ft^3)	23,000 (812,245)	23,000 (812,245)	23,000 (812,245)	23,000 (812,245)	23,000 (812,245)
Nitrogen, m^3 (ft^3)	10,000,000 (353,150,000)	10,000,000 (353,150,000)	10,000,000 (353,150,000)	10,000,000 (353,150,000)	10,000,000 (353,150,000)
Oxygen, m^3 (ft^3)	74 (2,613)	74 (2,613)	74 (2,613)	74 (2,613)	74 (2,613)
Argon, m^3 (ft^3)	500,000 (17,657,500)	500,000 (17,657,500)	500,000 (17,657,500)	500,000 (17,657,500)	500,000 (17,657,500)
Helium, m^3 (ft^3)	21,000 (741,615)	21,000 (741,615)	21,000 (741,615)	21,000 (741,615)	21,000 (741,615)
Phosphoric acid, kg (lb)	100 (220)	100 (220)	100 (220)	100 (220)	100 (220)
Sodium nitrate, kg (lb)	500 (1,102)	500 (1,102)	500 (1,102)	500 (1,102)	500 (1,102)
Sodium hydroxide, kg (lb)	76 (168)	76 (168)	76 (168)	76 (168)	76 (168)
Ethylene glycol, kg (lb)	300 (661)	300 (661)	300 (661)	300 (661)	300 (661)
Lubricant zinc stearate, kg (lb)	300 (661)	300 (661)	300 (661)	300 (661)	300 (661)
[Text deleted.]					
Nitric acid, m^3 (ft^3)	180 (6,357)	180 (6,357)	180 (6,357)	180 (6,357)	180 (6,357)
Silver nitrate kg (lb)	140 (309)	140 (309)	140 (309)	140 (309)	140 (309)
Solvent, l (gal)	15 (3.97)	15 (3.97)	15 (3.97)	15 (3.97)	15 (3.97)
[Text deleted.]					
Hydroxylamine nitrate, kg (lb)	660 (1,455)	660 (1,455)	660 (1,455)	660 (1,455)	660 (1,455)
[Text deleted.]					
Oxalic acid dihydrate, kg (lb)	7,000 (15,432)	7,000 (15,432)	7,000 (15,432)	7,000 (15,432)	7,000 (15,432)
Reillex HPG resin (wet basis), kg (lb)	160 (353)	160 (353)	160 (353)	160 (353)	160 (353)

[a] Fuel oil includes gasoline and oil.

Key: FMEF, Fuels and Materials Examination Facility; NA, not applicable.

Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values.

Source: DOE 1999; ORNL 1998; UC 1998e–h.

E.4 LEAD ASSEMBLY FABRICATION FACILITY

Table E–25. Lead Assembly Fabrication Facility Schedule

Activity	Calendar Year
Equipment procured	2000–2001
Facility design	1999–2001
Facility permitting	2000–2002
Facility modification	2001–2002
Lead assembly fabrication (operation)	2003–2006
Deactivation and stabilization	2010–2013

Note: Schedule dates are approximate based on latest information. Actual timing may cause some activities to start later in the reference year and end sometime past the end year shown here.
Source: O'Connor et al. 1998a–e.

Table E–26. Lead Assembly Fabrication Annual Employment Operation Requirements

Employees	Number of Employees
Officials and managers	1
Professionals	4
Technicians	31
Office and clerical	2
Craft workers	5
Operatives	8
Service workers	9
Total employment	60

Source: O'Connor et al. 1998a–e.

Table E–27. Lead Assembly Fabrication Construction Resource Requirements

Resource Requirement	ANL–W	Hanford	LLNL	LANL	SRS
Electricity (MWh)	NR	NR	NR	NR	2,800
Fuel oil,[a] l (gal)	NR	NR	NR	NR	45,000 (11,888)
Water, l (gal)	NR	NR	NR	NR	15,000,000 (3,962,550)
Industrial gases, m^3 (ft^3)	NR	NR	NR	NR	57 (2,013)
Concrete, m^3 (yd^3)	NR	NR	NR	NR	19 (25)
Steel, t (tons)	NR	NR	NR	NR	45 (50)

[a] Fuel oil includes gasoline, diesel, and oil.
Key: ANL–W, Argonne National Laboratory–West; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; NR, not reported.
Note: ANL–W, Hanford, LLNL, and LANL require minor modifications to existing buildings; therefore, no significant construction resource requirements are expected.
Source: O'Connor et al. 1998a–e.

Table E–28. Lead Assembly Fabrication Annual Operation Resource Requirements

Resource Requirement	ANL–W	Hanford	LLNL	LANL	SRS
Electricity (MWh)	720	1,200	720	720	720
Coal, t (tons)	NA	NA	NA	NA	60 (66)
Natural gas, m^3 (ft^3)	NA	NA	55,000 (1,942,325)	55,000 (1,942,325)	NA
Fuel oil,[a] l (gal)	61,000 (16,114)	12,000 (3,170)	12,000 (3,170)	12,000 (3,170)	12,000 (3,170)
Water, l (gal)	1,600,000 (422,672)	1,600,000 (422,672)	1,600,000 (422,672)	1,600,000 (422,672)	1,600,000 (422,672)
Argon, m^3 (ft^3)	16,000 (565,040)	16,000 (565,040)	16,000 (565,040)	16,000 (565,040)	16,000 (565,040)
Helium, m^3 (ft^3)	10 (353)	10 (353)	10 (353)	10 (353)	10 (353)
Hydrogen, m^3 (ft^3)	1,000 (35,315)	1,000 (35,315)	1,000 (35,315)	1,000 (35,315)	1,000 (35,315)
Nitrogen, m^3 (ft^3)	5,300 (187,170)	5,300 (187,170)	5,300 (187,170)	5,300 (187,170)	5,300 (187,170)
Oxygen, m^3 (ft^3)	5,000 (176,575)	5,000 (176,575)	5,000 (176,575)	5,000 (176,575)	5,000 (176,575)
Sodium nitrate, kg (lb)	85 (187)	85 (187)	85 (187)	85 (187)	85 (187)
Alcohol, l (gal)	230 (61)	230 (61)	230 (61)	230 (61)	230 (61)
General cleaning fluids, l (gal)	230 (61)	230 (61)	230 (61)	230 (61)	230 (61)

[a] Fuel oil includes gasoline, diesel, and oil.

Key: ANL–W, Argonne National Laboratory–West; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; NA, not applicable.

Note: For purposes of the SPD EIS, metric values provided in the data reports were rounded to two significant figures and converted to the English values. Resource requirements less than 50 kg/yr (110 lb/yr) are not listed.

Source: O'Connor et al. 1998a–e.

E.5 REFERENCES

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Appendix F
Impact Assessment Methods

This appendix briefly describes the methods used to evaluate the potential direct, indirect, and cumulative effects of the alternatives for surplus plutonium disposition. The same methodologies were also applied to the assessment of impacts at each of the proposed lead assembly and postirradiation examination sites. Included are impact assessment methods for air quality and noise, geology and soils, water resources, ecological resources, cultural and paleontological resources, land use and visual resources, infrastructure, waste management, socioeconomics, human health risk and hazardous chemicals, facility accidents, transportation, environmental justice, and cumulative impacts. Each section is organized so that first the affected resource is described and then the impact assessment method is presented. Detailed descriptions of the methods for facility accident and transportation impact analyses are presented as Appendixes K and L, respectively.

Although impacts were generally described as either major or minor, this assignment was made in different ways, depending on the resource. For air quality, for example, estimated pollutant emissions from the proposed surplus plutonium disposition facilities were compared with the appropriate regulatory standards or guidelines. For human health risk, estimated radionuclide exposure to humans from the proposed facilities were compared with applicable dose limits. Comparison with regulatory standards is a commonly used method for benchmarking environmental impact and is done here to provide perspective on the magnitude of identified impacts.

Other indicators of impact were also established to focus the analysis on impacts that could be major. The analysis of waste management impacts, for example, focused on alternatives where additional waste generation would be a large percentage of current site waste generation, although a major impact was suggested only where waste generation would exceed the capacity of existing waste management facilities. Cumulative impacts were also evaluated with a view to ensuring that actions with minor impacts individually could not have major impacts collectively.

Impacts in all resource areas were analyzed consistently; that is, the impact values were estimated using a consistent set of input variables and computations. Moreover, efforts were made to ensure that calculations in all areas used accepted protocols and up-to-date models. Finally, like presentations were developed to facilitate the comparison of alternatives.

The impact assessment methods used to evaluate the effects of irradiating mixed oxide (MOX) fuel at the proposed domestic, commercial reactor sites (see Section 4.28) are generally the same as those applied to assess the impacts of the surplus plutonium disposition alternatives at each of the candidate U.S. Department of Energy (DOE) sites. Where there is a difference in the impact assessment method, the nature of the deviation and a discussion of the impact assessment methods used for the reactor sites are provided. Otherwise, if no specific exception is noted, the impact assessment methods applied to the candidate DOE sites were also applied to the proposed reactor sites.

F.1 AIR QUALITY AND NOISE

F.1.1 Description of Affected Resources

F.1.1.1 Air Quality

Air pollution refers to any substance in the air that could harm human or animal populations, vegetation, or structures, or that unreasonably interferes with the comfortable enjoyment of life and property. For purposes of the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS), only outdoor air pollutants were addressed. They may be in the form of solid particles, liquid droplets, gases, or a combination of these

forms. Generally, they can be categorized as primary pollutants (those emitted directly from identifiable sources) and secondary pollutants (those produced in the air by interaction between two or more primary pollutants or by reaction with normal atmospheric constituents, which may be influenced by sunlight). Air pollutants are transported, dispersed, or concentrated by meteorological and topographical conditions. Thus, air quality is affected by air pollutant emission characteristics, meteorology, and topography.

Ambient air quality in a given location can be described by comparing the concentrations of various pollutants in the atmosphere with the appropriate standards. Ambient air quality standards have been established by Federal and State agencies, allowing an adequate margin of safety for protection of public health and welfare from the adverse effects of pollutants in the ambient air. Pollutant concentrations higher than the corresponding standards are considered unhealthy; those below such standards, acceptable.

The pollutants of concern are primarily those for which Federal and State ambient air quality standards have been established, including criteria air pollutants, hazardous air pollutants, and other toxic air compounds. Criteria air pollutants are those listed in 40 CFR 50, *National Primary and Secondary Ambient Air Quality Standards* (EPA 1997a). Hazardous air pollutants and other toxic compounds are those listed in Title I of the 1990 Clean Air Act (CAA) as amended, those regulated by the National Emissions Standards for Hazardous Air Pollutants (NESHAPs), and those that have been proposed or adopted for regulation by the respective State or are listed in State guidelines. Also of concern are air pollutant emissions that may contribute to the depletion of stratospheric ozone or global warming. Construction activities, particularly those that involve modification of existing facilities, may be subject to certain NESHAPs requirements, for example, the reporting, training, and work practice requirements for asbestos renovation (EPA 1997b). Provisions of other NESHAPs requirements, such as those for benzene (EPA 1997c), would likely not apply because the amounts stored and used for construction and operation of these facilities would be small. Provisions of NESHAPs for radionuclides are discussed in Chapter 5 and Appendix F.10.

Areas with air quality better than the National Ambient Air Quality Standards (NAAQS) for criteria air pollutants are designated as being in attainment; areas with air quality worse than the NAAQS for such pollutants, as nonattainment areas. Areas may be designated as unclassified when sufficient data for attainment status designation are lacking. Attainment status designations are assigned by county, metropolitan statistical area, consolidated metropolitan statistical area, or portions thereof. Air Quality Control Regions designated by the U.S. Environmental Protection Agency (EPA) are listed in 40 CFR 81, *Designation of Areas for Air Quality Planning Purposes*.

For locations that are in an attainment area for criteria air pollutants, prevention of significant deterioration (PSD) regulations limit pollutant emissions from new sources and establish allowable increments of pollutant concentrations. Three PSD classifications are specified with the criteria established in the CAA amendments. Class I areas include national wilderness areas, memorial parks larger than 2,020 ha (5,000 acres), and national parks larger than 2,430 ha (6,000 acres), and areas that have been redesignated as Class I. Class II areas are all areas not designated as Class I. No Class III areas have been designated.

Designation as a nonattainment area for criteria air pollutants triggers control requirements designated to achieve attainment status by specified dates. In addition, facilities that constitute major new emission sources cannot be constructed in a nonattainment area without permits that impose stringent pollution control requirements to ensure progress toward compliance.

The region of influence (ROI) for air quality is that area around a site potentially affected by air pollutant emissions caused by the surplus plutonium disposition alternatives. The air quality impact area normally evaluated is the area in which concentrations of criteria air pollutants would increase more than a significant amount in a Class II area. Significance varies according to the averaging period: 2,000 $\mu g/m^3$ for 1 hr for carbon

monoxide; 25 $\mu g/m^3$ for 3 hr for sulfur dioxide; 5 $\mu g/m^3$ for 24 hr for sulfur dioxide and particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}); and 1 $\mu g/m^3$ annually for sulfur dioxide, PM_{10}, and nitrogen dioxide (EPA 1997d). Generally, this covers a few kilometers downwind from the source. For sources within 100 km (62 mi) of a Class I area, the air quality impact area evaluated would include the Class I area if the average 24-hr increase in concentration were greater than 1$\mu g/m^3$. The size of the ROI depends on emission source characteristics, pollutant types, emission rates, and meteorological and topographical conditions. For purposes of this analysis, where most of the sites are large, impacts were evaluated at the site boundary, along roads within the sites to which the public has access, and anywhere else the contributions to pollutant concentrations could exceed the established significance levels.

Baseline air quality is typically described in terms of pollutant concentrations modeled for existing sources at each site and background air pollutant concentrations measured near the sites. For this analysis, concentrations for existing sources were obtained from existing source documents or by modeling recent emissions data. Data from the *Storage and Disposition PEIS* (DOE 1996a) were incorporated where appropriate.

The maximum concentrations of toxic air pollutants at or beyond the site boundary were compared with Federal and State regulations or limits. To determine human health risk (see Appendix F.10), modeling outputs on chemical concentrations in air were weighed against chemical-specific toxicity values. Emissions of radionuclides to the air (see Appendix F.10) were evaluated in terms of a total dosage standard.

F.1.1.2 Noise

Sound results from the compression and expansion of air or some other medium when an impulse is transmitted through it. Sound requires a source of energy and a medium for transmitting the sound wave. Propagation of sound is affected by various factors, including meteorology, topography, and barriers. Noise is undesirable sound that interferes or interacts negatively with the human or natural environment. Noise may disrupt normal activities (e.g., hearing, sleep), damage hearing, or diminish the quality of the environment.

Sound-level measurements used to evaluate the effects of nonimpulsive sound on humans are compensated by an A-weighting scale that accounts for the hearing response characteristics (i.e., frequency) of the human ear. Sound levels are expressed in decibels, or in the case of A-weighted measurements, decibels A-weighted. The EPA has developed noise-level guidelines for different land-use classifications. Some States and localities have established noise control regulations or zoning ordinances that specify acceptable noise levels by land-use category.

Noise from facility operations and associated traffic could affect human and animal populations. Because most nontraffic noise associated with construction and operation of the proposed facilities would be distant from offsite noise-sensitive receptors, the contribution to offsite noise levels should be small. Impacts associated with transportation access routes, including noise from increased traffic, could result in small increases in noise along these routes. The ROI for each of the sites includes the site and surrounding areas, including transportation corridors, where proposed activities might increase noise levels. Transportation corridors most likely to experience increased noise levels are those roads within a few miles of the site boundary that carry most of the site's employee and shipping traffic.

Sound-level data representative of site environs were obtained from existing reports and from calculations of the sound levels typical of prevailing traffic volumes along the transportation corridors. The acoustic environment was further described in terms of existing noise sources for each site.

F.1.2 Description of Impact Assessment

F.1.2.1 Air Quality

Potential air quality impacts of pollutant emissions from construction and normal operations were evaluated for each alternative (see Table F–1). That assessment included a comparison of effects of each alternative with applicable Federal and State ambient air quality standards and concentration limits. The more stringent standards, EPA or State, served as the assessment criteria. Criteria for hazardous and toxic air pollutants include those listed in Title III of the 1990 CAA Amendments, NESHAPs, and standards and guidelines adopted by the respective states. The State ambient standards are the same as or more stringent than the Federal ambient standards. The Federal primary ambient standards define levels of air quality that EPA "judges are necessary with an adequate margin of safety, to protect the public health" (EPA 1997a). The Federal secondary ambient standards define levels of air quality that EPA "judges are necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant" (EPA 1997a). The surplus plutonium disposition incremental change in concentrations of pollutants was compared with the PSD Class II allowable increments. Impacts on Class I PSD areas were evaluated where there was a Class I area within 100 km (62 mi) of the site.

Operational air pollutant emissions data for each alternative (other than No Action) were based on engineering design reports; construction emissions data for each alternative, on engineering design reports, emission factors for construction equipment listed in *Compilation of Air Pollutant Emission Factors: Mobile Sources* (EPA 1991:vol. II, 7-1–7-7), and emission factors for fugitive dust from construction listed in *Compilation of Air Pollutant Emission Factors* (EPA 1996a:13.2-1; 13.2-2; 13.2.2-1–13.2.2-8; 13.2.3-1–13.2.3-7; 13.2.4-1–13.2.4-9; 13.2.5-1–13.2.5-21). Traffic emissions were estimated using EPA's MOBILE5b and PART 5 emissions calculation models.

For each alternative, contributions to offsite air pollutant concentrations were modeled on the basis of guidance presented in the *Guideline on Air Quality Models* (EPA 1997e). The EPA-recommended Industrial Source Complex Model, Version 3 (ISC3), was selected as the most appropriate model to perform the air dispersion modeling, because it is designed to support the EPA regulatory modeling program and is capable of handling multiple sources and source types. The short-term version of ISC3, ISCST3, was used to calculate concentrations with averaging times of 1 to 24 hours and annual average concentrations. Concentrations for the No Action Alternative were based on information provided in the *Storage and Disposition PEIS* (DOE 1996a).

For each reactor site proposed for irradiation of MOX fuel, the contributions to offsite air pollutant concentrations were modeled using the EPA long-term version of the ISC3 model, ISCLT3, for annual average concentrations, and the SCREEN3 model, for short-term average concentrations. Emissions were based on information provided by Duke Engineering and Services, COGEMA Inc., and Stone and Webster as summarized in the *MOX Fuel Fabrication Facility and Nuclear Power Reactor Data Report* (DOE 1999).

The modeling analysis incorporated conservative assumptions, which tend to overestimate the pollutant concentrations. The "highest-high" concentration for each pollutant and averaging time was selected for comparison with the applicable assessment criterion, instead of the less conservative EPA-recommended "highest-high" and "highest second-highest" concentration for long-term and short-term averaging times, respectively. The concentrations evaluated were the maximum occurring at or beyond the site boundary or a public access road, and included the contribution of the alternative and that of existing onsite sources. Available monitoring data, which reflect both onsite and offsite sources, were also taken into consideration. Concentrations of the criteria air pollutants, hazardous air pollutants, and toxic air compounds were presented for each alternative. Construction equipment activity emissions were evaluated as a volume source for each

Table F–1. Impact Assessment Protocol for Air Quality and Noise

Resource	Required Data: Affected Environment	Required Data: Facility Design	Measure of Impact
Air quality			
Criteria air pollutants and other regulated pollutants[a]	Ambient concentration ($\mu g/m^3$) of air pollutants, and concentrations of pollutants from existing sources at site	Emission (kg/yr) of air pollutants from facility and facility construction or modification; source characteristics (e.g., stack height and diameter, exit temperature and velocity); shipments and workforce estimates	Contribution of proposed alternative to concentrations of each pollutant at or beyond site boundary; total concentration of each pollutant at or beyond site boundary; percent of applicable standard
Toxic/hazardous air pollutants[b]	Ambient concentrations ($\mu g/m^3$) of toxic air pollutants; concentrations of pollutants from existing sources at site	Emission rate (kg/yr) of toxic air pollutants from facility; source characteristics (e.g., stack height and diameter, exit temperature and velocity)	Contribution of proposed alternative to concentrations of each pollutant at or beyond the site boundary; total concentration of each pollutant at or beyond site boundary; percent of applicable standard
Noise	Sound levels at sensitive offsite receptors (e.g., at nearby residences, along major access routes); sound levels at noise-sensitive wildlife habitat (nearby threatened and endangered wildlife habitat)	Descriptions of major construction and operation sources; shipment and workforce estimates	Increase in day/night average sound level at sensitive receptors

[a] Carbon monoxide; hydrogen fluoride; lead; nitrogen oxides; ozone; particulate matter with an aerodynamic diameter less than or equal to 10 μg; sulfur dioxide; total suspended particulates.

[b] Title III pollutants, pollutants regulated under the National Emissions Standard for Hazardous Air Pollutants, and other State-regulated pollutants.

alternative using the ISC3 model. The total concentration, including the contribution from each alternative and the percent of the applicable standard, were presented. This percentage reflects the variability of the No Action concentrations, the standards and guidelines among sites and the differences among the alternatives.

The effects of traffic related to construction and operation for each alternative were evaluated by calculating the emissions of criteria pollutants from worker vehicles and shipping activities.

One year of sequential hourly onsite meteorological data from the sites and upper-air data for appropriate locations from the National Climactic Data Center were used in the air quality modeling. For consistency, the data were for the same year considered in the *Storage and Disposition PEIS* (DOE 1996a).

Additional assumptions were incorporated in the air quality modeling at each site. For example, to model emissions from a generic process stack for MOX fuel fabrication, a single source within the facility was used, assuming a stack height of 8 m (26 ft), a stack diameter of 0.3 m (1 ft), a stack exit temperature equal to the

ambient temperature, and a stack exit velocity of 0.03 m/s (0.1 ft/s). Where they could be obtained, however, actual stack locations and stack parameters were used to model pollutant concentrations.

The analysis tends to overestimate pollutant concentrations, since the location of the maximum site boundary concentrations due to surplus plutonium disposition facilities was assumed to be the same as the location of maximum concentrations of other pollutant sources at the site.

Ozone is typically formed as a secondary pollutant in the ambient air (troposphere). It is formed from such primary pollutants as nitrogen oxides and volatile organic compounds, which emanate from vehicular (mobile), natural, and other stationary sources. It is not emitted directly as a pollutant from the sites. Although ozone may thus be regarded appropriately as a regional issue, specific ozone precursors, notably nitrogen dioxide and volatile organic compounds, were analyzed as applicable to the alternatives under consideration.

The CAA, as amended, required that Federal actions conform to the host State's "State Implementation Plan." A State Implementation Plan provides for the implementation, maintenance, and enforcement of NAAQS for the six criteria pollutants: sulfur dioxide; PM_{10}; carbon monoxide; ozone; nitrogen dioxide; and lead. Its purpose is to eliminate or reduce the severity and number of violations of NAAQS and to expedite the attainment of these standards. No department, agency, or instrumentality of the Federal Government shall engage in or support in any way (i.e., provide financial assistance for, license or permit, or approve) any activity that does not conform to an applicable implementation plan. The final rule for *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* (EPA 1993) took effect on January 31, 1994. Hanford, Pantex, the Idaho National Engineering and Environmental Laboratory, the Savannah River Site, and Los Alamos National Laboratory are within areas currently designated as attainment for criteria air pollutants. Therefore, the surplus plutonium disposition alternatives being considered at these sites are not affected by the provisions of the conformity rule. Rocky Flats Environmental Technology Site (RFETS) is in an area designated nonattainment for ozone, PM_{10}, and carbon monoxide. Lawrence Livermore National Laboratory is in an area designated nonattaining for ozone. Applicability of the conformity rule to the RFETS is discussed in Section 4.2.1.7 on No Action.

Emissions of potential stratospheric ozone-depleting compounds such as chlorofluorocarbons were not evaluated because no emissions of these pollutants were identified in the engineering design reports.

Emissions of pollutants that are potential contributors to global warming (e.g., carbon dioxide, nitrous oxide chlorofluorocarbons, and methane) were evaluated using emission data in the engineering design reports. These emissions were compared with annual releases of these pollutants from other sources (EPA 1997f).

F.1.2.2 Noise

Also addressed in the SPD EIS assessment were the onsite and offsite acoustic impacts of construction and operation of the proposed facilities (see Table F–1). That analysis drew from available information (e.g., engineering design reports) on the types of noise sources and the locations of the proposed facilities relative to the site boundary and noise-sensitive locations. Its focus was the degree of change in noise levels at sensitive receptors (e.g., residences near the site boundary and along access routes, and schools along access routes) with respect to ambient conditions. (A change in noise level of less than 3 decibels is generally not detectable by the human ear. An increase of 10 decibels is roughly equivalent to a doubling of the perceived sound.) Most nontraffic noise sources associated with construction and operation of the surplus plutonium disposition facilities are far enough from offsite noise-sensitive receptors that the contribution to offsite noise levels should be small. Projections of traffic noise during construction and operations were based on the employment and shipment projections provided in the engineering design reports.

F.2 GEOLOGY AND SOILS

F.2.1 Description of Affected Resources

Geologic resources include consolidated and unconsolidated earth materials, including mineral assets such as ore and aggregate materials, and fossil fuels such as coal, oil, and natural gas. Geologic conditions include hazards such as earthquakes, faults, volcanoes, landslides, and land subsidence. Soil resources include the loose surface materials of the earth in which plants grow, usually consisting of mineral particles from disintegrating rock, organic matter, and soluble salts.

The ROI for geology and soils includes all areas subject to disturbance by construction and operation of surplus plutonium disposition facilities, and those areas beneath these facilities that would remain inaccessible for the life of the facilities.

Geology and soils were considered with respect to natural conditions that could affect the alternative, as well as those portions of the resource that could be affected by the alternative. Geology and soil conditions that could affect the integrity and safety of the surplus plutonium disposition alternatives include large-scale geologic hazards and attributes of the soil beneath the proposed facility. Geology and soil resources that could be affected by the surplus plutonium disposition alternatives include economically valuable mineral resources and prime farmland soils.

F.2.2 Description of Impact Assessment

Facility construction and operations for the surplus plutonium disposition alternatives were considered from the perspective of impacts on specific geologic resources and soil attributes. Construction impacts would predominate in effects on geologic and soil resources; hence, key factors in the analysis were the land area to be disturbed during construction and occupied during operations (see Table F–2). The main objective was avoidance of the siting of facilities over unstable soils (i.e., soils prone to liquefaction, shrink-swell, or erosion).

Table F–2. Impact Assessment Protocol for Geology and Soils

	Required Data		
Resource	**Affected Environment**	**Facility Design**	**Measure of Impact**
Soil attributes	Presence of any unstable soils at proposed facility location	Location of proposed facility on the site	Location of facility on unstable soils
Valuable mineral and energy resources	Presence of any valuable mineral or energy resources at proposed facility location	Location of proposed facility on the site	Destruction or rendering inaccessible of valuable mineral or energy resources
Prime farmland soils	Presence of prime farmland soils at proposed facility location	Location of proposed facility on the site	Conversion of prime farmland soils to nonagricultural use

Included in the geology and soil impact analysis was consideration of the risks to the proposed facilities of large-scale geologic hazards such as faulting and earthquakes, lava extrusions and other volcanic activity, landslides, sinkholes, and salt dissolution (i.e., conditions that tend to affect broad expanses of land). In the *Storage and Disposition PEIS* (DOE 1996a:4-45–47, 4-148–150, 4-204–206, 4-309–311), hazards from the large-scale geologic conditions at each candidate site were assessed for proposed long-term storage facilities. The

supporting data and findings of that analysis, which focused on the presence of the hazard and the distance of the facilities from it, were reviewed and accepted as generally applicable to the surplus plutonium disposition facilities and therefore are incorporated by reference. Efforts were also made to determine if locating the surplus plutonium disposition facilities at a specific site could destroy, or preclude the use of, valuable mineral or energy resources.

Pursuant to the Farmland Protection Policy Act (FPPA) (7 USC 4201 et seq.), and the regulations (7 CFR 658) promulgated as result thereof, the presence of prime farmland was also evaluated. This act requires agencies to make FPPA evaluations part of the National Environmental Policy Act (NEPA) process, the main purpose being to reduce the conversion of farmland to nonagricultural uses by Federal projects and programs. Prime farmland, as defined in 7 CFR 657, is land that contains the best combination of physical and chemical characteristics for producing crops. It includes cropland, pasture land, rangeland, and forest land. Potential prime farmlands not acquired prior to June 22, 1982, the effective date of the FPPA, are exempt from its provisions (DOE 1996b:4-22).

F.3 WATER RESOURCES

F.3.1 Description of Affected Resources

Water resources are the surface and subsurface waters that are suitable for human consumption, agricultural purposes, or irrigation or industrial/commercial purposes, and that could be impacted by the proposed action. This analysis involved the review of engineering estimates of expected water use and effluent discharges from proposed construction, operation, maintenance, and decontamination and decommissioning (D&D) of the proposed facilities, and ultimately the impacts of the activities on the local surface water and groundwater.

F.3.2 Description of Impact Assessment

The water resources evaluation for the SPD EIS tiers from the corresponding analysis presented in the *Storage and Disposition PEIS* (DOE 1996a). Its purpose was to evaluate the differences in the impacts where changes would be incurred in the assumed water usage to accommodate the facilities involved in the planned disposition activities. Determination of the impacts of the alternatives on water resources (see Table F–3) consisted of a comparison of field-generated data with regulatory standards, design parameters commonly used in the water and wastewater design industry, and accepted industry standards.

Certain assumptions were integral to this analysis: (1) that all water and sewage treatment facilities would be approved by the appropriate permitting authority, and thus that the impacts of project-specific withdrawals from the water treatment plants and effluent discharges from the sewage treatment plant would be in accordance with established standards; (2) that the sewage treatment facilities would meet the effluent limitations imposed by their respective National Pollutant Discharge Elimination System (NPDES) permits; and (3) that any storm-water runoff from construction or operation activities would be handled in accordance with the regulations of the appropriate permitting authority. It was also assumed that, during construction, siltation fencing or other erosion control devices would be used to mitigate short-term adverse impacts from siltation, and that, as appropriate, storm-water holding ponds would be constructed to lessen the impacts of rainfall events on the receiving streams.

Table F–3. Impact Assessment Protocol for Water Resources[a]

Resource	Required Data: Affected Environment	Required Data: Facility Design	Measure of Impact
Surface water quality	Surface waters near the facilities in terms of stream classifications and changes in water quality	Anticipated effluent quantity and quality	Noncompliance of surface water quality with relevant standards of Clean Water Act or with State regulations
Groundwater quality	Groundwater near the facilities in terms of classification, presence of designated sole source aquifers, and changes in quality of groundwater	Quantity and quality of anticipated withdrawals from, or discharges to, groundwater	Concentrations of contaminants in groundwater exceeding standards established in accordance with Safe Drinking Water Act or State regulations
Surface water availability	Surface waters near the facilities, including average flow; 7-day, 10-year low flow; and numbers of downstream users	Volume of withdrawals from, and discharges to, surface waters	Changes in availability to downstream users of water for drinking, irrigation, or animal feeding[b]
Groundwater availability	Groundwater near the facilities, including numbers of all groundwater users, existing water rights for major water users, and contractual agreements for water supply use within impacted area	Volume of withdrawals and discharges to groundwater	Changes in availability of groundwater for human consumption, irrigation, or animal feeding
Flooding impacts	Locations of 100- and 500-year floodplains	Facility location on the site	Construction of facilities in a floodplain[c]

[a] For flows above the design capacity of existing water and sewage treatment systems.
[b] An impact is assumed if withdrawals exceed 10 percent of the 7-day, 10-year low flow of the receiving stream.
[c] A floodplain assessment is a prerequisite to construction on a floodplain.

Further assumptions regarding water resources impacts were based in part on results of the analysis. The first step in the analysis was to determine whether any revisions in project water and wastewater flows had occurred between the time of the *Storage and Disposition PEIS* (DOE 1996a) and the collection of data for the SPD EIS. If no revisions were necessary, and if no evidence of an impact on water resources was presented in the *Storage and Disposition PEIS* (DOE 1996a), then it was assumed that no such impact would be incurred. If the analysis reflected a revision downward in the assumed water use for a proposed activity, and there was no impact for that activity in the *Storage and Disposition PEIS* (DOE 1996a), then no impact was attributed to that activity. If the analysis reflected an increase in water use, then an evaluation of the design capacity of the water and wastewater treatment facilities was made to determine whether their design capacity would be exceeded by the additional flows. If the combined flow (i.e., the existing flow plus those from the proposed activities) were less than the design capacity of the water and sewage treatment plants, then it was assumed that there would be no impact on water availability for local users or on the receiving stream from sewage treatment plant effluent discharges. If the flows from the proposed facilities were found to exceed the design capacity of the existing water or sewage treatment facilities, then the following extensive analyses of the impact of these flows were conducted.

Surface Water Availability. The analysis of the potential impacts on water availability entailed comparing the rate of surface water use for the specific alternative, the associated effluent discharges, and the use and classification of water in downstream waterways. For facilities intending to use surface water, an evaluation was

made of the total use and the 7-day, 10-year low-flow conditions of the receiving stream. Discharges of effluent back into the receiving stream were included in the evaluation. If net losses were found to exceed 10 percent of the 7-day, 10-year low flow, an impact was assumed. Where groundwater was the source of water, discharges to surface water were interpreted as adding to the flow in the receiving stream. If the increases exceeded 200 percent of the 7-day, 10-year low flow, then an impact was assumed.

Surface Water Quality. The evaluation of the surface water quality impacts focused on the quality and quantity of the effluent to be discharged and the quality of the receiving stream upstream and downstream from the proposed facilities. The evaluation of effluent quality featured review of the expected design parameters, such as the design average and maximum flows, as well as the effluent parameters reflected in the existing or expected NPDES permit. Those parameters include biochemical oxygen demand, total suspended solids, metals, coliform bacteria, organic and inorganic chemicals, radionuclides, and any other parameters that affect the local environment. Water quality management practices were reviewed to ensure that NPDES permit limitations would be met. Factors that currently degrade water quality were also identified.

During construction, the receiving stream could be affected by construction site runoff and sedimentation. Such impacts relate to the amount of land disturbed, the type of soil at the site, the topography, and weather conditions. They would be minimized by application of standard management practices for storm-water and erosion control.

During operations, receiving waters could be affected by increased runoff from parking lots, buildings, or other cleared areas. Storm water from these areas could be contaminated with materials deposited by airborne pollutants, automobile exhaust and residues, and process effluents. Impacts of storm-water discharges could be highly specific, and mitigation would depend on management practices, the design of holding facilities, the topography, and adjacent land use. Data from the existing water quality database were compared with expected flows from the new facilities to determine the relative impacts on the quality of the water in the receiving stream.

Groundwater Availability. Effects of the proposed action on groundwater supplies were determined by analyzing potential withdrawal rates for the construction and operation phases of the action. Estimates of withdrawal from the affected aquifers were provided. Additionally, instances in which groundwater use could exceed a large portion of the locally developed groundwater supplies were identified.

Groundwater Quality. Potential groundwater quality impacts associated with effluent discharges during the construction and operation phases were examined. The groundwater quality projections were then weighed against Federal and State groundwater quality standards, effluent limitations, and drinking water standards to determine the impacts of each alternative. Also evaluated were the effects of construction and operation activities on the movement of existing groundwater contamination plumes, and the consequences thereof for groundwater use in the area.

Floodplain Impacts. Once the regional 100- and 500-year floodplains were identified from maps and other existing documents, the likely impacts of proposed surplus plutonium disposition facility construction and operation activities were analyzed. For any facilities proposed for location in a floodplain, a floodplain assessment would be prepared, as necessary. Where possible, the surplus plutonium disposition facilities were sited to ensure compliance with Executive Order 11988, *Floodplain Management*, and 10 CFR 1022, *Compliance With Floodplain/Wetlands Environmental Review Requirements*.

F.4 ECOLOGICAL RESOURCES

F.4.1 Description of Affected Resources

Ecological resources include terrestrial and aquatic resources (plants and animals), wetlands, and threatened and endangered species that could be affected by proposed construction and operations at the proposed surplus plutonium disposition sites. In accordance with the *Storage and Disposition PEIS* (DOE 1996a), the ROI for habitat impacts from facility construction and operations is the area within a 1.6-km (1-mi) radius of the proposed facilities.

F.4.2 Description of Impact Assessment

The proposed alternatives would involve, at a minimum, land disturbance during modifications to existing facilities and may require site clearing for construction of new facilities (see Table F–4). Accordingly, ecological impacts were assessed in terms of potential disturbances or loss of nonsensitive terrestrial and aquatic habitats and the potential effects on nearby sensitive habitats. For purposes of the SPD EIS, sensitive habitats include those areas occupied by threatened and endangered species, State-protected species, and wetlands.

Table F–4. Impact Assessment Protocol for Ecological Resources

	Required Data		
Resource	**Affected Environment**	**Facility Design**	**Measure of Impact**
Nonsensitive terrestrial and aquatic habitats	Vegetation and wildlife within a 1.6-km (1-mi) radius of proposed facility locations	Area disturbed by construction of proposed facility	Decrease in acreage of undisturbed local and regional nonsensitive habitats
Sensitive terrestrial and aquatic habitats, including wetlands	Sensitive species habitats within a 1.6-km (1-mi) radius of proposed facility locations	Area disturbed by construction of proposed facility	Decrease in extent of sensitive habitats in ROI Determination by USFWS and State agencies that facility construction could disturb sensitive habitats

Key: ROI, region of influence; USFWS, U.S. Fish and Wildlife Service.

F.4.2.1 Nonsensitive Habitat Impacts

During the construction phase, ecological resources could be affected through disturbance or loss of habitat resulting from site clearing, land disturbance, human intrusion, and noise. Terrestrial resources could be directly affected through changes in vegetative cover important to individual animals of certain species with limited home ranges, such as small mammals and songbirds. Likely impacts include increased direct mortality and susceptibility to predation. Activities associated with the construction and operation of facilities (e.g., human intrusion and noise) could also compel the migration of the wildlife to adjacent areas with similar habitat. If the receiving areas were already supporting the maximum sustainable wildlife, competition for limited resources and habitat degradation could be fatal to some species. Therefore, the analysis of impacts on terrestrial wildlife was based largely on the extent of plant community loss or modification.

Construction or modification of facilities, and the operation thereof, could directly affect aquatic resources through increased runoff and sedimentation, increased flows, and the introduction of thermal and chemical changes to the water. However, various mitigation techniques should minimize construction impacts, and discharges of contaminants to surface waters from routine operations are expected to be limited by engineering control practices. Therefore, impacts are expected to be minimal.

F.4.2.2 Sensitive Habitat Impacts

Impacts on threatened and endangered species, State-protected species, and their habitats during construction of the proposed surplus plutonium disposition facilities were determined in a manner similar to that for nonsensitive habitats. A list of sensitive species that could be present at each site was compiled. Informal consultations were initiated with the appropriate U.S. Fish and Wildlife Service (USFWS) offices and State-equivalent agencies as part of the impacts assessment for sensitive species. Plans were developed for preconstruction surveys, as necessary, to determine the presence of any Federal- or State-listed species within the ROI. Those plans call for consulting the USFWS and various State agencies to confirm that potential impacts on sensitive habitats are acceptable or can be mitigated.

Most construction impacts on wetlands are related to the displacement of wetlands by filling, draining, or dredging activities. Operational impacts thereon could result from effluents, surface water or groundwater withdrawals, or the creation of new wetlands. Loss of wetlands resulting from construction and operation of the surplus plutonium disposition facilities was addressed by comparing data on the location and areal extent of wetlands in the ROI with the land area requirements for the proposed facilities.

F.5 CULTURAL AND PALEONTOLOGICAL RESOURCES

F.5.1 Description of Affected Resources

Cultural resources are the indications of human occupation and use of the landscape as defined and protected by a series of Federal laws, regulations, and guidelines. For the SPD EIS, the potential impacts of proposed surplus plutonium disposition activities were assessed separately for each of the three general categories of cultural resources: prehistoric, historic, and Native American. Paleontological resources are the physical remains, impressions, or traces of plants or animals from a former geological age, and may be sources of information on paleoenvironments and the evolutionary development of plants and animals. Although not governed by the same historic preservation laws as cultural resources, they could be affected by the proposed surplus plutonium disposition activities in much the same manner.

Prehistoric resources are physical remains of human activities that predate written records; they generally consist of artifacts that may alone or collectively yield otherwise inaccessible information about the past. Historic resources consist of physical remains that postdate the emergence of written records; in the United States, they are architectural structures or districts, archaeological objects, and archaeological features dating from 1492 and later. Ordinarily, sites less than 50 years old are not considered historic, but exceptions can be made for such properties if they are of particular importance, such as structures associated with Cold War themes. Native American resources are sites, areas, and materials important to Native Americans for religious or heritage reasons. Such resources may include geographical features, plants, animals, cemeteries, battlefields, trails, and environmental features.

The primary ROI used for the cultural and paleontological resource analyses encompasses the land areas directly disturbed by construction and operation of the proposed facilities. The natural setting of those resources was considered a contextual component thereof.

F.5.2 Description of Impact Assessment

The SPD EIS study addressed the potential direct and indirect impacts on cultural resources at each of the candidate sites from the proposed action and alternatives (see Table F–5). The assessment of direct impacts focused on ground-disturbing activities and alterations to existing resources, particularly those listed or eligible for listing on the National Register of Historic Places (National Register), and those considered important to

Table F–5. Impact Assessment Protocol for Cultural and Paleontological Resources

Resource	Required Data: Affected Environment	Required Data: Facility Design	Measure of Impact
Prehistoric resources	Site cultural resource inventory/management plan reflecting listing or eligibility for listing on National Register Existing programmatic agreements	Location of proposed facility on the site Areas to be disturbed	Potential for physical destruction, damage, or alteration; isolation or alteration of the character of the property; introduction of visual, audible, or atmospheric elements out of character; and neglect of resources listed or eligible for listing on the National Register Noncompliance with existing laws, regulations, and programmatic agreements
Historic resources	Site cultural resource inventory/management plan reflecting listing or eligibility for listing on National Register Existing programmatic agreements	Location of proposed facility on the site Areas to be disturbed	Potential for physical destruction, damage, or alteration; isolation or alteration of the character of the property; introduction of visual, audible, or atmospheric elements out of character; and neglect of resources listed or eligible for listing on the National Register Noncompliance with existing laws, regulations, and programmatic agreements
Native American resources	Site cultural resource inventory/management plan reflecting listing or eligibility for listing on National Register Existing programmatic agreements Resources identified through consultations with Native American tribal governments	Location of proposed facility on the site Areas to be disturbed	Potential for disturbance of Native American resources as determined through consultations with potentially affected Native American tribal governments (per DOE Order 1230.2) Noncompliance with existing laws, regulations, and programmatic agreements
Paleontological resources	Site cultural resource inventory/management plan Existing programmatic agreements	Location of proposed facility on the site Areas to be disturbed	Potential for appropriation, excavation, injury, or destruction of resources without permission (per Antiquities Act of 1906) Noncompliance with existing laws, regulations, and programmatic agreements

Native Americans. Potential indirect impacts of surplus plutonium disposition activities were also assessed—impacts associated with reduced access to a resource site, as well as impacts associated with increased traffic and visitation in sensitive areas.

For specific sites, depending on the alternative, more detailed information was required (e.g., file investigations, Native American consultations, implementation of the Native American policy of DOE, predictive modeling) to determine the types, numbers, and locations, as well as the National Register eligibility or importance in other respects of resources in the proposed project area.

Plans were drawn up for consultation with each State Historic Preservation Officer and reviews of existing DOE site cultural resource surveys and management plans to determine the National Register eligibility and importance of the resources, and to assess measures designed to mitigate the impacts of the proposed actions.

The measure of impact on a particular resource will depend largely on specific cultural resource management agreements with the candidate sites, the consultations with State Historic Preservation Officers and affected Native American tribes, and overall compliance with Section 106 of the National Historic Preservation Act.

F.6 LAND RESOURCES

F.6.1 Description of Affected Resources

Land resources include the land on and contiguous to each candidate site; the physical features that influence current or proposed uses; local urban and rural population density; pertinent State, county, and municipal land-use plans and regulations; land ownership and availability; and the aesthetic characteristics of the site and surrounding areas.

Land resources analysis for the SPD EIS determined the potential beneficial or adverse impacts on land use and visual resources for the defined ROI. The ROI for land use at each candidate site varies due to disparities in population density and growth trends, the extent of Federal land ownership, adjacent land-use patterns and trends, and other geographic or safety considerations. The ROI for visual resources includes those lands within the viewshed of the proposed action and alternatives.

F.6.2 Description of Impact Assessment

F.6.2.1 Land-Use Analysis

Requirements for the SPD EIS included estimating the impacts of the alternatives on land use within each DOE site, adjacent Federal or State lands, adjacent communities, and wildlife or resource areas. At issue were the net land area affected; its relationship to conforming and nonconforming land uses; current growth trends, land values, and other socioeconomic factors pertaining to land use; and the projected modifications to other facility activities and missions consistent with the proposed alternatives (see Table F–6). Land-use impacts could vary considerably from site to site, depending on existing facility land-use configurations, adjoining land uses, plans for transportation security, proximity to residential areas, and other environmental and containment factors.

Evaluation of existing land uses at each of the potentially affected sites required review of existing and future facility land-use plans. Where land adjacent to the proposed site is managed by local government, applicable community general plans, zoning ordinances, and population growth trend data were reviewed. Where such land is managed or under the jurisdiction of a Federal or State land management agency, the respective agency resource management plans and policies were reviewed. Total land area requirements include those areas to be occupied by the footprint of each building and nonbuilding support area in conjunction with all paved roads, parking areas, graveled areas, and construction laydown areas, and any land graded and cleared of vegetation. Land area requirements were identified using proposed facility data reports.

Table F–6. Impact Assessment Protocol for Land Resources

Resource	Required Data: Affected Environment	Required Data: Facility Design	Measure of Impact
Land use; area used	Total site acreage; available acreage	Location of proposed facility on the site; total land area requirements	Facility land requirements greater than 30% of available acreage
Compatibility with existing or future land-use plans, policies, or regulations	Existing facility and regional land-use configurations; applicable plans, policies, or regulations	Location of proposed facility on the site; facility D&D procedures; expected modifications of other facility activities and missions to accommodate proposed alternatives	Incompatibility with existing facility or adjacent land use; encroachment by disturbed area onto sensitive lands protected by existing management plans or policies; significant long-term or permanent loss of land use resulting from facility construction, operation, or D&D
Visual resources	Delineation of nearby visual resources and viewsheds, including Class I areas	Location of proposed facility on the site; facility dimensions and appearance	Significant reduction of assigned VRM classification for a notable viewshed

Key: D&D, decontamination and decommissioning; VRM, Visual Resource Management.

F.6.2.2 Visual Resources Analysis

Visual resource impacts are changes in the physical features of the landscape attributable to the proposed action. Visual resource assessment was based on the Bureau of Land Management Visual Resource Management (VRM) classification scheme (DOI 1986a, 1986b). Impacts on scenic or visual resources were analyzed by identifying existing VRM classifications and documenting any potential reductions therein at each of the alternative locations as a result of the proposed action or alternatives (see Table F–6). Existing class designation was derived from an inventory of scenic qualities, sensitivity levels, and distance zones for particular areas. The elements of scenic quality are landforms, vegetation, water, color, adjacent scenery, scarcity, and cultural modification. Scenic value is determined by the variety and harmonious composition of the elements of scenic quality. Sensitivity levels are determined by user volumes and user attention. Distance zones concern the visibility from travel routes or observation points.

Important concerns of the visual resources analysis were the degree of contrast between the proposed action and the surrounding landscape, the location and sensitivity levels of public vantage points, and the visibility of the proposed action from the vantage points. The distance from a vantage point to the affected area and atmospheric conditions were also taken into consideration, as distance and haze can diminish the degree of contrast and visibility. A qualitative assessment of the degree of contrast between the proposed facilities or activities and the existing visual landscape was also presented. Reduction of an assigned VRM classification could result if the affected area could be seen from the vantage point with a high sensitivity level.

F.7 INFRASTRUCTURE

F.7.1 Description of Affected Resources

Site infrastructure includes physical resources required to support the construction and operation of facilities. It includes the capacities of the onsite road and rail transportation networks; electric power and electrical load capacities; natural gas, coal, and fuel oil capacities; and water supply system capacities.

The ROI is generally limited to the boundaries of DOE sites. However, should infrastructure requirements exceed site capacities, the ROI would be expanded (for analysis) to include the sources of additional supply. For example, if electrical demand (with added facilities) exceeded site availability, then the ROI would be expanded to include the likely source of additional power: the power pool currently supplying the site.

F.7.2 Description of Impact Assessment

In general, infrastructure impacts were assessed by evaluating the requirements of each alternative against the site capacities. An impact assessment was made for each resource (road networks, rail interfaces, electricity, fuel, and water) for the various alternatives (see Table F–7). Tables reflecting site availability and infrastructure requirements were developed for each alternative. Data for these tables were obtained from reports describing the existing infrastructure at the sites, and from the data reports for each facility. If necessary, design mitigation considerations conducive to reduction of the infrastructure demand were also identified.

Table F–7. Impact Assessment Protocol for Infrastructure

	Required Data		
Resource	**Affected Environment**	**Facility Design**	**Measure of Impact**
Transportation Roads (km) Railroads (km)	Site capacity and current usage	Facility requirements	Additional requirement (with added facilities) exceeding site capacity
Electricity Energy consumption (MWh/yr) Peak load (MW)	Site capacity and current usage	Facility requirements	Additional requirement (with added facilities) exceeding site capacity
Fuel Natural gas (m^3/yr) Oil (l/yr) Coal (t/yr)	Site capacity and current usage	Facility requirements	Additional requirement (with added facilities) exceeding site capacity
Water (l/yr)	Site capacity and current usage	Facility requirements	Additional requirement (with added facilities) exceeding site capacity

Any projected demand for infrastructure resources exceeding site availability can be regarded as an indicator of environmental impact. Whenever projected demand approaches or exceeds capacity, further analysis for that resource is warranted. Often, design changes can mitigate the impact of additional demand for a given resource. For example, substituting fuel oil for natural gas (or vice versa) for heating or industrial processes can be accomplished at little cost during the design of a facility, provided the potential for impact is identified early. Similarly, a dramatic "spike" in peak demand for electricity can sometimes be mitigated by changes to operational procedures or parameters.

F.8 WASTE MANAGEMENT

F.8.1 Description of Affected Resources

The operation of surplus plutonium disposition support facilities would generate several types of waste, depending on the alternative. Such wastes include the following:

- **Transuranic:** Waste containing more than 100 nCi of alpha-emitting transuranic (TRU) isotopes with half-lives greater than 20 year per gram of waste, except for (1) high-level waste; (2) waste that DOE has determined, with the concurrence of EPA, does not need the degree of isolation required by 40 CFR 191, and (3) waste that the U.S. Nuclear Regulatory Commission (NRC) has approved for

disposal, case by case in accordance with 10 CFR 61. Mixed transuranic waste contains hazardous components regulated under the Resource Conservation and Recovery Act (RCRA).

- **Low-level:** Waste that contains radioactivity and is not classified as high-level waste, TRU waste, or spent nuclear fuel,[1] or the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level waste, provided the TRU concentration is less than 100 nCi/g of waste.

- **Mixed low-level:** Low-level waste that also contains hazardous components regulated under RCRA.

- **Hazardous:** Under RCRA, a solid waste that, because of its characteristics, may (1) cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness, or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous wastes appear on special EPA lists or possess at least one of the following characteristics: ignitability, corrosivity, reactivity, or toxicity. This category does not include source, special nuclear, or byproduct material as defined by the Atomic Energy Act.

- **Nonhazardous:** Discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. This category does not include source, special nuclear, or byproduct material as defined by the Atomic Energy Act.

The alternatives for surplus plutonium disposition could have an impact on existing site facilities devoted to the treatment, storage, and disposal of these categories of waste.

For new facilities, construction wastes would be similar to those generated by any construction project of comparable scale. Wastes generated during the modification of existing nuclear facilities, however, could produce additional radioactive or hazardous demolition debris.

For all but nonhazardous wastes, DOE chose to combine the liquid and solid waste generation estimates into one waste generation rate for ease of comparison to site waste generation rates. Liquid waste was converted from liters to cubic meters using a conversion factor of 1,000 liters per cubic meter. This is likely to be conservative because it includes the volume of the liquid waste before treatment.

Waste management activities in support of the disposition of surplus plutonium would be contingent on Records of Decision (RODs) issued for the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE 1997a). Depending on future waste-type-specific RODs, in accordance with that EIS, wastes could be treated and disposed of on the site or at regionally or centrally located waste management centers. The ROD for hazardous waste issued on August 5, 1998, states that most DOE sites will continue to use offsite facilities for the treatment and disposal of major portions of nonwastewater hazardous waste, with the Oak Ridge Reservation and SRS continuing to treat some of their own hazardous waste on the site in existing facilities where this is economically favorable. According to the TRU Waste ROD issued on January 20, 1998, TRU and TRU mixed waste would be treated on the site according to the current planning-basis Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria and shipped to WIPP for disposal. The impacts of disposing of TRU waste at WIPP are

[1] Fuel withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

described in the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (DOE 1997b). Current schedules for shipment of TRU waste to WIPP would accommodate shipment of contact-handled TRU waste from surplus plutonium disposition facilities beginning in 2016 (DOE 1997c:17). Therefore, it is assumed TRU waste would be stored on the site until 2016.

F.8.2 Description of Impact Assessment

As shown in Table F–8, impacts were assessed by comparing the projected waste stream volumes generated from the proposed activities at each site with current site waste generation rates and storage volumes.[2] Furthermore, projected waste generation rates for the proposed activities were compared with processing rates and capacities of those existing treatment, storage, and disposal facilities likely to be involved in managing the additional waste. Most likely, each waste type would be managed at many different facilities; for simplicity, however, it was assumed that the entire waste volume would be managed at one treatment facility, one storage facility, and one disposal facility.

Table F–8. Impact Assessment Protocol for Waste Management

	Required Data		
Resource	**Affected Environment**	**Facility Design**	**Measure of Impact**
Waste management capacity TRU waste Low-level waste Mixed low-level waste Hazardous waste Nonhazardous waste	Site generation rates (m^3/yr) for each waste type Site management capacities (m^3) or rates (m^3/yr) for potentially affected treatment, storage, and disposal facilities for each waste type	Construction and operation generation rates (m^3/yr) for each waste type	SPD facility waste generation rates are a large percentage of existing site generation rates and a large percentage of capacities of applicable waste management facilities
Disposal capacity for transuranic waste (including mixed TRU waste)	TRU waste volume (m^3) expected to be disposed of at WIPP Capacity at WIPP (m^3)	Total TRU waste generated (m^3) for SPD facilities	Combination of SPD facility TRU waste generation and existing TRU waste generation exceeds capacity of WIPP

Key: SPD, surplus plutonium disposition; TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

F.9 SOCIOECONOMICS

F.9.1 Description of Affected Resources

Socioeconomic impacts may be defined as the environmental consequences of a proposed action in terms of demographic and economic changes. Two types of jobs would be created as a result of DOE's adopting any of the surplus plutonium disposition alternatives: (1) construction-related jobs, transient in nature and short in duration, and thus less likely to impact public services; and (2) jobs related to plant operations, required for a decade or more and thus possibly creating additional service requirements in the ROI.

[2] For the SPD EIS, only the impacts relative to the capacities of waste management facilities were considered. Environmental impacts of waste management facility operation are evaluated in other facility-specific or sitewide NEPA documents.

F.9.2 Description of Impact Assessment

Before the socioeconomic analyses could begin, the socioeconomic environment had to be defined for two geographic regions, the regional economic area (REA) and ROI. The REA is used to assess potential effects of an action on the regional economy. REAs are the broad markets defined by the economic linkages among and between the regional industrial and service sectors and the communities within a region. These linkages determine the nature and magnitude of any multiplier effect associated with a change in economic activity.

For example, as work expands at a given site, the money spent on accomplishing this work flows into the local economy; it is spent on additional jobs, goods, and services within the REA. Using the Regional Input-Output Modeling System developed by the Bureau of Economic Analysis of the U.S. Department of Commerce, the regional economic impacts of a proposed project can be estimated over the life of the project.

Similarly, potential demographic impacts were assessed for the ROI. The ROI could represent a smaller geographic area—one in which only the housing market and local community services would be significantly affected by a given alternative. Site-specific ROIs were identified as those counties in which at least 90 percent of the site's workforce reside. This distribution reflects existing residential preferences for people currently employed at the sites and was used to estimate the distribution of new workers required to support the alternatives.

For each REA, data were compiled on the current socioeconomic conditions, including unemployment rates, economic sector activities, and the civilian labor force. For each ROI, statistics were compiled on the housing demand and community services. These data were combined with population forecasts developed using Census Bureau data to project changes to reflect the various siting alternatives being considered. Site-specific data were then used to help determine whether the overall workforce would be increased by the alternatives being considered (see Table F–9).

In some cases, a site’s overall workforce was projected to decrease at the same time additional workers would be needed to support an alternative under consideration in the SPD EIS. In these cases, there would be little change in the site's overall workforce from current levels, and thus very little change in requirements for community services would be expected from a particular alternative. In the alternative, where the projected increases in the site workforce were greater than current levels, the impacts on community services were assessed by determining the increase in community services required to maintain the current status.

F.10 HUMAN HEALTH RISK DURING NORMAL OPERATIONS

F.10.1 Description of Affected Resources

Assessments for the SPD EIS aimed in part at enhancing public understanding of the potential impacts of each of the alternatives on their own health and that of workers. Included was a description of the radiological and chemical releases resulting from construction activities and normal operations for each alternative, including No Action, and the impacts on public and occupational health.

The risks from radiation were not added to those from hazardous chemicals, given the considerable uncertainty as to their combined effects. Impacts of some chemicals are enhanced by radiation, while those of others are not affected or can even be reduced. The reverse also holds true: chemicals can increase, decrease, or not influence radiological effects.

For the public, impacts on individuals (maximally exposed and average exposed) and on the population within 80 km (50 mi) of the site were evaluated; for workers, the focus was impacts on individuals and on the total

Table F–9. Impact Assessment Protocol for Socioeconomics

Resource	Required Data: Affected Environment	Required Data: Facility Design	Measure of Impact
Workforce requirements	Site workforce projections from DOE sites	Estimated construction and operating staff requirements and timeframes	Workforce requirements added to sites' workforce projections
REA civilian labor force	Labor force projections based on State population projections	Estimated construction and operating staff requirements and timeframes	Workforce requirements as a percentage of the civilian labor force
Unemployment rate	1996 unemployment rates in counties surrounding sites and in host States	Estimated construction and operating staff requirements	Projected change in unemployment rates
Health care services			
Number of hospital beds per 100,000 residents	Latest available rates based on telephone interviews with area hospitals and State hospital associations	Estimated influx of new health care facilities to meet construction and operating staff requirements	Projected change in numbers to maintain current rates
Number of physicians per 100,000 residents	Latest available rates based on AMA data	Estimated influx of new health care employees to meet construction and operating staff requirements	Projected change in numbers to maintain current rates
Housing—Percent of occupied housing units	Latest available rates from the Census Bureau	Estimated influx of new housing units needed for influx of construction and operating staff requirements	Projected change in numbers to maintain current rates
Schools			
Percent operating capacity for school districts in ROI	Latest available rates based on telephone interviews with school districts	Estimated influx of new students generated by movement of employees and their families into ROI	Projected change in operating capacity for school districts in ROI
Teacher-to-student ratio	Latest available rates based on telephone interviews with school districts	Estimated influx of new students generated by movement of employees and their families into ROI	Projected change in number of teachers to maintain current teacher-to-student ratio
Community services			
Ratio of police to 100,000 residents	Latest number of sworn officers based on telephone interviews with police departments	Estimated influx of new officers to meet construction and operating staff requirements	Projected change in number of officers to maintain current police-to-resident ratio
Ratio of firefighters to 100,000 residents	Latest number of firefighters based on telephone interviews with fire departments	Estimated influx of new firefighters to meet construction and operating requirements	Projected change in number of firefighters to maintain current firefighter-to-resident ratio

Key: AMA, American Medical Association; REA, regional economic area; ROI, region of influence.

facility workforce. The basic health risk issue addressed was whether any of the alternatives would result in undue numbers of health effects (e.g., cancers among workers or the public). Because protection of human health is regulated by DOE, EPA, NRC, and the Occupational Safety and Health Administration (OSHA), estimates

of public and worker doses and associated health risks are also necessary to demonstrate that surplus plutonium disposition facilities are being designed in compliance with the applicable standards issued by these agencies.

F.10.2 Description of Impact Assessment

F.10.2.1 Public Health Risks

The health risks to the general public were determined in the following ways: (1) for present operations, doses stated in the most recent environmental or safety reports were used to calculate health risks; and (2) for operations of the proposed facilities, incremental radiological and chemical doses were modeled using specific facility data and site-dependent parameters and converted into their associated health risks.

Radiological and chemical impacts associated with the No Action Alternative were estimated from projected releases from all site facilities that are expected to be operating at the time the actions assessed in the SPD EIS are under way. For each of the other alternatives, radiological and chemical effluents were obtained from facility data reports specific to each surplus plutonium disposition process.

F.10.2.1.1 Radiological Risks

Public health risk assessments from radiological releases during normal operations of the proposed facilities at the candidate sites were performed using the Generation II computer code, to calculate doses from inhalation, ingestion of terrestrial foods, drinking water, fish, and direct exposure to radiation in plumes or on the ground. This type of assessment uses site-dependent factors, including meteorology, population distributions, agricultural production, and facility locations on a given site. As reflected in Table F–10, doses were calculated for the maximally exposed individual (MEI) member of the public, for the average exposed member of the public, and for the total population living within 80 km (50 mi) of a given release location (NRC 1977:1.109.30).

Total site doses were compared with regulatory limits and, for perspective, with background radiation levels in the vicinity of the site. These doses were also converted into a projected number of fatal cancers using a risk estimator of 500 fatal cancers per 1 million person-rem derived from data prepared by the National Research Council's Committees on the Biological Effects of Ionizing Radiations and by the International Commission on Radiological Protection (ICRP 1991). The calculated health effects were compared with those arising among the same population groups from other causes.

[Text deleted.]

F.10.2.1.2 Chemical Risks

The potential impacts on the offsite public from exposure to hazardous chemicals released to the atmosphere as a result of the construction or routine operation of the proposed facilities were evaluated. The receptor considered in these evaluations was the MEI member of the offsite population at each candidate site. The MEI is the hypothetical individual in the population who has the highest potential exposure.

Table F–10. Impact Assessment Protocol for Human Health Risk

Risk	Required Data: Affected Environment	Required Data: Facility Design	Measure of Impact
Radiation: public			
Offsite MEI dose via airborne pathways	Current annual dose (mrem) to MEI via all airborne pathways at site	Annual radionuclide release rates (Ci) to air from proposed facility. Stack height. Location of proposed facility on the site.	Annual dose greater than 10 mrem via airborne releases (NESHAPs limit), and 5 mrem (airborne external [10 CFR 50]).
Offsite MEI dose via liquid pathways	Current annual dose (mrem) to MEI via all liquid pathways at site	Annual radionuclide release rates (Ci) to liquid pathways.	Annual dose via liquid releases greater than 4 mrem (SDWA) and 3 mrem (10 CFR 50).
Offsite MEI dose via all pathways, including air, water, and others (e.g., direct radiation)	Current annual dose (mrem) to MEI via all pathways at site Annual radionuclide release rates to air and water from site release locations Joint frequency meteorological data Water dilution factors Distances from radionuclide release points to site boundary for 16 cardinal directions Exposure information associated with other potential pathways (e.g., direct radiation from each site area)	Annual radionuclide releases to air and via any other pathway (e.g., direct radiation) from proposed facility. Stack height. Location of proposed facility on the site. Exposure information associated with other potential pathways (e.g., direct radiation).	Annual dose greater than 100 mrem via all pathways (DOE 5400.5 and 10 CFR 20)
Dose to population within 80 km (50 mi) of site via all pathways	Current annual population dose (person-rem) via all pathways at site Projected population distribution within an 80-km (50-mi) radius from radionuclide release points Latest available milk, meat, and vegetable distributions within an 80-km (50-mi) radius from radionuclide release points Joint frequency meteorological data Water usage values (e.g., fish harvest, number of water drinkers) Water dilution factors	Annual radionuclide release rates (Ci) to air and liquid from proposed facility. Stack height. Location of proposed facility on the site.	Annual population dose greater than 100 person-rem via all pathways (proposed 10 CFR 834).

Table F–10. Impact Assessment Protocol for Human Health Risk (Continued)

Risk	Required Data: Affected Environment	Required Data: Facility Design	Measure of Impact
Radiation: occupational			
Average dose to involved (facility) worker[a]	Not applicable	Annual average dose (mrem) to the facility worker.	Annual dose of more than 750 mrem. This value represents 15% of 10 CFR 835 and 10 CFR 20 limit of 5,000 mrem/yr and 37.5% of DOE administrative control level of 2,000 mrem/yr, and has been chosen to ensure that dose received by average worker is well below dose limits and administrative control level. Annual dose of more than 5,000 mrem/yr for commercial plants (10 CFR 20).
Average dose to noninvolved (site) worker[a]	Current annual average dose (mrem) among all noninvolved workers at site	Not applicable.	Annual dose of more than 250 mrem. This value represents 5% of 10 CFR 835 limit of 5,000 mrem/yr and 12.5% of the DOE administrative control level of 2,000 mrem/yr, and has been chosen to ensure that dose received by average worker is well below dose limits and administrative control level.
Total dose to involved (facility) workers	Not applicable	Annual total dose (person-rem) among all facility workers. Number of facility workers.	Annual dose of more than 750 mrem times number of involved workers. Annual dose of more than 5,000 mrem/yr for commercial plants (10 CFR 20).
Total dose to noninvolved (site) workers	Current annual total dose (person-rem) among all workers at site Number of noninvolved workers	Not applicable.	Annual dose of more than 250 mrem times number of noninvolved workers at site.
Radiation: construction workers			
Average dose to construction worker[a]	Level of existing contamination and dose expected from working in that area of site	Annual average and total dose to construction worker.	For average worker, 50% of values given above for public's MEI. This is based on interpretation of a construction worker as a member of the public and application of a reduction factor of 2 in going to an average rather than a maximally exposed worker.
Total dose to construction workers		Numbers of construction workers.	For total workforce, number of workers in workforce times doses for an average worker.

Table F–10. Impact Assessment Protocol for Human Health Risk (Continued)

Risk	Required Data: Affected Environment	Required Data: Facility Design	Measure of Impact
Hazardous chemicals: public			
Offsite MEI latent cancer incidence risk	Distribution of population in ROI Joint frequency meteorological data	Airborne release (kg/yr) of hazardous chemicals.	Probability of latent cancer incidence for MEI.
[Text deleted.]			

[a] More meaningful in determining health risk than dose to maximally exposed worker, which varies significantly each year. Monitoring, however, will ensure that dose to the maximally exposed worker remains within regulatory limits.

Key: CFR, Code of Federal Regulations; MEI, maximally exposed individual; NESHAPs, National Emission Standards for Hazardous Air Pollutants; ROI, region of influence; SDWA, Safe Drinking Water Act.

As a result of releases from construction and routine operation of facilities, receptors are expected to be potentially exposed to concentrations of hazardous chemicals that are below those that could cause acutely toxic health effects. Acutely toxic health effects result from short-term exposure to relatively high concentrations of contaminants, such as those that may be encountered during facility accidents. Long-term exposure to relatively lower concentrations of hazardous chemicals can produce adverse chronic health effects that may include both carcinogenic and noncarcinogenic effects. However, the health effect endpoint evaluated in this analysis is limited to the probability of an excess latent cancer incidence for the offsite population MEI because only carcinogenic chemicals are expected to be released from the proposed actions.

Estimates of airborne concentrations of hazardous chemicals were developed using the ISC air dispersion model. This model was developed by EPA for regulatory air-dispersion-modeling applications (EPA 1996b). ISC3 is the most recent version of the model and is approved for use for a wide variety of emission sources and conditions. The ISC model estimates atmospheric concentrations based on the airborne emissions from the facility for each block in a circular grid comprising 16 directional sectors (e.g., north, north-northeast, northeast) at radial distances out to 80 km (50 mi) from the point of release, producing a distribution of atmospheric concentrations. The offsite population MEI is located in the block with the highest estimated concentration.

For carcinogenic chemicals, risk is estimated by the following equation:

$$\text{Risk} = \text{CA} \times \text{URF}$$

where

Risk = unitless probability of cancer incidence
CA = contaminant concentration in air (in $\mu g/m^3$)
URF = cancer inhalation unit risk factor (in units of cancers per $\mu g/m^3$)

Cancer unit risk factors are used in risk assessments to estimate an upper-bound lifetime probability of an individual developing cancer as a result of exposure to a particular concentration of a potential carcinogen.

For the proposed actions, benzene is the only potential carcinogen that may be released to the atmosphere during facility construction activities (UC 1998a, 1998b, 1998c, and 1998d). EPA considers benzene to be a human carcinogen based on several studies that show increased incidence of nonlymphocytic leukemia from occupational exposure, increased incidence of neoplasia in rats and mice exposed by inhalation and gavage, and increases in chromosomal aberrations of bone marrow cells and peripheral lymphocytes in workers exposed to benzene and in laboratory studies with rabbits and rats (EPA 1997g).

F.10.2.2 Occupational Health Risks

F.10.2.2.1 Radiological Risks

Health risks from radiological exposure were determined for two types of workers: the facility worker, (i.e., the worker inside one of the plutonium-processing facilities or one of the commercial plants); and the site worker (i.e., the worker elsewhere on the site but not involved in plutonium processing). Health risks to individual workers and to total workforces were assessed.

The facility worker's dose was based on data from design reports on specific surplus plutonium disposition facilities or from the commercial plant historical data. It was assumed that the noninvolved site worker only receives a dose that results from his or her primary onsite activities. No additional dose to these workers would be expected from surplus plutonium disposition facility operation.

Worker doses were converted into the number of projected fatal cancers using the risk estimator of 400 fatal cancers per 1 million person-rem given in the International Commission on Radiological Protection Publication 60 (ICRP 1991). This risk estimator, compared with that for members of the public, reflects the absence of the most radiosensitive age groups (i.e., infants and children) in the workforce.

F.10.2.2.2 Hazardous Chemical Risks

Impacts of exposures to hazardous chemicals for workers directly involved in the proposed actions were not quantitatively evaluated. The use of personal protective equipment by the workers, as well as the use of engineering process controls, will limit worker exposure to levels within OSHA *Permissible Exposure Limits* (in 29 CFR 1910) or American Conference of Governmental Industrial Hygienists *Threshold Limit Values.*

F.11 FACILITY ACCIDENTS

F.11.1 Description of Affected Resources

Processing any hazardous material poses a risk of accidents impacting involved workers (workers directly involved in facility processes), noninvolved workers (workers on the site but not directly involved in facility processes), and members of the public. The consequences of such accidents could involve the release of radioactive or chemical material or the release of hazardous (e.g., explosive) energy, beyond the intended confines of the process. Risk is determined by the development of a representative spectrum of accidents, each of which is conservatively characterized by a likelihood (i.e., expected frequency of occurrence) and a consequence.

For the purpose of this analysis, involved workers were defined as workers in the immediate vicinity of the process involved in the accident; noninvolved workers, as workers located at the closer of 1,000 m (3,281 ft) from the accident (emission) source or the site boundary; and members of the public, as persons residing outside the site boundary and within 80 km (50 mi) of the facility.

F.11.2 Description of Impact Assessment

To avoid duplication, the analysis of potential accidents performed for the SPD EIS took full cognizance of the corresponding analyses in the *Storage and Disposition PEIS* (DOE 1996a), including accident sequence development, source term definition, and consequence analysis. The analysis focused on the likelihoods and consequences of a variety of a bounding spectrum of accidents postulated for each alternative, from high-consequence, low-frequency accidents to low-consequence, high-frequency accidents.

One objective of the accident analysis, a follow-on to a hazard analysis, was to translate each source term into a probabilistic distribution of consequences based on site-specific modeling of meteorological dispersion of the hazardous material and resulting uptake of that material by members of the human population. To predict the impacts of postulated accidents on the health of workers and the public, source terms were translated into consequences using the Melcor Accident Consequence Code System (MACCS2).

Metrics used to measure the impact of each accident include the accident frequency, the mean and 95th percentile doses for the noninvolved worker at the closer of 1,000 m (3,281 ft) or the site boundary, the mean and 95th percentile doses for the MEI at the site boundary, and the mean and 95th percentile doses for members of the general public within 80 km (50 mi) of the facility. Additionally, the individual doses were translated into the probability of latent cancer fatality, and the dose to the general public into the expected number of latent cancer fatalities (see Table F–11). Additional information on the development of accident sequences, source term definition, and consequence analysis can be found in Appendix K.

Table F–11. Impact Assessment Protocol for Facility Accidents

	Required Data		
Accident	**Affected Environment**	**Facility Design**	**Measure of Impact**
Operational events External events NPH events	Meteorological data Data on population within 80 km (50 mi) of facility Site boundary data	Accident source terms Accident frequencies Facility location	Radiological dose at 1,000 m (3,281 ft) from accident source Probability of latent cancer fatality given dose at 1,000 m (3,281 ft) Radiological dose to offsite MEI Probability of latent cancer fatality given dose at site boundary Dose to general public within 80 km (50 mi) of facility Latent cancer fatalities among general public within 80 km (50 mi) of facility

Key: MEI, maximally exposed individual; NPH, natural phenomena hazard.

F.12 TRANSPORTATION

F.12.1 Description of Affected Resources

Overland transportation of any commodity involves a risk to both transportation crew members and members of the public. This risk results directly from transportation-related accidents and indirectly from the increased levels of pollution from vehicle emissions, regardless of cargo. The transportation of plutonium, radioactive waste, or other nuclear materials can pose additional risks owing to the unique properties of the material.

Accordingly, DOE, NRC, and the U.S. Department of Transportation have instituted strict policies and regulations governing the transport of such materials. The requirements are applicable throughout a shipment's ROI, which encompasses the onsite roadways, as well as the public roads between DOE sites and between DOE sites and commercial sites. For site-to-site transport, for example, shippers are required to use interstate highways predominantly.

F.12.2 Description of Impact Assessment

The risk from incident-free transportation was assessed for persons living within 0.8 km (0.5 mi) of the route; the risk from hypothetical accidents, for persons living within 80 km (50 mi) of the route. Assessment of the

human health risks of overland transportation is crucial to a complete appraisal of the environment impacts of transportation associated with the surplus plutonium disposition alternatives.

The impacts associated with overland transportation were calculated per shipment, and then multiplied by the number of shipments. This approach allowed for maximum flexibility in determining the risk for a variety of alternatives (see Table F–12).

Fundamental assumptions of this analysis were consistent with those of the *Storage and Disposition PEIS* (DOE 1996a), and the same computer codes, release data, and accident scenarios were used. The HIGHWAY computer program was used for selecting highway routes for transporting radioactive materials by truck. The HIGHWAY database is a computerized road atlas that currently describes approximately 386,242 km (240,000 mi) of roads. A complete description of the interstate system and all U.S. highways is included in the database. Most of the principal State highways and many local and community roadways are also identified. The code is updated periodically to reflect current road conditions, and has been benchmarked against the reported mileages and observations of commercial trucking firms.

The first analytic step in the ground transportation analysis was to determine the incident-free and accident risk factors per shipment for transportation of the various types of hazardous materials. As with any risk estimate, the risk factors were calculated as the product of the probability and the magnitude of the exposure. Accident risk factors were calculated for radiological and nonradiological traffic accidents. The probabilities (much lower than unity [i.e., 1]) and the magnitudes of exposure were multiplied, yielding risk numbers. Incident-free risk factors were calculated for crew and public exposure to radiation emanating from the package and for public exposure to the chemical toxicity of the transportation vehicle exhaust. The probability of incident-free exposure is unity.

The RADTRAN 4 computer code (Neuhauser and Kanipe 1995) was used for the incident-free and accident risk assessments to estimate the impacts on collective populations. RADTRAN 4 was developed by Sandia National Laboratories to calculate population risk associated with the transportation of radioactive materials by a variety of modes: truck, rail, air, ship, and barge. Calculations are in terms of the probabilities and consequences of potential exposure events.

The RISKIND computer code (Yuan et al. 1995) was used to estimate the incident-free doses to MEIs and to develop impact estimates for use in the accident consequence assessment. This code was developed for DOE's Office of Civilian Radioactive Waste Management to analyze the exposure of individuals during incident-free transportation. It also allows for a detailed assessment of the consequences for individuals and population subgroups of severe transportation accidents in various environmental settings.

RISKIND calculations supplemented the collective risk results achieved with RADTRAN 4; they addressed areas of specific concern to individuals and population subgroups. Essentially, the RISKIND analyses answered the "what if" questions, such as, "What if I live next to a site access road?" or "What if an accident happens near my town?"

Radiological doses, expressed in units of rem, were multiplied by the ICRP 60 (ICRP 1991) conversion factors and the estimated numbers of shipments to produce risk estimates in units of latent cancer fatalities. The vehicle emission risk factors were calculated in terms of latent fatalities; the vehicle accident risk factors, in fatalities. The nonradiological risk factors were multiplied by the number of shipments.

For each alternative, risks of both incident-free and accident conditions were assessed. For the incident-free assessment, risks were calculated for "collective populations" of potentially exposed individuals and for MEIs. (The collective population risk is a measure of the radiological risk posed to society as a whole by the

Table F–12. Impact Assessment Protocol for Transportation

Risk	Required Data: Affected Environment	Required Data: Facility Design	Measure of Impact
Incident-free transportation			
Radiation dose to crew		Origin and destination of shipments Characterization of vehicles and material shipped	Dose and latent cancer fatalities to crew
Radiation dose to public On-link Off-link During stops	Population within 0.8 km (0.5 mi) of route Number of persons using a highway Traffic conditions along route	Origin and destination of shipments Characterization of vehicles and material shipped	Dose and latent cancer fatalities to public
Maximally exposed crew member		Origin and destination of shipments Characterization of vehicles and material shipped Location of workers	Radiation doses compared with 10 CFR 20 limits (2 mrem/hr and 100 mrem/yr)
Maximally exposed member of public		Origin and destination of shipments Characterization of vehicles and material shipped	Radiation doses compared with 10 CFR 20 limits (2 mrem/hr and 100 mrem/yr)
Health risks from vehicle emissions		Origin and destination of shipments Characterization of vehicles	Fatalities
Transportation accidents			
Radiological risk to public	Population within 80 km (50 mi) of route	Origin and destination of shipments Characterization of vehicles and material shipped	Doses and latent cancer fatalities
Nonradiological risk to public (nonradiological)	Traffic conditions along route	Origin and destination of shipments	Fatalities
Maximally exposed individual		Origin and destination of shipments Characterization of vehicles and material shipped	Doses and latent cancer fatalities

Key: CFR, Code of Federal Regulations.

alternative being considered. It was the primary means of comparing the various alternatives.) The accident assessment had two components: (1) a probabilistic risk assessment, which addressed the probabilities and consequences of a range of possible transportation accident environments, including low-probability accidents with high consequences and high-probability accidents with low consequences; and (2) an accident consequence assessment, which concerned only the consequences of the most severe transportation accidents postulated.

F.13 ENVIRONMENTAL JUSTICE

F.13.1 Description of Affected Resources

Constituting the affected environment are the low-income and minority populations residing in the potentially affected area. For the analysis of environmental justice relative to incident-free transportation, that area was defined as a corridor 1.6 km (1 mi) wide centered on rail or truck routes. For analyses pertaining to transportation accidents and evaluations of environmental justice in facility environs, it consisted of the geographical area within an 80 km (50 mi) distance of the accident site or facility.

Minority populations were split among four groups: Asians, Blacks, Hispanics, and Native Americans. The population group designated as Hispanic includes all persons who identified themselves as having Hispanic origins, regardless of race. For example, a person self-identified as Asian and of Hispanic origin was included among Hispanics. Persons self-identified as Asian and not of Hispanic origin were included in the Asian population.

Block group spatial resolution was used throughout the analysis (see Table F–13). The Census Bureau defines block group to include 250–500 housing units with 400 being typical. The minority population residing in the affected area was determined from data contained in Table P12 of Standard Tape File 3A published by the Census Bureau (DOC 1992). Low-income populations were estimated from data in Table P121 (DOC 1992:B-28, B-29), which provides statistical data characterizing income status relative to the poverty threshold for each block group.

F.13.2 Description of Impact Assessment

Formal requirements for inclusion of environmental justice concerns in environmental documentation were initiated by Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, issued in February 1994. The Council on Environmental Quality has oversight responsibility for implementation of the Executive order in documentation prepared under the provisions of NEPA. The Council issued draft guidance for environmental justice in May 1996 (CEQ 1997). These guidelines provide the foundation for evaluation of environmental justice in the SPD EIS.

Analysis of environmental justice for the SPD EIS focused on the "block group," one of the geographical aggregations of demographic data typically provided by the Census Bureau (DOC 1992). Block groups provide the finest spatial resolution available for evaluation of low-income populations. It is rare, however, that the boundaries of block groups coincide with those of affected areas. Uniform population distribution within block groups is also uncommon. Such uniformity was assumed, however, for purposes of SPD EIS population estimates. Thus, for each block group, the percentage of the population included in the population count equaled the percentage of the geographical area of the block group that lay within the affected area. An upper bound for the potentially affected population was obtained by including the total population of partially included block groups in the population count; a lower bound, by excluding the total population of such block groups from the count.

The following definitions were used in the evaluation:

- **Minority individuals:** Persons who are members of any of the following population groups: Asian or Pacific Islander, Black, Hispanic, or Native Americans (American Indian, Eskimo, or Aleut). This definition includes all persons except those self-designated as not of Hispanic origin and as either White or "Other Race" (one of the classifications used by the Census Bureau in the 1990 census).

Table F–13. Impact Assessment Protocol for Environmental Justice

Resource	Required Data: Affected Environment	Required Data: Health Effects	Measure of Impact
Minority population	Minority population data at block group spatial resolution from Table P12 of STF3A (DOC 1992)		Disproportionately high annual population dose to minority population (CEQ 1997:app. A)
	Distribution within 80 km (50 mi) of each candidate site	Population dose for sectors within 80-km (50-mi) radius of candidate site	
	Distribution within 1.6 km (1 mi) of transportation corridors	Population dose for areas within 1.6-km (1-mi) radius of transportation corridor	
Low-income population	Low-income population data at block group spatial resolution from Table P121 of STF3A (DOC 1992)		Disproportionately high annual population dose to low-income population (CEQ 1997:app. A)
	Distribution within 80 km (50 mi) of each candidate site	Population dose for sectors within 80-km (50-mi) radius of candidate site	
	Distribution within 1.6 km (1 mi) of transportation corridor	Population dose for areas within 1.6-km (1-mi) radius of transportation corridor	

Key: CEQ, Council on Environmental Quality; DOC, U.S. Department of Commerce; STF, Standard Tape File.

- **Minority population:** The total number of minority individuals residing within a potentially affected area.

- **Low-income individuals:** All persons whose self-reported income is below the poverty threshold as adopted by the Census Bureau (DOC 1992:app. B, B-28).

- **Low-income population:** The total number of low-income individuals residing within a potentially affected area.

If the analysis of health or other environmental effects showed that the actions consistent with the proposed alternatives would have significant impacts on the general population, then additional analysis of impacts on the minority and low-income populations was conducted. The analysis method was identical to that described for the evaluation of radiological impacts on the general population. Given the impracticality of extrapolating block level population and income data, minority and low-income populations within each block group were assumed to increase in direct proportion to the increase in general population from the year 1990 to the year of interest.

F.14 CUMULATIVE IMPACTS

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). The cumulative impact analysis for the SPD EIS involved combining the impacts of the SPD EIS alternatives (including No Action) with the impacts of other past, present, and reasonably foreseeable activities.

[Text deleted.]

In general, cumulative impacts were calculated by adding the values for the baseline,[3] the maximum impacts from the proposed activities at the candidate sites, and other future actions. This cumulative value was then weighed against the appropriate impact indicators to determine the potential for impact. Table F–14 shows the selected indicators of cumulative impacts evaluated in the SPD EIS. The analysis focused on the potential for cumulative impacts at each candidate site from DOE actions under detailed consideration at the time of the SPD EIS (see Table F–15). Non-DOE actions were also considered where information was readily available. Public documents prepared by agencies of Federal, State, and local government were the primary sources of information for the non-DOE actions.

Table F–14. Selected Indicators of Cumulative Impact

Category	Indicator
Resource use	Land occupied
	Electricity use
	Water use
	Workers required
[Text deleted.]	
Air quality	Percent of NAAQS for criteria pollutants
Human health	Offsite population
	MEI dose
	Total dose
	Latent cancer fatalities
	Workers
	Average dose
	Total dose
	Latent cancer fatalities
Waste generation	Site waste generation rate versus capacity
	TRU waste
	LLW
	Mixed LLW
	Hazardous waste
	Nonhazardous waste
Transportation	Number of offsite trips
	MEI dose
	Risk of latent cancer fatality

Key: LLW, low-level waste; MEI, maximally exposed individual; NAAQS, National Ambient Air Quality Standards; TRU, transuranic.

It is assumed that construction impacts would not be cumulative because such construction is typically of short duration and construction impacts are generally temporary. However, waste created during construction as well as any radiation doses received by construction workers have been added to the cumulative totals for all

[3] The conditions attributable to actions, past and present, by DOE and other public and private entities.

Table F–15. Other Past, Present, and Reasonably Foreseeable Actions Considered in the Cumulative Impact Assessment for Candidate DOE Sites

Activities	Hanford	INEEL	Pantex	SRS	LLNL	LANL	ORNL
Storage and Disposition of Weapons-Usable Fissile Materials	X	X	X	X			X
Disposition of Surplus Highly Enriched Uranium				X			X
Interim Management of Nuclear Materials at SRS				X			
[Text deleted.]							
Tritium Supply and Recycling				X			
Waste Management	X	X	X	X		X	X
Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management	X	X		X			
Foreign Research Reactor Spent Nuclear Fuel	X	X		X			
Tank Waste Remediation System	X						
Shutdown of the River Water System at SRS				X			
Radioactive releases from nuclear power plant sites, Vogtle and WNP	X			X			
Hanford Reach of the Columbia River Comprehensive River Conservation Study	X						
FEIS and Environmental Information Report for Continued Operation of LLNL and SNL					X		
Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components			X				
Stockpile Stewardship and Management			X	X	X		X
[Text deleted.]							
Management of Plutonium Residues and Scrub Alloy at Rocky Flats				X			
Spent Nuclear Fuel Management (SRS)				X			
DWPF Final Supplemental				X			
Supplemental EIS for In-Tank Precipitation Process Alternatives				X			
Construction and Operation of a Tritium Extraction Facility at SRS				X			
Supplement Analysis for Storing Plutonium in the Actinide Packaging and Storage Facility and Building 105–K at SRS				X			
Los Alamos Site-Wide EIS						X	
Hanford Remedial Action and Comprehensive Land Use Plan	X						
Advanced Mixed Waste Treatment Project		X					
Construction and Operation of the Spallation Neutron Source							X
Long-Term Management and Use of Depleted Uranium Hexafluoride							X

Key: DWPF, Defense Waste Processing Facility; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; ORNL, Oak Ridge National Laboratory; SNL, Sandia National Laboratories; WNP, Washington Nuclear Power.

proposed surplus plutonium disposition activities. D&D of the proposed facilities was not addressed in the cumulative impact estimates. Given the uncertainty regarding the timing of D&D, any impact estimate at this time would be highly speculative. A detailed evaluation of D&D will be provided in follow-on NEPA documentation closer to the actual time of those actions.

Recent sitewide NEPA documents (see Table F–16) provide the latest comprehensive evaluation of cumulative impacts for the sites.

Table F–16. Recent Comprehensive National Environmental Policy Act Documents for the DOE Sites

Site	Document	Year	ROD Issued[a]
Hanford	*Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement*	1996	February 1997
INEEL	*DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement*	1995	March 1996
Pantex	*Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*	1996	January 1997
SRS	*Savannah River Site Waste Management Final Environmental Impact Statement*	1995	October 1995
LLNL	*Final Site-Wide Environmental Impact Statement for Continued Operation of the Lawrence Livermore National Laboratory*	1992	January 1993
LANL	*Final Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory*	1999	Pending

[a] Date of the first ROD issued.
Key: ROD, Record of Decision.

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Appendix G
Air Quality

This appendix presents detailed information that support the air quality impact assessments in Chapter 4. Data are provided for the four candidate U.S. Department of Energy sites: the Hanford Site (Hanford), Idaho National Engineering and Environmental Laboratory (INEEL), the Pantex Plant (Pantex), and the Savannah River Site (SRS).

G.1 HANFORD

G.1.1 Assessment Data

Emission rates for criteria, hazardous, and toxic air pollutants at Hanford are presented in Table F.1.2.2–1 of the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement (Storage and Disposition PEIS)* (DOE 1996a:F-6). These emission rates were used as input into the modeled No Action Alternative pollutant concentrations presented in that environmental impact statement (EIS) and reflect projected Hanford facility emissions for 2005. The storage alternative selected for Hanford results in no change in these concentrations (DOE 1996a:4-34). In addition to the concentrations projected for 2005, the concentrations for the Phased Implementation Alternative—Phase II Operation of the vitrification facilities presented in the *Tank Waste Remediation System Final EIS* (DOE 1996b:5-68) were included in the estimate of the No Action concentration for surplus plutonium disposition as shown in Table G–1. Other onsite activities related to programs analyzed in EISs for spent nuclear fuel and waste management are also included. Other activities at Hanford that may occur during the time period 2005–2015 are discussed in the cumulative impacts section. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–1. Estimated Concentrations ($\mu g/m^3$) From No Action at Hanford

Pollutant	Averaging Period	PEIS Estimated Base Year (2005)	Tank Waste Remediation	Other Onsite From PEIS	No Action
Carbon monoxide	8 hours	0.08	34	0	34.1
	1 hour	0.30	48	0	48.3
Nitrogen dioxide	Annual	0.03	0.12	0.1	0.25
PM_{10}	Annual	<0.01	0.0079	0	0.0179
	24 hours	0.02	0.75	0	0.77
Sulfur dioxide	Annual	<0.01	0.02	1.6	1.63
	24 hours	<0.01	1.6	7.3	8.91
	3 hours	0.01	3.6	26	29.6
	1 hour	0.02	4.0	29	32.9
Total suspended particulates	Annual	<0.01	0.0079	0	0.0179
	24 hours	<0.02	0.75	0	0.77
Benzene	Annual	(a)	0.000006	0	0.000006
[Text deleted.]					

[a] No sources of this pollutant have been identified at the site.
Key: PEIS, *Storage and Disposition PEIS*.
Source: DOE 1996a:4-34, 4-912; 1996b:5-68.

G.1.2 Facilities

G.1.2.1 Pit Conversion Facility

G.1.2.1.1 Construction of Pit Conversion Facility

Potential air quality impacts from modification of the Fuels and Materials Examination Facility (FMEF) and construction of support facilities for pit disassembly and conversion at Hanford were analyzed using the Industrial Source Complex Model, Short-Term, Version 3 (ISCST3) as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from soil disturbance by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–2.

Table G–2. Emissions (kg/yr) From Construction of Pit Conversion Facility in FMEF at Hanford

Pollutant	Diesel Equipment and Construction Fugitive Emissions	Vehicles
Carbon monoxide	1,000	11,300
Nitrogen dioxide	2,400	3,040
PM_{10}	3,500	10,300
Sulfur dioxide	160	0
Volatile organic compounds	200	1,400
Total suspended particulates	9,300	10,300

Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1998a.

Maximum air pollutant concentrations from construction activities are summarized in Table G–3.

Table G–3. Concentrations ($\mu g/m^3$) From Construction of Pit Conversion Facility in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	34.1	0.277	34.4
	1 hour	40,000	48.3	1.88	50.2
Nitrogen dioxide	Annual	100	0.25	0.0199	0.27
PM_{10}	Annual	50	0.0179	0.029	0.047
	24 hours	150	0.77	0.323	1.09
Sulfur dioxide	Annual	50	1.63	0.00133	1.63
	24 hours	260	8.91	0.0148	8.93
	3 hours	1,300	29.6	0.1	29.7
	1 hour	660[b]	32.9	0.301	33.2
Total suspended particulates	Annual	60	0.0179	0.0771	0.095
	24 hours	150	0.77	0.857	1.63

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.1.2 Operation of Pit Conversion Facility

Potential air quality impacts from operation of the pit conversion and support facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–4. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 36 m (118 ft) height, 3.88 m (12.7 ft) diameter, stack exit temperature of 20 C (68 F), and an exit velocity of 3.3 m/s (10.8 ft/s). There was no boiler modeled because heating requirements would be met using electric power (UC 1998a).

Table G–4. Emissions (kg/yr) From Operation of Pit Conversion Facility in FMEF at Hanford

Pollutant	Emergency Generator	Process	Vehicles
Carbon monoxide	520	0	41,800
Nitrogen dioxide	2,000	0	11,200
PM_{10}	50	0	38,100
Sulfur dioxide	34	0	0
Volatile organic compounds	58	0	5,150
Total suspended particulates	50	0	38,100

Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1998a.

Maximum air pollutant concentrations resulting from the emergency diesel generators and process sources, plus the No Action concentrations, are summarized in Table G–5. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–5. Concentrations ($\mu g/m^3$) From Operation of Pit Conversion Facility in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	34.1	0.144	34.2
	1 hour	40,000	48.3	0.978	49.3
Nitrogen dioxide	Annual	100	0.25	0.0166	0.267
PM_{10}	Annual	50	0.0179	0.000415	0.0183
	24 hours	150	0.77	0.00461	0.775
Sulfur dioxide	Annual	50	1.63	0.000282	1.63
	24 hours	260	8.91	0.00313	8.91
	3 hours	1,300	29.6	0.0213	29.6
	1 hour	660[b]	32.9	0.064	33.0
Total suspended particulates	Annual	60	0.0179	0.000415	0.0183
	24 hours	150	0.77	0.00461	0.775

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.2 Immobilization Facility

G.1.2.2.1 Construction of Immobilization Facility

Potential air quality impacts from modification of FMEF and construction of support facilities for plutonium conversion and immobilization (ceramic or glass) at Hanford were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from soil disturbance by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–6.

Table G–6. Emissions (kg/yr) From Construction of Immobilization Facility in FMEF at Hanford

Pollutant	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	1,170	0	0	39,900
Nitrogen dioxide	3,010	0	0	10,700
PM_{10}	230[b]	193[b]	65[b]	36,400
Sulfur dioxide	310	0	0	0
Volatile organic compounds	240	0	0	4,920
Total suspended particulates	230	193	65	36,400

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for the purpose of this analysis resulting in some overestimate of PM_{10} concentrations.
Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1999a, 1999b.

Maximum air pollutant concentrations from construction activities are summarized in Table G–7.

Table G–7. Concentrations ($\mu g/m^3$) From Construction of Immobilization Facility in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Ceramic or Glass	Total
Carbon monoxide	8 hours	10,000	34.1	0.324	34.4
	1 hour	40,000	48.3	2.2	50.5
Nitrogen dioxide	Annual	100	0.25	0.025	0.275
PM_{10}	Annual	50	0.0179	0.00405	0.022
	24 hours	150	0.77	0.158	0.928
Sulfur dioxide	Annual	50	1.63	0.00257	1.63
	24 hours	260	8.91	0.0286	8.94
	3 hours	1,300	29.6	0.194	29.8
	1 hour	660[b]	32.9	0.583	33.5
Total suspended particulates	Annual	60	0.0179	0.00405	0.022
	24 hours	150	0.77	0.158	0.928

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.2.2 Operation of Immobilization Facility

Potential air quality impacts from operation of immobilization (ceramic or glass) and support facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–8. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 35.6 m (116.8 ft) height, 3.88 m (12.7 ft) diameter, stack exit temperature of 20 C (68 F), and an exit velocity of 3.3 m/s (10.8 ft/s). There was no boiler modeled because heating requirements would be met using electric power (UC 1999a, 1999b).

Table G–8. Emissions (kg/yr) From Operation of Immobilization Facility in FMEF at Hanford

Pollutant	Emergency Generator	Ceramic or Glass Process	Vehicles
Carbon monoxide	980	0	46,400
Nitrogen dioxide	4,530	0	12,500
PM_{10}	320	0	42,400
Sulfur dioxide	300	0	0
Volatile organic compounds	370	0	5,720
Total suspended particulates	320	0	42,400

Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1999a, 1999b.

Maximum air pollutant concentrations resulting from the emergency diesel generators and process sources, plus the No Action concentrations, are summarized in Table G–9. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–9. Concentrations ($\mu g/m^3$) From Operation of Immobilization Facility in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Ceramic or Glass	Total
Carbon monoxide	8 hours	10,000	34.1	0.271	34.4
	1 hour	40,000	48.3	1.84	50.1
Nitrogen dioxide	Annual	100	0.25	0.0376	0.288
PM_{10}	Annual	50	0.0179	0.00265	0.021
	24 hours	150	0.77	0.0295	0.799
Sulfur dioxide	Annual	50	1.63	0.00249	1.63
	24 hours	260	8.91	0.0277	8.94
	3 hours	1,300	29.6	0.188	29.8
	1 hour	660[b]	32.9	0.564	33.5
Total suspended particulates	Annual	60	0.0179	0.00265	0.021
	24 hours	150	0.77	0.0295	0.799

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.3 MOX Facility

G.1.2.3.1 Construction of MOX Facility

Potential air quality impacts from construction of new mixed oxide (MOX) and support facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from soil disturbance by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–10.

Table G–10. Emissions (kg/yr) From Construction of New MOX Facility at Hanford

Pollutant	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	3,840	0	0	37,600
Nitrogen dioxide	10,080	0	0	10,100
PM_{10}	768[b]	6,880	1,460[b]	34,400
Sulfur dioxide	1,020	0	0	0
Volatile organic compounds	792	0	0	4,640
Total suspended particulates	768	13,600	1,460	34,400
Toxics[c]	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for the purpose of this analysis, resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Source: UC 1998b.

Maximum air pollutant concentrations from construction activities are summarized in Table G–11.

Table G–11. Concentrations ($\mu g/m^3$) From Construction of New MOX Facility at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	34.1	1.06	35.1
	1 hour	40,000	48.3	7.22	55.5
Nitrogen dioxide	Annual	100	0.25	0.0836	0.334
PM_{10}	Annual	50	0.0179	0.0744	0.092
	24 hours	150	0.77	3.27	4.03
Sulfur dioxide	Annual	50	1.63	0.00846	1.64
	24 hours	260	8.91	0.094	9.
	3 hours	1,300	29.6	0.64	30.3
	1 hour	660[b]	32.9	1.92	34.8
Total suspended particulates	Annual	60	0.0179	0.132	0.15
	24 hours	150	0.77	5.88	6.66
Toxics[c]	Annual	0.12	0.000006	0.000008	0.000014

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) may be emitted during construction and were analyzed as benzene.
Source: EPA 1997; WDEC 1994.

G.1.2.3.2 Operation of MOX Facility

Potential air quality impacts from operation of the new MOX and support facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–12. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 35.6 m (116.8 ft) height, 0.3048 m (1.0 ft) diameter, stack exit temperature of 20 C (68 F), and an exit velocity of 0.03 m/s (0.1 ft/s). There was no boiler modeled because heating requirements would be met using electric power (UC 1998b).

Table G–12. Emissions (kg/yr) From Operation of New MOX Facility at Hanford

Pollutant	Emergency Generator	Process	Vehicles
Carbon monoxide	374	0	34,200
Nitrogen dioxide	1,738	0	9,170
PM_{10}	122	0	31,200
Sulfur dioxide	114	0	0
Volatile organic compounds	142	0	4,210
Total suspended particulates	122	0	31,200
[Text deleted.]			

[Text deleted.]
Source: UC 1998b.

Maximum air pollutant concentrations resulting from the emergency diesel generators and process sources, plus the No Action concentrations, are summarized in Table G–13. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–13. Concentrations ($\mu g/m^3$) From Operation of New MOX Facility at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	34.1	0.103	34.2
	1 hour	40,000	48.3	0.704	49.0
Nitrogen dioxide	Annual	100	0.25	0.0144	0.264
PM_{10}	Annual	50	0.0179	0.00101	0.0189
	24 hours	150	0.77	0.0113	0.781
Sulfur dioxide	Annual	50	1.63	0.000946	1.63
	24 hours	260	8.91	0.0105	8.92
	3 hours	1,300	29.6	0.0715	29.7
	1 hour	660[b]	32.9	0.214	33.1
Total suspended particulates	Annual	60	0.0179	0.00101	0.0189
	24 hours	150	0.77	0.0113	0.781
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
[Text deleted.]
Source: EPA 1997; WDEC 1994.

G.1.2.4 Pit Conversion and Immobilization Facilities

G.1.2.4.1 Construction of Pit Conversion and Immobilization Facilities

Potential air quality impacts from modification of FMEF and construction of support facilities for pit disassembly and conversion and plutonium conversion and immobilization (ceramic or glass) at Hanford were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from soil disturbance by construction

equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized inTable G–14.

Table G–14. Emissions (kg/yr) From Construction of Pit Conversion and Immobilization Facilities in FMEF at Hanford

	Pit Conversion		Immobilization			
Pollutant	**Diesel Equipment and Construction Fugitive Emissions**	**Vehicles**	**Diesel Equipment**	**Construction Fugitive Emissions[a]**	**Concrete Batch Plant**	**Vehicles**
Carbon monoxide	1,000	11,300	3,060	0	0	40,000
Nitrogen dioxide	2,400	3,040	7,890	0	0	10,700
PM_{10}	3,500	10,300	600[b]	6,770	560[b]	36,500
Sulfur dioxide	160	0	800	0	0	0
Volatile organic compounds	200	1,400	620	0	0	4,930
Total suspended particulates	9,300	10,300	600	13,100	560	36,500

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for the purpose of this analysis resulting in some overestimate of PM_{10} concentrations.
Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1998a, 1999a, 1999b.

Maximum air pollutant concentrations from construction activities are summarized in Table G–15.

Table G–15. Concentrations ($\mu g/m^3$) From Construction of Pit Conversion and Immobilization Facilities in FMEF at Hanford

				Immobilization		
Pollutant	**Averaging Period**	**Most Stringent Standard or Guideline[a]**	**No Action**	**Pit Conversion**	**(Ceramic or Glass)**	**Total**
Carbon monoxide	8 hours	10,000	34.1	0.277	0.846	35.2
	1 hour	40,000	48.3	1.88	5.76	55.9
Nitrogen dioxide	Annual	100	0.25	0.0199	0.0654	0.335
PM_{10}	Annual	50	0.0179	0.029	0.0651	0.112
	24 hours	150	0.77	0.323	2.96	4.05
Sulfur dioxide	Annual	50	1.63	0.00133	0.00664	1.64
	24 hours	260	8.91	0.0148	0.0737	9.
	3 hours	1,300	29.6	0.1	0.502	30.2
	[Text deleted.]					
	1 hour	660[b]	32.9	0.301	1.5	34.7
Total suspended particulates	Annual	60	0.0179	0.0771	0.117	0.212
	24 hours	150	0.77	0.857	5.58	7.21

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.4.2 Operation of Pit Conversion and Immobilization Facilities

Potential air quality impacts from operation of pit conversion, immobilization (ceramic or glass), and support facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–16. Stack parameters used for modeling were as stated previously.

Table G–16. Emissions (kg/yr) From Operation of Pit Conversion and Immobilization Facilities in FMEF at Hanford

	Pit Conversion			Immobilization		
Pollutant	**Emergency Generator**	**Process**	**Vehicles**	**Emergency Generator**	**Ceramic or Glass Process**	**Vehicles[a]**
Carbon monoxide	520	0	41,800	1,460	0	57,100
Nitrogen dioxide	2,000	0	11,200	6,790	0	15,300
PM_{10}	50	0	38,100	480	0	52,100
Sulfur dioxide	34	0	0	450	0	0
Volatile organic compounds	58	0	5,150	550	0	7,040
Total suspended particulates	50	0	38,100	480	0	52,100

[a] For 50-t (55-ton) case.
Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1998a, 1999a, 1999b.

Maximum air pollutant concentrations resulting from the emergency diesel generators and process sources, plus No Action concentrations, are summarized in Table G–17. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–17. Concentrations ($\mu g/m^3$) From Operation of Pit Conversion and Immobilization Facilities in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guidelines[a]	No Action	Pit Conversion	Immobilization (Ceramic or Glass)	Total[b]
Carbon monoxide	8 hours	10,000	34.1	0.144	0.404	34.6
	1 hour	40,000	48.3	0.978	2.75	52.
Nitrogen dioxide	Annual	100	0.25	0.0166	0.0563	0.323
PM_{10}	Annual	50	0.0179	0.000415	0.00398	0.0223
	24 hours	150	0.77	0.00461	0.0443	0.819
Sulfur dioxide	Annual	50	1.63	0.000282	0.00373	1.63
	24 hours	260	8.91	0.00313	0.0415	8.95
	3 hours	1,300	29.6	0.0213	0.282	29.9
	[Text deleted.]					
	1 hour	660[c]	32.9	0.064	0.847	33.8
Total suspended particulates	Annual	60	0.0179	0.000415	0.00398	0.0223
	24 hours	150	0.77	0.00461	0.0443	0.819

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] The concentrations for ceramic and glass are the same for both 17-t and 50-t cases.
[c] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.5 Pit Conversion and MOX Facilities

G.1.2.5.1 Construction of Pit Conversion and MOX Facilities

Potential air quality impacts from modification of FMEF and construction of support facilities for pit disassembly and conversion and MOX fuel fabrication at Hanford were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–18.

Table G–18. Emissions (kg/yr) From Construction of Pit Conversion and MOX Facilities in FMEF at Hanford

	Pit Conversion		MOX			
Pollutant	Diesel Equipment and Construction Fugitive Emissions	Vehicles	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	1,000	11,300	778	0	0	37,300
Nitrogen dioxide	2,400	3,040	2,009	0	0	10,000
PM_{10}	3,500	10,300	154[b]	2,830	435[b]	34,100
Sulfur dioxide	160	0	204	0	0	0
Volatile organic compounds	200	1,400	160	0	0	4,600
Total suspended particulates	9,300	10,300	154	5,590	435	34,100
Toxics[c]	0	0	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for the purpose of this analysis resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1998a, 1998b.

Maximum air pollutant concentrations from construction activities are summarized in Table G–19.

Table G–19. Concentrations ($\mu g/m^3$) From Construction of Pit Conversion and MOX Facilities in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	MOX	Total
Carbon monoxide	8 hours	10,000	34.1	0.277	0.215	34.6
	1 hour	40,000	48.3	1.88	1.46	51.6
Nitrogen dioxide	Annual	100	0.25	0.0199	0.0167	0.287
PM_{10}	Annual	50	0.0179	0.029	0.0274	0.0743
	24 hours	150	0.77	0.323	1.32	2.41
Sulfur dioxide	Annual	50	1.63	0.00133	0.00169	1.63
	24 hours	260	8.91	0.0148	0.0188	8.94
	3 hours	1,300	29.6	0.1	0.128	29.8
	[Text deleted.]					
	1 hour	660[b]	32.9	0.301	0.384	33.6
Total suspended particulates	Annual	60	0.0179	0.0771	0.051	0.146
	24 hours	150	0.77	0.857	2.4	4.03
Toxics[c]	Annual	0.12	0.000006	0	0.000008	0.000014

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.5.2 Operation of Pit Conversion and MOX Facilities

Potential air quality impacts from operation of pit conversion, MOX, and support facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–20. Stack parameters used for modeling were as stated previously.

Table G–20. Emissions (kg/yr) From Operation of Pit Conversion and MOX Facilities in FMEF at Hanford

	Pit Conversion			MOX		
Pollutant	**Emergency Generator**	**Process**	**Vehicles**	**Emergency Generator**	**Process**	**Vehicles**
Carbon monoxide	520	0	41,800	374	0	34,200
Nitrogen dioxide	2,000	0	11,200	1,738	0	9,170
PM_{10}	50	0	38,100	122	0	31,200
Sulfur dioxide	34	0	0	114	0	0
Volatile organic compounds	58	0	5,150	142	0	4,210
Total suspended particulates	50	0	38,100	122	0	31,200
[Text deleted.]						

[Text deleted.]
Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1998a, 1998b.

Maximum air pollutant concentrations resulting from the emergency diesel generators and process sources, plus the No Action concentrations, are summarized in Table G–21. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–21. Concentrations ($\mu g/m^3$) From Operation of Pit Conversion and MOX Facilities in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	MOX	Total
Carbon monoxide	8 hours	10,000	34.1	0.144	0.103	34.3
	1 hour	40,000	48.3	0.978	0.704	50.0
Nitrogen dioxide	Annual	100	0.25	0.0166	0.0144	0.281
PM_{10}	Annual	50	0.0179	0.000415	0.00101	0.0193
	24 hours	150	0.77	0.00461	0.0113	0.786
Sulfur dioxide	Annual	50	1.63	0.000282	0.000946	1.63
	24 hours	260	8.91	0.00313	0.0105	8.92
	3 hours	1,300	29.6	0.0213	0.0715	29.7
	[Text deleted.]					
	1 hour	660[b]	32.9	0.064	0.214	33.2
Total suspended particulates	Annual	60	0.0179	0.000415	0.00101	0.0193
	24 hours	150	0.77	0.00461	0.0113	0.786
[Text deleted.]						

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
[Text deleted.]
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.6 Immobilization and MOX Facilities

G.1.2.6.1 Construction of Immobilization and MOX Facilities

Potential air quality impacts from modification of FMEF and construction of support facilities for collocating immobilization (ceramic or glass) and MOX facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–22.

Table G–22. Emissions (kg/yr) From Construction of Immobilization and MOX Facilities Collocated in FMEF at Hanford

	Immobilization (Ceramic or Glass)				MOX			
Pollutant	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	3,900	0	0	49,000	778	0	0	37,300
Nitrogen dioxide	10,100	0	0	13,100	2,009	0	0	10,000
PM_{10}	770[b]	8,860[b]	733[b]	44,700	154	2,830	435[b]	34,100
Sulfur dioxide	1,020	0	0	0	204	0	0	0
Volatile organic compounds	800	0	0	6,040	160	0	0	4,600
Total suspended particulates	770	16,900	733	44,700	154	5,590	435	34,100
Toxics[c]	0	0	0	0	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for the purpose of this analysis resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1998b, 1999a, 1999b.

Maximum air pollutant concentrations from construction activities are summarized in Table G–23.

Table G–23. Concentrations ($\mu g/m^3$) From Construction of Immobilization and MOX Facilities Collocated in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Immobilization (Ceramic or Glass)	MOX	Total
Carbon monoxide	8 hours	10,000	34.1	1.08	0.215	35.4
	1 hour	40,000	48.3	7.34	1.46	57.1
Nitrogen dioxide	Annual	100	0.25	0.0838	0.0167	0.351
PM_{10}	Annual	50	0.0179	0.0849	0.0274	0.13
	24 hours	150	0.77	3.85	1.32	5.94
Sulfur dioxide	Annual	50	1.63	0.00846	0.00169	1.64
	24 hours	260	8.91	0.094	0.0188	9.02
	3 hours	1,300	29.6	0.64	0.128	30.4
	[Text deleted.]					
	1 hour	660[b]	32.9	1.92	0.383	35.2
Total suspended particulates	Annual	60	0.0179	0.153	0.051	0.222
	24 hours	150	0.77	7.05	2.4	10.2
Toxics[c]	Annual	0.12	0.000006	0	0.000008	0.000014

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.6.2 Operation of Immobilization and MOX Facilities

Potential air quality impacts from operation of the collocated immobilization (ceramic or glass) and MOX and support facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–24. Stack parameters used for modeling were as stated previously.

Table G–24. Emissions (kg/yr) From Operation of Immobilization and MOX Facilities Collocated in FMEF at Hanford

	Immobilization			MOX		
Pollutant	**Emergency Generator**	**Ceramic or Glass Process**	**Vehicles**	**Emergency Generator**	**Process**	**Vehicles**
Carbon monoxide	1,460	0	52,700	374	0	34,200
Nitrogen dioxide	6,790	0	14,100	1,738	0	9,170
PM_{10}	480	0	48,100	122	0	31,200
Sulfur dioxide	450	0	0	114	0	0
Volatile organic compounds	550	0	6,490	142	0	4,210
Total suspended particulates	480	0	48,100	122	0	31,200
[Text deleted.]						

[Text deleted.]
Key: FMEF, Fuels and Materials Examination Facility.
Source: UC 1998b, 1999a, 1999b.

Maximum air pollutant concentrations resulting from the emergency diesel generators and process sources are summarized in Table G–25. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–25. Concentrations ($\mu g/m^3$) From Operation of Immobilization and MOX Facilities Collocated in FMEF at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Immobilization (Ceramic or Glass)	MOX	Total With Ceramic or Glass
Carbon monoxide	8 hours	10,000	34.1	0.404	0.103	34.6
	1 hour	40,000	48.3	2.75	0.704	51.8
Nitrogen dioxide	Annual	100	0.25	0.0563	0.0144	0.321
PM_{10}	Annual	50	0.0179	0.00398	0.00101	0.023
	24 hours	150	0.77	0.0443	0.0113	0.825
Sulfur dioxide	Annual	50	1.63	0.00373	0.000946	1.64
	24 hours	260	8.91	0.0415	0.0105	8.96
	3 hours	1,300	29.6	0.282	0.0715	30
	[Text deleted.]					
	1 hour	660[b]	32.9	0.847	0.214	34
Total suspended particulates	Annual	60	0.0179	0.00398	0.00101	0.0229
	24 hours	150	0.77	0.0443	0.0113	0.825
[Text deleted.]						

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
[Text deleted.]
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.7 Pit Conversion, Immobilization, and MOX Facilities

G.1.2.7.1 Construction of Pit Conversion, Immobilization, and MOX Facilities

Potential air quality impacts from modification of FMEF for pit disassembly and conversion and plutonium conversion and immobilization (ceramic or glass), and new construction of MOX and support facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from soil disturbance by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–26.

Maximum air pollutant concentrations from construction activities are summarized in Table G–27.

Table G–26. Emissions (kg/yr) From Construction of Pit Conversion and Immobilization Facilities in FMEF and MOX in New Construction at Hanford

	Pit Conversion		Immobilization				MOX			
Pollutant	Diesel Equipment & Construction Fugitive Emissions	Veh	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Veh	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Veh
CO	1,000	11,300	3,060	0	0	40,000	3,840	0	0	37,600
NO_2	2,400	3,040	7,890	0	0	10,700	10,080	0	0	10,100
PM_{10}	3,500	10,300	600[b]	6,770	560[b]	36,500	768[b]	6,880	1,460[b]	34,400
SO_2	160	0	800	0	0	0	1,020	0	0	0
VOC	200	1,400	620	0	0	4,930	792	0	0	4,640
TSP	9,300	10,300	600	13,100	560	36,500	768	13,600	1,460	34,400
Toxics[c]	0	0	0	0	0	0	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as TSP emissions for the purpose of this analysis resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Key: CO, carbon monoxide; FMEF, Fuels and Materials Examination Facility; NO_2, nitrogen dioxide; SO_2, sulfur dioxide; TSP, total suspended particulates; Veh, vehicles; VOC, volatile organic compounds.
Source: UC 1998a, 1998b, 1999a, 1999b.

Table G–27. Concentrations ($\mu g/m^3$) From Construction of Pit Conversion and Immobilization Facilities in FMEF and MOX in New Construction at Hanford

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	Immobilization (Ceramic or Glass)	MOX	Total
Carbon monoxide	8 hours	10,000	34.1	0.277	0.846	1.06	36.3
	1 hour	40,000	48.3	1.88	5.76	7.22	63.2
Nitrogen dioxide	Annual	100	0.25	0.0199	0.0654	0.0836	0.419
PM_{10}	Annual	50	0.0179	0.029	0.0651	0.0744	0.186
	24 hours	150	0.77	0.323	2.96	3.27	7.32
Sulfur dioxide	Annual	50	1.63	0.00133	0.00664	0.00846	1.65
	24 hours	260	8.91	0.0148	0.0737	0.094	9.09
	3 hours	1,300	29.6	0.1	0.502	0.64	30.9
	[Text deleted.]						
	1 hour	660[b]	32.9	0.301	1.5	1.92	36.6
Total suspended particulates	Annual	60	0.0179	0.0771	0.117	0.132	0.344
	24 hours	150	0.77	0.857	5.58	5.88	13.1
Toxics[c]	Annual	0.12	0.000006	0	0	0.000008	0.000014

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.1.2.7.2 Operation of Pit Conversion, Immobilization, and MOX Facilities

Potential air quality impacts from operation of the three surplus plutonium disposition and support facilities at Hanford were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–28. Stack parameters used for modeling were as stated previously.

Table G–28. Emissions (kg/yr) From Operation of Pit Conversion and Immobilization Facilities in FMEF and MOX in New Construction at Hanford

	Pit Conversion			Immobilization			MOX		
Pollutant	**EG**	**Process**	**Veh**	**EG**	**Process[a]**	**Veh**	**EG**	**Process**	**Veh**
Carbon monoxide	520	0	41,800	1,460	0	52,700	374	0	34,200
Nitrogen dioxide	2,000	0	11,200	6,790	0	14,100	1,738	0	9,170
PM_{10}	50	0	38,100	480	0	48,100	122	0	31,200
Sulfur dioxide	34	0	0	450	0	0	114	0	0
Volatile organic compounds	58	0	5,150	550	0	6,490	142	0	4,210
Total suspended particulates	50	0	38,100	480	0	48,100	122	0	31,200
[Text deleted.]									

[a] Ceramic or glass.
Key: EG, emergency generator; FMEF, Fuels and Materials Examination Facility; Veh, vehicle.
Source: UC 1998a, 1998b, 1999a, 1999b.

Maximum air pollutant concentrations resulting from the emergency diesel generators and process sources, plus the No Action concentrations, are summarized in Table G–29. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–29. Concentrations ($\mu g/m^3$) From Operation of Pit Conversion and Immobilization Facilities in FMEF and MOX in New Construction at Hanford

Pollutant	**Averaging Period**	**Most Stringent Standard or Guideline[a]**	**No Action**	**Pit Conversion**	**Immobilization (Ceramic or Glass)**	**MOX**	**Total**
Carbon monoxide	8 hours	10,000	34.1	0.144	0.404	0.103	34.7
	1 hour	40,000	48.3	0.978	2.75	0.704	52.7
Nitrogen dioxide	Annual	100	0.25	0.0166	0.0563	0.0144	0.337
PM_{10}	Annual	50	0.0179	0.000415	0.00398	0.00101	0.023
	24 hours	150	0.77	0.00461	0.0442	0.0113	0.83
Sulfur dioxide	Annual	50	1.63	0.000282	0.00373	0.000946	1.64
	24 hours	260	8.91	0.00313	0.0415	0.0105	8.97
	3 hours	1,300	29.6	0.0213	0.282	0.0715	30
	[Text deleted.]						
	1 hour	660[b]	32.9	0.064	0.847	0.214	34
Total suspended particulates	Annual	60	0.0179	0.000415	0.00398	0.00101	0.023
	24 hours	150	0.77	0.00461	0.0443	0.0113	0.83
[Text deleted.]							

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] At Hanford, the level is not to be exceeded more than twice in any 7 consecutive days.
[Text deleted.]
Key: FMEF, Fuels and Materials Examination Facility.
Source: EPA 1997; WDEC 1994.

G.2 INEEL

G.2.1 Assessment Data

Emission rates for criteria, hazardous, and toxic pollutants at INEEL are presented in Table F.1.2.4–1 of the *Storage and Disposition PEIS* (DOE 1996a:F-10). These emission rates were used as input into the modeled No Action pollutant concentrations presented in that document and reflect INEEL facility emissions for 1990, which were assumed to be representative of No Action for 2005. The storage alternative selected for INEEL results in no change in these concentrations (DOE 1996a:4-138). Other onsite activities related to programs analyzed in EISs for spent nuclear fuel and waste management are also included in the estimates of the No Action concentration for surplus plutonium disposition shown in Table G–30. For the cumulative impacts analysis, additional emissions from the proposed Advanced Mixed Waste Treatment Project are also considered. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–30. Estimated Concentrations ($\mu g/m^3$) From No Action at INEEL

Pollutant	Averaging Period	PEIS Estimated Base Year (2005)	Other Onsite From PEIS	No Action	AMWTP[a]
Carbon monoxide	8 hours	284	18	302	0.85
	1 hour	614	605	1,219	115
Nitrogen dioxide	Annual	4	7	11	0.34
PM_{10}	Annual	3	0	3	0.006
	24 hours	33	6	39	4.6
Sulfur dioxide	Annual	6	0	6	0.012
	24 hours	135	2	137	4.5
	3 hours	579	12	591	25
Benzene	Annual	0.029	0	0.029	0.0001
[Text deleted.]					

[a] Contribution from the Advanced Mixed Waste Treatment Project proposed action with microencapsulation or vitrification (included in cumulative impacts analysis).

Key: AMWTP, *INEEL Advanced Mixed Waste Treatment Project Final EIS*; PEIS, *Storage and Disposition PEIS*.

Source: DOE 1996a:4-138, 4-928, 4-929; DOE 1999.

G.2.2 Facilities

G.2.2.1 Pit Conversion Facility

G.2.2.1.1 Construction of Pit Conversion Facility

Potential air quality impacts from modification of the Fuel Processing Facility (FPF) and construction of new support facilities at INEEL for pit disassembly and conversion were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from soil disturbance by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from construction of a new facility are higher than for modification of an existing facility described previously. Emissions from these sources are summarized in Table G–31.

Maximum air pollutant concentrations from construction activities are summarized in Table G–32 but are not expected to result in the exceedance of the ambient air quality standards.

Table G–31. Emissions (kg/yr) From Construction of Pit Conversion Facility in FPF at INEEL

Pollutant	Diesel Equipment and Construction Fugitive Emissions	Vehicles
Carbon monoxide	1,300	44,100
Nitrogen dioxide	5,600	11,100
PM_{10}	3,900	33,300
Sulfur dioxide	370	0
Volatile organic compounds	460	5,390

Key: FPF, Fuel Processing Facility.
Source: UC 1998c.

Table G–32. Concentrations ($\mu g/m^3$) From Construction of Pit Conversion Facility in FPF at INEEL

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	302	0.524	303
	1 hour	40,000	1,219	1.42	1,220
Nitrogen dioxide	Annual	100	11	0.0658	11.1
PM_{10}	Annual	50	3	0.0458	3.05
	24 hours	150	39	0.585	39.6
Sulfur dioxide	Annual	80	6	0.00434	6
	24 hours	365	137	0.0555	137
	3 hours	1,300	591	0.223	591

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Key: FPF, Fuel Processing Facility.
Source: EPA 1997; ID DHW 1995.

G.2.2.1.2 Operation of Pit Conversion Facility

Potential air quality impacts from operation of the pit conversion and support facilities at INEEL were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–33. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 35 m (115 ft) height, 1.82 m (6.0 ft) diameter, stack exit temperature of 11 C (52 F), and an exit velocity of 0.03 m/s (0.1 ft/s). The boiler stack was modeled with a 45.7 m (150 ft) height, 1.85 m (6.1 ft) diameter, stack exit temperature of 174 C (345 F), and an exit velocity of 3.25 m/s (10.7 ft/s) (UC 1998c).

Table G–33. Emissions (kg/yr) From Operation of Pit Conversion Facility in FPF at INEEL

Pollutant	Boilers	Emergency Generator	Process	Vehicles
Carbon monoxide	580	520	0	74,100
Nitrogen dioxide	18,000	2,000	0	18,600
PM_{10}	1,250	50	0	56,000
Sulfur dioxide	30,000	34	0	0
Volatile organic compounds	62	58	0	9,050

Key: FPF, Fuel Processing Facility.
Source: UC 1998c.

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–34.

Table G–34. Concentrations ($\mu g/m^3$) From Operation of Pit Conversion Facility in FPF at INEEL

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	302	0.253	302
	1 hour	40,000	1,219	0.80	1,220
Nitrogen dioxide	Annual	100	11	0.0838	11.1
PM_{10}	Annual	50	3	0.00477	3.00
	24 hours	150	39	0.0494	39.1
Sulfur dioxide	Annual	80	6	0.101	6.10
	24 hours	365	137	1.01	138
	3 hours	1,300	591	5.42	596

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Key: FPF, Fuel Processing Facility.
Source: EPA 1997; ID DHW 1995.

At the nearest prevention of significant deterioration (PSD) Class I area, Craters of the Moon National Monument, the contribution to air pollutant concentrations is less than 0.01 $\mu g/m^3$ for nitrogen dioxide, particulate matter with an aerodynamic diameter less than or equal to 10 μm (PM_{10}), and sulfur dioxide, except for the 24-hr sulfur dioxide value, which is 0.05 $\mu g/m^3$, and the 3-hr sulfur dioxide value, which is 0.23 $\mu g/m^3$. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

G.2.2.2 MOX Facility

G.2.2.2.1 Construction of MOX Facility

Potential air quality impacts from construction of new MOX and support facilities at INEEL were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from construction of a new facility are higher than for modification of an existing facility described previously. Emissions from these sources are summarized in Table G–35.

Table G–35. Emissions (kg/yr) From Construction of New MOX Facility at INEEL

Pollutant	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	3,840	0	0	114,000
Nitrogen dioxide	10,080	0	0	28,600
PM_{10}	768	6,860	1,460	85,900
Sulfur dioxide	1,020	0	0	0
Volatile organic compounds	792	0	0	13,900
Toxics[b]	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Source: UC 1998d.

Maximum air pollutant concentrations from construction activities are summarized in Table G–36.

Table G–36. Concentrations ($\mu g/m^3$) From Construction of New MOX Facility at INEEL

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	302	1.54	304
	1 hour	40,000	1,219	4.18	1,220
Nitrogen dioxide	Annual	100	11	0.118	11.1
PM_{10}	Annual	50	3	0.105	3.11
	24 hours	150	39	5.32	44.3
Sulfur dioxide	Annual	80	6	0.012	6.01
	24 hours	365	137	0.153	137
	3 hours	1,300	591	0.614	592
Toxics[b]	Annual	0.12	0.029	0.00001	0.029

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
Source: EPA 1997; ID DHW 1995.

G.2.2.2.2 Operation of MOX Facility

Potential air quality impacts from operation of the new MOX and support facilities at INEEL were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–37. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 8 m (26 ft) height, 0.3048 m (1.0 ft) diameter, stack exit temperature of 11 C (52 F), and an exit velocity of 0.03 m/s (0.1 ft/s). The boiler stack was modeled with a 45.7 m (150 ft) height, 1.85 m (6.1 ft) diameter, stack exit temperature of 174 C (345 F), and exit velocity of 3.25 m/s (10.7 ft/s) (UC 1998d).

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–38.

Table G–37. Emissions (kg/yr) From Operation of New MOX Facility at INEEL

Pollutant	Boilers	Emergency Generator	Process	Vehicles
Carbon monoxide	4,800	374	0	77,600
Nitrogen dioxide	12,000	1,738	0	19,500
PM_{10}	636	122	0	58,600
Sulfur dioxide	72,600	114	0	0
Volatile organic compounds	0	142	0	9,470
[Text deleted.]				

[Text deleted.]
Source: UC 1998d.

Table G–38. Concentrations ($\mu g/m^3$) From Operation of New MOX Facility at INEEL

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	302	0.509	303
	1 hour	40,000	1,219	2.34	1,220
Nitrogen dioxide	Annual	100	11	0.0606	11.1
PM_{10}	Annual	50	3	0.00356	3.
	24 hours	150	39	0.0396	39.
Sulfur dioxide	Annual	80	6	0.244	6.24
	24 hours	365	137	2.45	139
	3 hours	1,300	591	13.2	604
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[Text deleted.]
Source: EPA 1997; ID DHW 1995.

At the nearest PSD Class I area, Craters of the Moon National Monument, the contribution to air pollutant concentrations is less than 0.01 $\mu g/m^3$ for nitrogen dioxide and PM_{10}. For sulfur dioxide the annual value is 0.01 $\mu g/m^3$, the 24-hr value is 0.11 $\mu g/m^3$, and the 3-hr value is 0.46 $\mu g/m^3$. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

G.2.2.3 Pit Conversion and MOX Facilities

G.2.2.3.1 Construction of Pit Conversion and MOX Facilities

Potential air quality impacts from modification of FPF for pit disassembly and conversion and construction of new MOX and support facilities at INEEL were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from construction of a new facility are higher than for modification of an existing facility described previously. Emissions from these sources are summarized in Table G–39.

Table G–39. Emissions (kg/yr) From Construction of Pit Conversion Facility in FPF and New MOX Facility at INEEL

	Pit Conversion		MOX			
Pollutant	**Diesel Equipment and Construction Fugitive Emissions**	**Vehicles**	**Diesel Equipment**	**Construction Fugitive Emissions[a]**	**Concrete Batch Plant**	**Vehicles**
Carbon monoxide	1,300	44,100	3,840	0	0	114,000
Nitrogen dioxide	5,600	11,100	10,080	0	0	28,600
PM_{10}	3,900	33,300	768	6,860	1,460	85,900
Sulfur dioxide	370	0	1,020	0	0	0
Volatile organic compounds	460	5,390	792	0	0	13,900
Toxics[b]	0	0	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Key: FPF, Fuel Processing Facility.
Source: UC 1998c, 1998d.

Maximum air pollutant concentrations from construction activities are summarized in Table G–40.

Table G–40. Concentrations ($\mu g/m^3$) From Construction of Pit Conversion Facility in FPF and New MOX Facility at INEEL

Pollutant	**Averaging Period**	**Most Stringent Standard or Guideline[a]**	**No Action**	**Pit Conversion**	**MOX**	**Total**
Carbon monoxide	8 hours	10,000	302	0.524	1.55	304
	1 hour	40,000	1,219	1.42	4.18	1,220
Nitrogen dioxide	Annual	100	11	0.0658	0.118	11.2
PM_{10}	Annual	50	3	0.0458	0.105	3.15
	24 hours	150	39	0.585	5.32	44.9
Sulfur dioxide	Annual	80	6	0.00434	0.012	6.02
	24 hours	365	137	0.0555	0.153	137
	3 hours	1,300	591	0.223	0.614	592
Toxics[b]	Annual	0.12	0.029	0	0.00001	0.029

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
Key: FPF, Fuel Processing Facility.
Source: EPA 1997; ID DHW 1995.

G.2.2.3.2 Operation of Pit Conversion and MOX Facilities

Potential air quality impacts from operation of the new pit conversion, MOX, and support facilities at INEEL were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from boilers, emissions from emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–41. Stack parameters used for modeling were as stated previously.

Table G–41. Emissions (kg/yr) From Operation of Pit Conversion Facility in FPF and New MOX Facility at INEEL

	Pit Conversion				MOX			
Pollutant	Boilers	Emergency Generator	Process	Vehicles	Boilers	Emergency Generator	Process	Vehicles
Carbon monoxide	580	520	0	74,100	4,800	374	0	77,600
Nitrogen dioxide	18,000	2,000	0	18,600	12,000	1,738	0	19,500
PM_{10}	1,250	50	0	56,000	636	122	0	58,600
Sulfur dioxide	30,000	34	0	0	72,600	114	0	0
Volatile organic compounds	62	58	0	9,050	0	142	0	9,470
[Text deleted.]								

[Text deleted.]
Key: FPF, Fuel Processing Facility.
Source: UC 1998c, 1998d.

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–42.

Table G–42. Concentrations ($\mu g/m^3$) From Operation of Pit Conversion Facility in FPF and New MOX Facility at INEEL

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	MOX	Total
Carbon monoxide	8 hours	10,000	302	0.253	0.509	303
	1 hour	40,000	1,219	0.80	2.34	1,220
Nitrogen dioxide	Annual	100	11	0.0838	0.0606	11.1
PM_{10}	Annual	50	3	0.00477	0.00356	3.01
	24 hours	150	39	0.0494	0.0396	39.1
Sulfur dioxide	Annual	80	6	0.101	0.244	6.35
	24 hours	365	137	1.01	2.45	140
	3 hours	1,300	591	5.42	13.2	610
[Text deleted.]						

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[Text deleted.]
Key: FPF, Fuel Processing Facility.
Source: EPA 1997; ID DHW 1995.

At the nearest PSD Class I area, Craters of the Moon National Monument, the contribution to air pollutant concentrations are 0.01 $\mu g/m^3$ or less for nitrogen dioxide and PM_{10}. For sulfur dioxide the annual value is 0.01 $\mu g/m^3$, the 24-hr value is 0.16 $\mu g/m^3$, and the 3-hr value is 0.69 $\mu g/m^3$. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

G.3 PANTEX

G.3.1 Assessment Data

Emission rates for criteria, hazardous, and toxic air pollutants at Pantex are presented in Table 4.7.2.1–3 of the *Final Environmental Impact Statement for the Continued Operation of Pantex* (DOE 1996c:4-147). These emission rates were used as input into the modeled pollutant concentrations presented in that document and reflect Pantex facility emissions for over a 10-year period to about 2006. These concentrations are assumed to be representative of No Action for 2005 and include the upgrade storage alternative selected for Pantex and discussed in the *Storage and Disposition PEIS* (DOE 1996a:4-190). Other onsite activities related to programs analyzed in EISs for stockpile stewardship management and waste management are added to these concentrations as shown in Table G–43. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–43. Estimated Concentrations ($\mu g/m^3$) From No Action at Pantex

Pollutant	Averaging Period	PEIS No Action[a]	Other Onsite From PEIS	No Action
Carbon monoxide	8 hours	602	17.5	620
	1 hour	2,900	92.8	2,990
Nitrogen dioxide	Annual	0.542	1.4	1.94
PM_{10}	Annual	8.73	0.06	8.79
	24 hours	88.5	0.93	89.4
Sulfur dioxide	Annual	0	0	0
	24 hours	0.00002	0	0.00002
	3 hours	0.00008	0	0.00008
	30 minutes	0.00016	0	0.00016
Total suspended particulates	3 hours	(a)	(a)	(a)
	1 hour	(a)	(a)	(a)
Benzene	Annual	0.0547	0	0.0547
	1 hour	19.4	0	19.4
[Text deleted.]				

[a] Three- and 1-hr concentrations for total suspended particulates were not reported in the source document.
[Text deleted.]
Key: PEIS, *Storage and Disposition PEIS*.
Source: DOE 1996a:4-936, 4-937; 1996c:4-139.

G.3.2 Facilities

G.3.2.1 Pit Conversion Facility

G.3.2.1.1 Construction of Pit Conversion Facility

Potential air quality impacts from construction of new pit conversion and support facilities at Pantex were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–44.

Maximum air pollutant concentrations from construction activities are summarized in Table G–45.

Table G–44. Emissions (kg/yr) From Construction of New Pit Conversion Facility at Pantex

Pollutant	Diesel Equipment and Construction Fugitive Emissions	Vehicles
Carbon monoxide	6,400	40,500
Nitrogen dioxide	29,200	11,200
PM_{10}	20,300	38,900
Sulfur dioxide	1,900	0
Volatile organic compounds	2,400	5,140
Total suspended particulates	47,500	38,900

Source: UC 1998e.

Table G–45. Concentrations ($\mu g/m^3$) From Construction of New Pit Conversion Facility at Pantex

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	620	3.77	623
	1 hour	40,000	2,990	23.5	3,020
Nitrogen dioxide	Annual	100	1.94	0.501	2.44
PM_{10}	Annual	50	8.79	0.349	9.14
	24 hours	150	89.4	4.18	93.6
Sulfur dioxide	Annual	80	0	0.0326	0.0326
	24 hours	365	0.00002	0.392	0.392
	3 hours	1,300	0.00008	1.71	1.71
	30 minutes	1,048	0.00016	6.98	6.98
Total suspended particulates	3 hours	200	(b)	42.7	42.7
	1 hour	400	(b)	174	174

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Three- and 1-hr concentrations for total suspended particulates were not listed in the source document.
Source: EPA 1997; TNRCC 1997a, 1997b.

G.3.2.1.2 Operation of Pit Conversion Facility

Potential air quality impacts from operation of the new pit conversion and support facilities at Pantex were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–46. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 35 m (115 ft) height, 1.82 m (6.0 ft) diameter, stack exit temperature of 20 C (68 F), and an exit velocity of 0.03 m/s (0.1 ft/s). The boiler stack was modeled with a 19.8 m (65 ft) height, 1.7 m (5.6 ft) diameter, stack exit temperature of 124 C (255 F), and an exit velocity of 6.2 m/s (20 ft/s) (UC 1998e).

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators and process sources, plus the No Action concentrations, are summarized in Table G–47. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–46. Emissions (kg/yr) From Operation of New Pit Conversion Facility at Pantex

Pollutant	Boilers	Emergency Generator	Process	Vehicles
Carbon monoxide	780	520	0	38,800
Nitrogen dioxide	700	2,000	0	10,800
PM_{10}	300	50	0	37,300
Sulfur dioxide	13	34	0	0
Volatile organic compounds	132	58	0	4,920
Total suspended particulates	300	50	0	37,300

Source: UC 1998e.

Table G–47. Concentrations ($\mu g/m^3$) From Operation of New Pit Conversion Facility at Pantex

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	620	0.381	620
	1 hour	40,000	2,990	2.14	2,990
Nitrogen dioxide	Annual	100	1.94	0.0374	1.98
PM_{10}	Annual	50	8.79	0.00215	8.79
	24 hours	150	89.4	0.0225	89.5
Sulfur dioxide	Annual	80	0	0.00064	0.00064
	24 hours	365	0.00002	0.00753	0.00755
	3 hours	1,300	0.00008	0.0327	0.0328
	30 minutes	1,048	0.00016	0.129	0.129
Total suspended particulates	3 hours	200	(b)	0.0937	0.0937
	1 hour	400	(b)	0.273	0.273

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Three- and 1-hr concentrations for total suspended particulates were not listed in the source document.
Source: EPA 1997; TNRCC 1997a, 1997b.

G.3.2.2 MOX Facility

G.3.2.2.1 Construction of MOX Facility

Potential air quality impacts from construction of new MOX and support facilities at Pantex were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–48.

Maximum air pollutant concentrations from construction activities are summarized in Table G–49.

Table G–48. Emissions (kg/yr) From Construction of New MOX Facility at Pantex

Pollutant	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	3,840	0	0	35,800
Nitrogen dioxide	10,080	0	0	9,930
PM_{10}	768[b]	6,890	1,460[b]	34,400
Sulfur dioxide	1,020	0	0	0
Volatile organic compounds	792	0	0	4,540
Total suspended particulates	768	13,700	1,460	34,400
Toxics[c]	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for the purpose of this analysis resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Source: UC 1998f.

Table G–49. Concentrations ($\mu g/m^3$) From Construction of New MOX Facility at Pantex

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	620	2.26	622
	1 hour	40,000	2,990	14.1	3,010
Nitrogen dioxide	Annual	100	1.94	0.173	2.12
PM_{10}	Annual	50	8.79	0.154	8.94
	24 hours	150	89.4	7.31	96.7
Sulfur dioxide	Annual	80	0	0.0175	0.018
	24 hours	365	0.00002	0.21	0.21
	3 hours	1,300	0.00008	0.917	0.918
	30 minutes	1,048	0.00016	3.75	3.75
Total suspended particulates	3 hours	200	(b)	57.4	57.4
	1 hour	400	(b)	234	234
Toxics[c]	Annual	3[d]	0.0547	0.00002	0.0547
	1 hour	75[d]	19.4	0.0162	19.4

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Three- and 1-hr concentrations for total suspended particulates were not listed in the source document.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
[d] Effects-screening level of the Texas Natural Resource Conservation Commission. Such levels are not ambient air standards, but merely "tools" used by the Toxicology and Risk Assessment staff to evaluate impacts of air pollutant emissions. Thus, exceedance of the screening levels by ambient air contaminants does not necessarily indicate a problem. That circumstance, however, would prompt a more thorough evaluation.
[Text deleted.]
Source: EPA 1997; TNRCC 1997a, 1997b.

G.3.2.2.2 Operation of MOX Facility

Potential air quality impacts from operation of the new MOX and support facilities at Pantex were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–50. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 8 m (26 ft) height, 0.3048 m

Table G–50. Emissions (kg/yr) From Operation of New MOX Facility at Pantex

Pollutant	Boilers	Emergency Generator	Process	Vehicles
Carbon monoxide	1,080	374	0	34,800
Nitrogen dioxide	1,470	1,738	0	9,660
PM_{10}	247	122	0	33,400
Sulfur dioxide	11	114	0	0
Volatile organic compounds	102	142	0	4,410
Total suspended particulates	247	122	0	33,400
[Text deleted.]				

Source: UC 1998f.

(1.0 ft) diameter, stack exit temperature of 20 C (68 F), and an exit velocity of 0.03 m/s (0.1 ft/s). The boiler stack was modeled with a 19.8 m (65 ft) height, 1.7 m (5.6 ft) diameter, stack exit temperature of 124 C (255 F), and an exit velocity of 6.2 m/s (20 ft/s) (UC 1998f).

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators and process sources, plus the No Action concentrations, are summarized in Table G–51. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–51. Concentrations ($\mu g/m^3$) From Operation of New MOX Facility at Pantex

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	620	0.324	620
	1 hour	40,000	2,990	1.70	2,990
Nitrogen dioxide	Annual	100	1.94	0.0362	1.98
PM_{10}	Annual	50	8.79	0.00316	8.79
	24 hours	150	89.4	0.0352	89.5
Sulfur dioxide	Annual	80	0	0.00201	0.002
	24 hours	365	0.00002	0.0239	0.0239
	3 hours	1,300	0.00008	0.104	0.104
	30 minutes	1,048	0.00016	0.422	0.422
Total suspended particulates	3 hours	200	(b)	0.15	0.15
	1 hour	400	(b)	0.522	0.522
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Three- and 1-hr concentrations for total suspended particulates were not listed in the source document.
[Text deleted.]
Source: EPA 1997; TNRCC 1997a, 1997b.

G.3.2.3 Pit Conversion and MOX Facilities

G.3.2.3.1 Construction of Pit Conversion and MOX Facilities

Potential air quality impacts from construction of new pit conversion, MOX, and support facilities at Pantex were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction

equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–52.

Table G–52. Emissions (kg/yr) From Construction of New Pit Conversion and MOX Facilities at Pantex

	Pit Conversion		MOX			
Pollutant	Diesel Equipment and Construction Fugitive Emissions	Vehicles	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	6,400	40,500	3,840	0	0	35,800
Nitrogen dioxide	29,200	11,200	10,080	0	0	9,930
PM_{10}	20,300	38,900	768[b]	6,890	1,460[b]	34,400
Sulfur dioxide	1,900	0	1,020	0	0	0
Volatile organic compounds	2,400	5,140	792	0	0	4,540
Total suspended particulates	47,500	38,900	768	13,700	1,460	34,400
Toxics[c]	0	0	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for MOX for the purpose of this analysis resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Source: UC 1998e, 1998f.

Maximum air pollutant concentrations from construction activities are summarized in Table G–53.

Table G–53. Concentrations (μ/m^3) From Construction of New Pit Conversion and MOX Facilities at Pantex

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	MOX	Total
Carbon monoxide	8 hours	10,000	620	3.77	2.26	626
	1 hour	40,000	2,990	23.5	14.1	3,030
Nitrogen dioxide	Annual	100	1.94	0.501	0.173	2.62
PM_{10}	Annual	50	8.79	0.349	0.154	9.29
	24 hours	150	89.4	4.18	7.31	100
Sulfur dioxide	Annual	80	0	0.0326	0.0175	0.0501
	24 hours	365	0.00002	0.392	0.21	0.602
	3 hours	1,300	0.00008	1.71	0.917	2.63
	30 minutes	1,048	0.00016	6.98	3.75	10.7
Total suspended particulates	3 hours	200	(b)	42.7	57.4	100
	1 hour	400	(b)	174	234	409
Toxics[c]	Annual	3	0.0547	0.00	0.00002	0.0547
	1 hour	75	19.4	0.00	0.0162	19.4

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Three- and 1-hr concentrations for total suspended particulates were not listed in the source document.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
[Text deleted.]
Source: EPA 1997; TNRCC 1997a, 1997b.

G.3.2.3.2 Operation of Pit Conversion and MOX Facilities

Potential air quality impacts from operation of the new pit conversion, MOX, and support facilities at Pantex were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–54. Stack parameters used for modeling were as stated previously.

Table G–54. Emissions (kg/yr) From Operation of New Pit Conversion and MOX Facilities at Pantex

	Pit Conversion				MOX			
Pollutant	Boilers	Emergency Generator	Process	Vehicles	Boilers	Emergency Generator	Process	Vehicles
Carbon monoxide	780	520	0	38,800	1,080	374	0	34,800
Nitrogen dioxide	700	2,000	0	10,800	1,470	1,738	0	9,660
PM_{10}	300	50	0	37,300	247	122	0	33,400
Sulfur dioxide	13	34	0	0	11	114	0	0
Volatile organic compounds	132	58	0	4,920	102	142	0	4,410
Total suspended particulates	300	50	0	37,300	247	122	0	33,400
[Text deleted.]								

[Text deleted.]
Source: UC 1998e, 1998f.

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–55. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–55. Concentrations ($\mu g/m^3$) From Operation of New Pit Conversion and MOX Facilities at Pantex

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	MOX	Total
Carbon monoxide	8 hours	10,000	620	0.381	0.324	620
	1 hour	40,000	2,990	2.14	1.7	3,000
Nitrogen dioxide	Annual	100	1.94	0.0374	0.0362	2.02
PM_{10}	Annual	50	8.79	0.00215	0.00316	8.80
	24 hours	150	89.4	0.0225	0.0352	89.5
Sulfur dioxide	Annual	80	0	0.00064	0.00201	0.00265
	24 hours	365	0.00002	0.00753	0.0239	0.0315
	3 hours	1,300	0.00008	0.0327	0.104	0.137
	30 minutes	1,048	0.00016	0.129	0.422	0.551
Total suspended particulates	3 hours	200	(b)	0.0937	0.15	0.244
	1 hour	400	(b)	0.273	0.522	0.796
[Text deleted.]						

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Three- and 1-hr concentrations for total suspended particulates were not listed in the source document.
[Text deleted.]
Source: EPA 1997; TNRCC 1997a, 1997b.

G.4 SRS

G.4.1 Assessment Data

Emission rates for 1994 for criteria, hazardous, and toxic air pollutants at SRS were used as input into the modeling of pollutant concentrations presented in the *Savannah River Site Spent Nuclear Fuel Management Draft Environmental Impact Statement* (DOE 1998a:3-26). Presented in Table G–56 are concentration estimates assumed to be representative of the No Action Alternative at SRS for 2005. These estimates take into account the storage upgrade to accommodate nonpit material from the Rocky Flats Environmental Technology Site (DOE 1996a:4-299), as well as other onsite activities responsive to EIS Records of Decision in various program areas, specifically, foreign research reactor spent nuclear fuel, highly enriched uranium disposition, interim management of nuclear materials, stockpile stewardship and management, tritium supply and recycling, and waste management (DOE 1996a:4-953, 4-954). Other activities at SRS, which may occur during the time period 2005–2015, including operation of the Tritium Extraction Facility and spent nuclear fuel processing, are discussed in the cumulative impacts section. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–56. Estimated Concentrations ($\mu g/m^3$) From No Action at SRS

Pollutant	Averaging Period	1994 Baseline Concentration[a]	Other Onsite Sources	No Action	TEF	SNF
Carbon monoxide	8 hours	632	39.1	671	0.45	1.3
	1 hour	5,010	82.2	5,100	3.6	9.8
Nitrogen dioxide	Annual	8.8	2.57	11.4	0.0055	3.4
PM_{10}	Annual	4.8	0.14	4.94	0.00009	0.02
	24 hours	80.6	5.13	85.7	0.01	0.13
Sulfur dioxide	Annual	16.3	0.39	16.7	0.00009	0.02
	24 hours	215	6.96	222	0.001	0.13
	3 hours	690	34.9	725	0.088	0.98
Total suspended particulates	Annual	43.3	2.08	45.4	0.00016	0.02
Benzene	24 hours	20.7	0	20.7	0	0
[Text deleted.]						

[a] DOE 1998a:3-26.

Key: SNF, SRS *Spent Nuclear Fuel Management Draft EIS*; TEF, *Construction and Operation of a Tritium Extraction Facility at SRS Draft EIS*.

Source: DOE 1995a:E-10–E-13; 1995b:5-3; 1995c: vol. 1, app. C, 5-9; 1995d:4-408; 1996a:4-299; 1996d:4-26; 1998a:5-4; 1998b:4-6.

G.4.2 Facilities

G.4.2.1 Pit Conversion Facility

G.4.2.1.1 Construction of Pit Conversion Facility

Potential air quality impacts from construction of new pit conversion and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from construction of a new facility are higher than for modification of an existing facility described previously. Emissions from these sources are summarized in Table G–57.

Table G–57. Emissions (kg/yr) From Construction of New Pit Conversion Facility at SRS

Pollutant	Diesel Equipment and Construction Fugitive Emissions	Vehicles
Carbon monoxide	6,400	38,600
Nitrogen dioxide	29,200	11,200
PM_{10}	20,300	39,500
Sulfur dioxide	1,900	0
Volatile organic compounds	2,400	5,160
Total suspended particulates	47,500	39,500

Source: UC 1998g.

Maximum air pollutant concentrations from construction activities are summarized in Table G–58.

Table G–58. Concentrations ($\mu g/m^3$) From Construction of New Pit Conversion Facility at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	671	0.911	672
	1 hour	40,000	5,100	4.14	5,100
Nitrogen dioxide	Annual	100	11.4	0.0601	11.4
PM_{10}	Annual	50	4.94	0.0418	4.98
	24 hours	150	85.7	1.03	86.8
Sulfur dioxide	Annual	80	16.7	0.00391	16.7
	24 hours	365	222	0.0964	222
	3 hours	1,300	725	0.578	726
Total suspended particulates	Annual	75	45.4	0.0977	45.5

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Source: EPA 1997; SCDHEC 1996.

G.4.2.1.2 Operation of Pit Conversion Facility

Potential air quality impacts from operation of the new pit conversion and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–59. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 35 m (115 ft) height, 1.82 m (6 ft) diameter, stack exit temperature of 20 C (68 F), and an exit velocity of 0.03 m/s (0.1 ft/s). The boiler stack was modeled with a 38.1 m (125 ft) height, 3.01 m (9.9 ft) diameter, stack exit temperature of 160 C (320 F), and an exit velocity of 10.67 m/s (35 ft/s) (UC 1998g).

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–60. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–59. Emissions (kg/yr) From Operation of New Pit Conversion Facility at SRS

Pollutant	Boilers	Emergency Generator	Process	Vehicles
Carbon monoxide	587	520	0	39,600
Nitrogen dioxide	20,000	2,000	0	11,500
PM_{10}	1,400	50	0	40,500
Sulfur dioxide	33,300	34	0	0
Volatile organic compounds	69	58	0	5,300
Total suspended particulates	1,400	50	0	40,500

Source: UC 1998g.

Table G–60. Concentrations ($\mu g/m^3$) From Operation of New Pit Conversion Facility at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	671	0.0942	672
	1 hour	40,000	5,100	0.373	5,100
Nitrogen dioxide	Annual	100	11.4	0.0287	11.4
PM_{10}	Annual	50	4.94	0.00182	4.94
	24 hours	150	85.7	0.026	85.8
Sulfur dioxide	Annual	80	16.7	0.041	16.7
	24 hours	365	222	0.56	223
	3 hours	1,300	725	1.46	726
Total suspended particulates	Annual	75	45.4	0.00182	45.4

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Source: EPA 1997; SCDHEC 1996.

G.4.2.2 [Text deleted.]

G.4.2.3 Immobilization Facility

G.4.2.3.1 Construction of Immobilization Facility

Potential air quality impacts from construction of new immobilization (ceramic or glass) and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from construction of a new facility are higher than for modification of an existing facility described previously. Emissions from these sources are summarized in Table G–61.

Maximum air pollutant concentrations from construction activities are summarized in Table G–62.

Table G–61. Emissions (kg/yr) From Construction of New Immobilization Facility at SRS

Pollutant	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	20,300	0	0	48,700
Nitrogen dioxide	52,700	0	0	14,100
PM_{10}	3,930[b]	11,300	2,610[b]	49,900
Sulfur dioxide	24,400	0	0	0
Volatile organic compounds	3,900	0	0	6,520
Total suspended particulates	3,930	21,600	2,610	49,900

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for this analysis, resulting in some overestimate of PM_{10} concentrations.
Source: UC 1999c, 1999d.

Table G–62. Concentrations ($\mu g/m^3$) From Construction of New Immobilization Facility at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Ceramic or Glass	Total
Carbon monoxide	8 hours	10,000	671	2.89	674
	1 hour	40,000	5,100	13.1	5,110
Nitrogen dioxide	Annual	100	11.4	0.108	11.5
PM_{10}	Annual	50	4.94	0.0366	4.98
	24 hours	150	85.7	3.56	89.3
Sulfur dioxide	Annual	80	16.7	0.0502	16.7
	24 hours	365	222	1.24	223
	3 hours	1,300	725	7.42	732
Total suspended particulates	Annual	75	45.4	0.0581	45.4

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Source: EPA 1997; SCDHEC 1996.

G.4.2.3.2 Operation of Immobilization Facility

Potential air quality impacts from operation of new immobilization (ceramic or glass) and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–63. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 41 m (135 ft) height, 5.1 m (17 ft) diameter, stack exit temperature of 20 C (68 F), and an exit velocity of 7 m/s (23 ft/s). The boiler stack was modeled with a 38.1 m (125 ft) height, 3.01 m (9.9 ft) diameter, stack exit temperature of 160 C (320 F), and an exit velocity of 10.67 m/s (35 ft/s) (UC 1999c, 1999d).

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–64. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–63. Emissions (kg/yr) From Operation of New Immobilization Facility at SRS

Pollutant	Boilers	Emergency Generator	Ceramic or Glass Process	Vehicles[a]
Carbon monoxide	370	980	0	46,500
Nitrogen dioxide	12,100	4,530	0	13,500
PM_{10}	940	320	0	47,600
Sulfur dioxide	35,500	300	0	0
Volatile organic compounds	80	370	0	6,220
Total suspended particulates	940	320	0	47,600

[a] For 50-t (55-ton) case.
Source: UC 1999c, 1999d.

Table G–64. Concentrations ($\mu g/m^3$) From Operation of New Immobilization Facility at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Ceramic or Glass	Total
Carbon monoxide	8 hours	10,000	671	0.152	671
	1 hour	40,000	5,100	0.657	5,100
Nitrogen dioxide	Annual	100	11.4	0.0242	11.4
PM_{10}	Annual	50	4.94	0.00181	4.94
	24 hours	150	85.7	0.032	85.8
Sulfur dioxide	Annual	80	16.7	0.0442	16.7
	24 hours	365	222	0.61	223
	3 hours	1,300	725	1.63	727
Total suspended particulates	Annual	75	45.4	0.00181	45.4

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
Source: EPA 1997; SCDHEC 1996.

G.4.2.4 MOX Facility

G.4.2.4.1 Construction of MOX Facility

Potential air quality impacts from construction of new MOX and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from construction of a new facility are higher than for modification of an existing facility described previously. Emissions from these sources are summarized in Table G–65.

Maximum air pollutant concentrations from construction activities are summarized in Table G–66.

Table G–65. Emissions (kg/yr) From Construction of New MOX Facility at SRS

Pollutant	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	3,840	0	0	33,600
Nitrogen dioxide	10,100	0	0	9,740
PM_{10}	768[b]	6,870	1,310[b]	34,400
Sulfur dioxide	1,020	0	0	0
Volatile organic compounds	792	0	0	4,490
Total suspended particulates	768	13,600	1,310	34,400
Toxics[c]	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for this analysis resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Source: UC 1998h.

Table G–66. Concentrations ($\mu g/m^3$) From Construction of New MOX Facility at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	671	0.547	672
	1 hour	40,000	5,100	2.48	5,100
Nitrogen dioxide	Annual	100	11.4	0.0207	11.4
PM_{10}	Annual	50	4.94	0.0185	4.96
	24 hours	150	85.7	1.8	87.5
Sulfur dioxide	Annual	80	16.7	0.0021	16.7
	24 hours	365	222	0.0517	222
	3 hours	1,300	725	0.31	725
Total suspended particulates	Annual	75	45.4	0.0321	45.4
Toxics[b]	24 hours	150	20.7	0.000224	20.7

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
Source: EPA 1997; SCDHEC 1996.

G.4.2.4.2 Operation of MOX Facility

Potential air quality impacts from operation of the new MOX and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–67. Emergency generators were modeled as a volume source. The process stack for radiological emissions was modeled with a 8 m (26 ft) height, 0.3048 m (1.0 ft) diameter, stack exit temperature of 20 C (68 F), and an exit velocity of 0.03 m/s (0.1 ft/s). The boiler stack was modeled with a 38.1 m (125 ft) height, 3.01 m (9.9 ft) diameter, stack exit temperature of 160 C (320 F), and an exit velocity of 10.67 m/s (35 ft/s) (UC 1998h).

Table G–67. Emissions (kg/yr) From Operation of New MOX Facility at SRS

Pollutant	Boilers	Emergency Generator	Process	Vehicles
Carbon monoxide	2,040	374	0	32,700
Nitrogen dioxide	5,640	1,740	0	9,470
PM_{10}	276	122	0	33,400
Sulfur dioxide	31,300	114	0	0
Volatile organic compounds	0	142	0	4,370
Total suspended particulates	276	122	0	33,400
[Text deleted.]				

[Text deleted.]
Source: UC 1998h.

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–68. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–68. Concentrations ($\mu g/m^3$) From Operation of New MOX Facility at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Contribution	Total
Carbon monoxide	8 hours	10,000	671	0.123	671
	1 hour	40,000	5,100	0.371	5,100
Nitrogen dioxide	Annual	100	11.4	0.0105	11.4
PM_{10}	Annual	50	4.94	0.00059	4.94
	24 hours	150	85.7	0.0108	85.7
Sulfur dioxide	Annual	80	16.7	0.0387	16.7
	24 hours	365	222	0.531	222
	3 hours	1,300	725	1.39	726
Total suspended particulates	Annual	75	45.4	0.00059	45.4
[Text deleted.]					

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[Text deleted.]
Source: EPA 1997; SCDHEC 1996.

G.4.2.5 Pit Conversion and Immobilization Facilities

G.4.2.5.1 Construction of Pit Conversion and Immobilization Facilities

Potential air quality impacts from construction of new pit conversion, immobilization (ceramic or glass), and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. [Text deleted.] Construction impacts result from emissions from fuel-burning construction equipment, particulate matter emissions from soil disturbance by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–69.

Table G–69. Emissions (kg/yr) From Construction of New Pit Conversion and Immobilization Facilities at SRS

	Pit Conversion		Immobilization (Ceramic or Glass)			
Pollutant	Diesel Equipment and Construction Fugitive Emissions	Veh	Construction Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Veh
Carbon monoxide	6,400	38,600	20,300	0	0	48,700
Nitrogen dioxide	29,200	11,200	52,700	0	0	14,100
PM_{10}	20,300	39,500	3,930[b]	11,300	2,610[b]	49,900
Sulfur dioxide	1,900	0	24,400	0	0	0
Volatile organic compounds	2,400	5,160	3,900	0	0	6,520
Total suspended particulates	47,500	39,500	3,930	21,600	2,610	49,900

[a] Does not include fugitive emissions from concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for this analysis, resulting in some overestimate of PM_{10} concentrations.
Key: Veh, vehicles.
Source: UC 1998g, 1999c, 1999d.

Maximum air pollutant concentrations from construction activities are summarized in Table G–70.

Table G–70. Concentrations ($\mu g/m^3$) From Construction of New Pit Conversion and Immobilization Facilities at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	Immobilization (Ceramic or Glass)	Total
Carbon monoxide	8 hours	10,000	671	0.911	2.89	675
	1 hour	40,000	5,100	4.14	13.1	5,110
Nitrogen dioxide	Annual	100	11.4	0.0601	0.108	11.5
PM_{10}	Annual	50	4.94	0.0418	0.0366	5.02
	24 hours	150	85.7	1.03	3.56	90.3
Sulfur dioxide	Annual	80	16.7	0.00391	0.0502	16.7
	24 hours	365	222	0.0964	1.24	223
	3 hours	1,300	725	0.578	7.42	733
Total suspended particulates	Annual	75	45.4	0.0977	0.0581	45.5

[a] The more stringent of the Federal and state standards is presented if both exist for the averaging period.
Source: EPA 1997; SCDHEC 1996.

G.4.2.5.2 Operation of Pit Conversion and Immobilization Facilities

Potential air quality impacts from operation of new pit conversion, immobilization (ceramic or glass), and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving

materials and wastes. Emissions from these sources are summarized in Table G–71. Stack parameters used for modeling were as stated previously.

Table G–71. Emissions (kg/yr) From Operation of New Pit Conversion and Immobilization Facilities at SRS

	Pit Conversion				Immobilization			
Pollutant	**Boilers**	**EG**	**Process**	**Veh**	**Boilers**	**EG**	**Process**	**Veh[a]**
Carbon monoxide	587	520	0	39,600	370	980	0	46,500
Nitrogen dioxide	20,000	2,000	0	11,500	12,100	4,530	0	13,500
PM_{10}	1,400	50	0	40,500	940	320	0	47,600
Sulfur dioxide	33,300	34	0	0	35,500	300	0	0
Volatile organic compounds	69	58	0	5,300	80	370	0	6,220
Total suspended particulates	1,400	50	0	40,500	940	320	0	47,600

[a] For 50-t (55-ton) case.
[Text deleted.]
Key: EG, emergency generator; Veh, vehicles.
Source: UC 1998g, 1999c, 1999d.

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–72. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–72. Concentrations ($\mu g/m^3$) From Operation of New Pit Conversion and Immobilization Facilities at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	Immobilization (Ceramic or Glass)	Total
Carbon monoxide	8 hours	10,000	671	0.0942	0.152	671
	1 hour	40,000	5,100	0.373	0.657	5,100
Nitrogen dioxide	Annual	100	11.4	0.0287	0.0242	11.4
PM_{10}	Annual	50	4.94	0.00182	0.00181	4.94
	24 hours	150	85.7	0.026	0.032	85.8
Sulfur dioxide	Annual	80	16.7	0.041	0.0442	16.8
	24 hours	365	222	0.56	0.61	223
	3 hours	1,300	725	1.46	1.63	728
Total suspended particulates	Annual	75	45.4	0.00182	0.00181	45.4

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[Text deleted.]
Source: EPA 1997; SCDHEC 1996.

G.4.2.6 Pit Conversion and MOX Facilities

G.4.2.6.1 Construction of Pit Conversion and MOX Facilities

Potential air quality impacts from construction of new pit conversion, MOX, and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Construction impacts result from emissions from diesel

fuel-burning construction equipment, particulate matter emissions from soil disturbance by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–73.

Table G–73. Emissions (kg/yr) From Construction of New Pit Conversion and MOX Facilities at SRS

	Pit Conversion		MOX			
Pollutant	Diesel Equipment and Construction Fugitive Emissions	Vehicles	Diesel Equipment	Construction Fugitive Emissions[a]	Concrete Batch Plant	Vehicles
Carbon monoxide	6,400	38,600	3,840	0	0	33,600
Nitrogen dioxide	29,200	11,200	10,100	0	0	9,740
PM_{10}	20,300	39,500	768[b]	6,870	1,310[b]	34,400
Sulfur dioxide	1,900	0	1,020	0	0	0
Volatile organic compounds	2,400	5,160	792	0	0	4,490
Total suspended particulates	47,500	39,500	768	13,600	1,310	34,400
Toxics[c]	0	0	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for this analysis, resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Source: UC 1998g, 1998h.

Maximum air pollutant concentrations from construction activities are summarized in Table G–74.

Table G–74. Concentrations ($\mu g/m^3$) From Construction of New Pit Conversion and MOX Facilities at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	MOX	Total
Carbon monoxide	8 hours	10,000	671	0.911	0.547	672
	1 hour	40,000	5,100	4.14	2.48	5,110
Nitrogen dioxide	Annual	100	11.4	0.0601	0.0207	11.5
PM_{10}	Annual	50	4.94	0.0418	0.0185	5.
	24 hours	150	85.7	1.03	1.8	88.5
Sulfur dioxide	Annual	80	16.7	0.00391	0.0021	16.7
	24 hours	365	222	0.0964	0.0517	222
	3 hours	1,300	725	0.578	0.31	726
Total suspended particulates	Annual	75	45.4	0.0977	0.0321	45.5
Toxics[b]	24 hours	150	20.7	0	0.000224	20.7

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Various toxic air pollutants (e.g., lead, benzene, and hexane) could be emitted during construction and were analyzed as benzene.
Source: EPA 1997; SCDHEC 1996.

G.4.2.6.2 Operation of Pit Conversion and MOX Facilities

Potential air quality impacts from operation of the new pit conversion and MOX facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–75. Stack parameters used for modeling were as stated previously.

Table G–75. Emissions (kg/yr) From Operation of New Pit Conversion and MOX Facilities at SRS

	Pit Conversion				MOX			
Pollutant	**Boilers**	**EG**	**Process**	**Vehicles**	**Boilers**	**EG**	**Process**	**Vehicles**
Carbon monoxide	587	520	0	39,600	2,040	374	0	32,700
Nitrogen dioxide	20,000	2,000	0	11,500	5,640	1,740	0	9,470
PM_{10}	1,400	50	0	40,500	276	122	0	33,400
Sulfur dioxide	33,300	34	0	0	31,300	114	0	0
Volatile organic compounds	69	58	0	5,300	0	142	0	4,370
Total suspended particulates	1,400	50	0	40,500	276	122	0	33,400
[Text deleted.]								

[Text deleted.]
Key: EG, emergency generator.
Source: UC 1998g, 1998h.

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–76. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–76. Concentrations ($\mu g/m^3$) From Operation of New Pit Conversion and MOX Facilities at SRS

Pollutant	**Averaging Period**	**Most Stringent Standard or Guideline[a]**	**No Action**	**Pit Conversion**	**MOX**	**Total**
Carbon monoxide	8 hours	10,000	671	0.0942	0.123	671
	1 hour	40,000	5,100	0.373	0.371	5,100
Nitrogen dioxide	Annual	100	11.4	0.0287	0.0105	11.4
PM_{10}	Annual	50	4.94	0.00182	0.00059	4.94
	24 hours	150	85.7	0.026	0.0108	85.7
Sulfur dioxide	Annual	80	16.7	0.041	0.0387	16.8
	24 hours	365	222	0.56	0.531	223
	3 hours	1,300	725	1.46	1.39	728
Total suspended particulates	Annual	75	45.4	0.00182	0.00059	45.4
[Text deleted.]						

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[Text deleted.]
Source: EPA 1997; SCDHEC 1996.

G.4.2.7 Immobilization and MOX Facilities

G.4.2.7.1 Construction of Immobilization and MOX Facilities

Potential air quality impacts from construction of new immobilization (ceramic or glass), MOX, and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. [Text deleted.] Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from disturbance of soil by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–77.

Table G–77. Emissions (kg/yr) From Construction of New Immobilization and MOX Facilities at SRS

	Immobilization (Ceramic or Glass)				MOX			
Pollutant	DE	CFE[a]	CBP	Veh	DE	CFE[a]	CBP	Veh
Carbon monoxide	20,300	0	0	48,700	3,840	0	0	33,600
Nitrogen dioxide	52,700	0	0	14,100	10,100	0	0	9,740
PM_{10}	3,930[b]	11,300	2,610[b]	49,900	768[b]	6,810	1,310[b]	34,400
Sulfur dioxide	24,400	0	0	0	1,020	0	0	0
Volatile organic compounds	3,900	0	0	6,520	792	0	0	4,490
Total suspended particulates	3,930	21,600	2,610	49,900	768	13,600	1,310	34,400
Toxics[c]	0	0	0	0	0	<1	0	0

[a] Does not include fugitive emissions from concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for this analysis, resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Key: CBP, concrete batch plant; CFE, construction fugitive emissions; DE, diesel equipment; Veh, vehicles.
Source: UC 1998h, 1999c, 1999d.

Maximum air pollutant concentrations from construction activities are summarized in Table G–78.

Table G–78. Concentrations ($\mu g/m^3$) From Construction of New Immobilization and MOX Facilities at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Immobilization (Ceramic or Glass)	MOX	Total
Carbon monoxide	8 hours	10,000	671	2.89	0.547	675
	1 hour	40,000	5,100	13.1	2.48	5,110
Nitrogen dioxide	Annual	100	11.4	0.108	0.0207	11.5
PM_{10}	Annual	50	4.94	0.0366	0.0185	5
	24 hours	150	85.7	3.56	1.8	91.1
Sulfur dioxide	Annual	80	16.7	0.0502	0.0021	16.7
	24 hours	365	222	1.24	0.0517	223
	3 hours	1,300	725	7.42	0.31	733
Total suspended particulates	Annual	75	45.4	0.0581	0.0321	45.5
Toxics[b]	24 hours	150	20.7	0	0.000224	20.7

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
Source: EPA 1997; SCDHEC 1996.

G.4.2.7.2 Operation of Immobilization and MOX Facilities

Potential air quality impacts from operation of new immobilization (ceramic or glass), MOX, and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from boilers, emergency diesel generators, process emissions, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–79. Stack parameters used for modeling were as stated previously.

Table G–79. Emissions (kg/yr) From Operation of New Immobilization and MOX Facilities at SRS

	Immobilization				MOX			
Pollutant	**Boilers**	**Emergency Generator**	**Process[a]**	**Vehicles**	**Boilers**	**Emergency Generator**	**Process**	**Vehicles**
Carbon monoxide	370	980	0	44,400	2,040	374	0	32,700
Nitrogen dioxide	12,100	4,530	0	12,900	5,640	1,740	0	9,470
PM_{10}	940	320	0	45,400	276	122	0	33,400
Sulfur dioxide	35,500	300	0	0	31,300	114	0	0
Volatile organic compounds	80	370	0	5,940	0	142	0	4,370
Total suspended particulates	940	320	0	45,400	276	122	0	33,400
[Text deleted.]								

[a] Ceramic or glass.
[Text deleted.]
Source: UC 1998h, 1999c, 1999d.

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–80. Radiological impacts, including those from emissions to the air, are discussed in Appendix J.

Table G–80. Concentrations ($\mu g/m^3$) From Operation of New Immobilization and MOX Facilities at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Immobilization	MOX	Total
Carbon monoxide	8 hours	10,000	671	0.152	0.123	671
	1 hour	40,000	5,100	0.657	0.371	5,100
Nitrogen dioxide	Annual	100	11.4	0.0242	0.0105	11.4
PM_{10}	Annual	50	4.94	0.00181	0.00059	4.94
	24 hours	150	85.7	0.032	0.0108	85.8
Sulfur dioxide	Annual	80	16.7	0.0442	0.0388	16.8
	24 hours	365	222	0.61	0.531	223
	3 hours	1,300	725	1.63	1.39	728
Total suspended particulates	Annual	75	45.4	0.00181	0.00059	45.4
[Text deleted.]						

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[Text deleted.]
Source: EPA 1997; SCDHEC 1996.

G.4.2.8 Pit Conversion, Immobilization, and MOX Facilities

G.4.2.8.1 Construction of Pit Conversion, Immobilization, and MOX Facilities

Potential air quality impacts from construction of new pit conversion, immobilization (ceramic or glass), MOX, and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. [Text deleted.] Construction impacts result from emissions from diesel fuel-burning construction equipment, particulate matter emissions from soil disturbance by construction equipment and other vehicles (construction fugitive emissions), operation of a concrete batch plant, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–81.

Table G–81. Emissions (kg/yr) From Construction of New Pit Conversion, Immobilization, and MOX Facilities at SRS

	Pit Conversion		Immobilization (Ceramic or Glass)				MOX			
Pollutant	DE & CFE	Veh	DE	CFE[a]	CBP	Veh	DE	CFE[a]	CBP	Veh
Carbon monoxide	6,400	38,600	20,300	0	0	48,700	3,840	0	0	33,600
Nitrogen dioxide	29,200	11,200	52,700	0	0	14,100	10,080	0	0	9,740
PM_{10}	20,300	39,500	3,930[b]	11,300	2,610[b]	49,900	768[b]	6,870	1,310[b]	34,400
Sulfur dioxide	1,900	0	24,400	0	0	0	1,020	0	0	0
Volatile organic compounds	2,400	5,160	3,900	0	0	6,520	792	0	0	4,490
Total suspended particulates	47,500	39,500	3,930	21,600	2,610	49,900	768	13,600	1,310	34,400
Toxics[c]	0	0	0	0	0	0	0	<1	0	0

[a] Does not include fugitive emissions from the concrete batch plant.
[b] PM_{10} emissions were assumed to be the same as total suspended particulate emissions for this analysis, resulting in some overestimate of PM_{10} concentrations.
[c] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction.
Key: CBP, concrete batch plant; CFE, construction fugitive emissions; DE, diesel equipment; Veh, vehicles.
Source: UC 1998g, 1998h, 1999c, 1999d.

Maximum air pollutant concentrations from construction activities are summarized in Table G–82.

Table G–82. Concentrations ($\mu g/m^3$) From Construction of New Pit Conversion, Immobilization, and MOX Facilities at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	Immobilization (Ceramic or Glass)	MOX	Total
Carbon monoxide	8 hours	10,000	671	0.911	2.89	0.547	675
	1 hour	40,000	5,100	4.14	13.1	2.48	5,120
Nitrogen dioxide	Annual	100	11.4	0.0601	0.108	0.0207	11.6
PM_{10}	Annual	50	4.94	0.0418	0.0366	0.0185	5.04
	24 hours	150	85.7	1.03	3.56	1.8	92.1
Sulfur dioxide	Annual	80	16.7	0.00391	0.0502	0.0021	16.7
	24 hours	365	222	0.0964	1.24	0.0517	223
	3 hours	1,300	725	0.578	7.42	0.31	733
Total suspended particulates	Annual	75	45.4	0.0977	0.0581	0.0321	45.6
Toxics[b]	24 hours	150	20.7	0	0	0.000224	20.7

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.
[b] Various toxic air pollutants (e.g., lead, benzene, hexane) could be emitted during construction and were analyzed as benzene.
Source: EPA 1997; SCDHEC 1996.

G.4.2.8.2 Operation of Pit Conversion, Immobilization, and MOX Facilities

Potential air quality impacts from operation of the three surplus plutonium disposition and support facilities at SRS were analyzed using ISCST3 as described in Appendix F.1. Operational impacts result from emissions from emergency diesel generators, process emissions, steam boilers, employee vehicles, and trucks moving materials and wastes. Emissions from these sources are summarized in Table G–83. Stack parameters used for modeling were as stated previously.

Table G–83. Emissions (kg/yr) From Operation of New Pit Conversion, Immobilization, and MOX Facilities at SRS

	Pit Conversion				Immobilization				MOX			
Pollutant	Boilers	EG	Process	Veh	Boilers	EG	Process[a]	Veh	Boilers	EG	Process	Veh
CO	587	520	0	39,600	370	980	0	44,400	2,040	374	0	32,700
NO_2	20,000	2,000	0	11,500	12,100	4,530	0	12,900	5,640	1,740	0	9,470
PM_{10}	1,400	50	0	40,500	940	320	0	45,400	276	122	0	33,400
SO_2	33,300	34	0	0	35,500	300	0	0	31,300	114	0	0
VOC	69	58	0	5,300	80	370	0	5,940	0	142	0	4,370
TSP	1,400	50	0	40,500	940	320	0	45,400	276	122	0	33,400
[Text deleted.]												

[a] Ceramic or glass.
[Text deleted.]
Key: CO, carbon monoxide; EG, emergency generator; NO_2, nitrogen dioxide; SO_2, sulfur dioxide; TSP, total suspended particulates; Veh, vehicles; VOC, volatile organic compounds.
Source: UC 1998g, 1998h, 1999c, 1999d.

Maximum air pollutant concentrations resulting from the boilers, emergency diesel generators, and process sources, plus the No Action concentrations, are summarized in Table G–84. Radiological impacts, including those emissions to the air, are discussed in Appendix J.

Table G–84. Concentrations ($\mu g/m^3$) From Operation of New Pit Conversion, Immobilization, and MOX Facilities at SRS

Pollutant	Averaging Period	Most Stringent Standard or Guideline[a]	No Action	Pit Conversion	Immobilization (Ceramic or Glass)	MOX	Total
Carbon monoxide	8 hours	10,000	671	0.0942	0.152	0.123	671
	1 hour	40,000	5,100	0.373	0.657	0.371	5,100
Nitrogen dioxide	Annual	100	11.4	0.0287	0.0242	0.0105	11.4
PM_{10}	Annual	50	4.94	0.00182	0.00181	0.00059	4.94
	24 hours	150	85.7	0.0261	0.032	0.0108	85.8
Sulfur dioxide	Annual	80	16.7	0.041	0.0442	0.0387	16.8
	24 hours	365	222	0.56	0.61	0.531	224
	3 hours	1,300	725	1.46	1.63	1.39	729
Total suspended particulates	Annual	75	45.4	0.00182	0.00181	0.00059	45.4

[Text deleted.]

[a] The more stringent of the Federal and State standards is presented if both exist for the averaging period.

[Text deleted.]

Source: EPA 1997; SCDHEC 1996.

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WDEC (Washington Department of Ecology), 1994, *Washington Administrative Code, Title 173*, Chapter 173-460, "Controls for New Sources of Toxic Air Pollutants"; Chapter 173-470, "Standards for Particulate Matter"; Chapter 173-474, "Ambient Air Quality Standards for Sulfur Oxides"; Chapter 173-475, "Ambient Air Quality Standards for Carbon Monoxide, Ozone, and Nitrogen Dioxide"; Chapter 173-481, "Ambient Air Quality and Environmental Standards for Fluorides," January 14.

H.4 SRS

H.4.1 Assessment Data

Impacts on SRS waste management facilities were estimated using information on existing environmental conditions from Chapter 3 and information on the characteristics of the proposed surplus plutonium disposition facilities from Chapter 2 and the facility data reports. A description of the methods used to evaluate impacts on waste management is presented in Appendix F.8.

H.4.2 Facilities

H.4.2.1 Pit Conversion Facility

H.4.2.1.1 Construction of Pit Conversion Facility

Table H–27 compares the expected construction waste generation rates for the facilities that may be constructed at SRS with the existing site waste generation rates. No radioactive waste would be generated during the 3-year construction period because this action involves new construction only (UC 1998g). In addition, no soil contaminated with hazardous or radioactive constituents would be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and all applicable Federal and State regulations.

Table H–27. Potential Waste Management Impacts of Construction of New Pit Conversion Facility at SRS

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
Hazardous	50	74	68
Nonhazardous			
Liquid	5,300	416,100	1
Solid	120	6,670	2

[a] See definitions in Appendix F.8.
[b] UC 1998g. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.

Hazardous waste generated during construction includes liquids such as spent cleaning solutions, oils, hydraulic fluids, antifreeze solutions, paints and chemicals, and rags or wipes contaminated with these materials. These wastes are typically generated during construction of an industrial facility. Any hazardous waste generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial treatment and disposal facilities (UC 1998g). Hazardous waste generation for construction of this facility is estimated to be 68 percent of existing annual site waste generation. Because these wastes would be treated and disposed of at offsite commercial facilities, the additional waste load generated during construction should not have a major impact on the SRS hazardous waste management system.

Nonhazardous solid waste includes office garbage, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice, and shipped to commercial or municipal facilities for recycling or disposal (UC 1998g). Waste metals would be sent off the site for recycling and, therefore, were not included in the waste volumes. Nonhazardous-solid-waste generation during construction of this facility is estimated to be 2 percent of existing annual site waste generation. The

additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets (UC 1998g). To be conservative, it was assumed that all nonhazardous liquid waste generated during construction would be managed at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and managed at offsite facilities. Nonhazardous liquid waste generated for construction of this facility is estimated to be 1 percent of existing annual site waste generation, 2 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, less than 1 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, the management of this additional waste should not have a major impact on the system.

H.4.2.1.2 Operation of Pit Conversion Facility

The waste management facilities within the pit conversion facility would process, temporarily store, and ship all wastes generated. Table H–28 compares the expected waste generation rates from operating the new facility at SRS with the existing site waste generation rates. No HLW would be generated by the facility (UC 1998g). Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995b).

Table H–28. Potential Waste Management Impacts of Operation of New Pit Conversion Facility at SRS

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	18	427	4
LLW	60	10,043	1
Mixed LLW	1	1,135	<1
Hazardous	2	74	3
Nonhazardous			
Liquid	25,000	416,100	6
Solid	1,800	6,670	27

[a] See definitions in Appendix F.8.
[b] UC 1998g. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

TRU wastes generated during operations include spent filters, contaminated beryllium pieces and cuttings, used containers and equipment, paper and cloth wipes, analytical and quality-control samples, and solidified inorganic solutions. Lead-lined gloves are likely to be managed as mixed TRU waste. It is anticipated that all TRU waste

would be contact-handled waste. TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facility. Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU Waste Characterization and Certification Facility at SRS (UC 1998g). Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for this facility is estimated to be 4 percent of existing annual site waste generation and 1 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 180 m^3 (235 yd^3) of TRU waste would be generated over the 10-year operation period. This would be 3 percent of the 6,977 m^3 (9,126 yd^3) of contact-handled TRU waste currently in storage, and 1 percent of the 34,400-m^3 (44,995-yd^3) storage capacity available at SRS. Assuming that the waste were stored in 208-l (55-gal) drums each with a capacity of 0.21 m^3 (0.27 yd^3), about 860 drums would be required to store this waste. Assuming that these drums can be stacked two high, that each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space, a storage area of about 260 m^2 (310 yd^2) would be required. Impacts of the storage of additional quantities of TRU waste on less than 0.1 ha (0.25 acre) of land at SRS should not be major.

The 180 m^3 (235 yd^3) of TRU waste generated by this facility would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500 m^3 (220,400 yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW includes used equipment, wipes, protective clothing, solidified inorganic solutions, and tritium. It is likely that the LLW generated during operations would originate from activities in the processing areas containing the glovebox lines but not from operations within the gloveboxes. Operations within the gloveboxes are likely to generate mostly TRU waste. LLW would be treated, packaged, certified, and accumulated at the new facilities before being transferred for additional treatment and/or disposal in existing onsite facilities. Tritium recovered from pit disassembly would be disposed of as LLW (UC 1998g). A total of 600 m^3 (780 yd^3) of LLW would be generated over the operation period. LLW generation for this facility is estimated to be 1 percent of existing annual site waste generation, less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 2 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687-m^3/ha (4,598-yd^3/acre) disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 600 m^3 (780 yd^3) of waste would require 0.1 ha (0.25 acre) of disposal space at SRS. Therefore, impacts of the management of this additional LLW at SRS should not be major.

Mixed LLW includes lead shielding, solvents contaminated with plutonium, scintillation vials from the analytical laboratory, and hazardous constituents that were introduced as part of the incoming pits (UC 1998g). Mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan for SRS. Mixed LLW generation for this facility is estimated to be less than 1 percent of existing annual site waste generation, and less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility. Over the operating life of this facility, the 10 m^3 (13 yd^3) of mixed LLW generated would be 1 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations includes spent cleaning solutions, vacuum pump oils, film processing fluids, hydraulic fluids, antifreeze solutions, paints, chemicals, lead packaging, and contaminated rags or wipes. Hazardous waste would be packaged for treatment and disposal at a combination of onsite and offsite permitted facilities (UC 1998g). Assuming that all hazardous waste is managed on the site, hazardous waste

generation for this facility is estimated to be 3 percent of existing annual site waste generation, less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and less than 1 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage buildings. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system.

Nonhazardous solid waste includes office garbage, coal ash, machine shop waste, and other industrial wastes from utility and maintenance operations. Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling (UC 1998g). The remaining solid sanitary waste would be sent to the Three Rivers Landfill (DOE 1998a:3-42). Nonrecyclable, nonhazardous solid waste generated by this facility is estimated to be 27 percent of existing annual site waste generation. This additional waste load should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets and process wastewater from lab sinks and drains, mop water, cooling tower blowdown, and steam condensate. Wastewater would be treated, if necessary, before being discharged to the F-Area sanitary sewer system that connects to the Central Sanitary Wastewater Treatment Facility (UC 1998g). Nonhazardous liquid waste generated for this facility is estimated to be 6 percent of the existing annual site waste generation, 9 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 2 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore the management of this additional waste should not have a major impact on the system.

H.4.2.2 Immobilization Facility

H.4.2.2.1 Construction of Immobilization Facility

Table H–29 compares the expected construction waste generation rates for the facilities that may be constructed at SRS with the existing site waste generation rates. No radioactive waste would be generated during the 3-year construction period because this action involves new construction only (UC 1999c, 1999d). In addition, no soil contaminated with hazardous or radioactive constituents would be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and all applicable Federal and State regulations. Construction waste generation would be the same for the ceramic and glass immobilization technologies and is the same for the 17-t (19-ton) and 50-t (55-ton) immobilization scenarios (UC 1999c, 1999d).

Table H–29. Potential Waste Management Impacts of Construction of New Immobilization Facility at SRS

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
Hazardous	35	74	47
Nonhazardous			
Liquid	21,000	416,100	5
Solid	2,200	6,670	33

[a] See definitions in Appendix F.8.
[b] UC 1999c, 1999d. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[Text deleted.]

[Text deleted.]

Hazardous waste generated during construction includes liquids such as spent cleaning solutions, lubricants, oils, hydraulic fluids, antifreeze solutions, paints and chemicals, and rags or wipes contaminated with these materials. These wastes are typically generated during construction of an industrial facility. Any hazardous waste generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial treatment and disposal facilities (UC 1999c, 1999d). Hazardous waste generation for construction of this facility is estimated to be 47 percent of existing annual site waste generation. Because these wastes would be treated and disposed of at offsite commercial facilities, the additional waste load generated during construction should not have a major impact on the SRS hazardous waste management system.

Nonhazardous solid waste includes office garbage, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice and shipped to commercial or municipal facilities for recycling or disposal (UC 1999c, 1999d). Waste metals would be sent off the site for recycling and, therefore, were not included in the waste volumes. Nonhazardous-solid-waste generation during construction of this facility is estimated to be 33 percent of existing annual site waste generation. Because these wastes would be managed at commercial or municipal facilities, the additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets (UC 1999c, 1999d). To be conservative, it was assumed that all nonhazardous liquid waste generated during construction would be managed at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and managed at offsite facilities. Nonhazardous liquid waste generated for construction of this facility is estimated to be 5 percent of existing annual site waste generation, 8 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 1 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, the management of this additional waste should not have a major impact on the system.

H.4.2.2.2 Operation of Immobilization Facility

The waste management facilities within the immobilization facility would process, temporarily store, and ship all wastes generated. Table H–30 compares the expected waste generation rates from operating the new facility at SRS with the existing site waste generation rates. Although HLW would be used in the immobilization process, no HLW would be generated by the facility (UC 1999c, 1999d). Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Waste generation would be the same for the ceramic and glass immobilization technologies, although the amount of waste generated would vary between the 17-t and the 50-t immobilization cases (UC 1999c, 1999d). Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995b).

Table H–30. Potential Waste Management Impacts of Operation of New Immobilization Facility at SRS

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b] 17 t	Estimated Waste Generation (m^3/yr)[b] 50 t	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation 17 t	Percent of Site Waste Generation 50 t
TRU[d]	95	130	427	22	30
LLW	81	110	10,043	1	1
Mixed LLW	1	1	1,135	<1	<1
Hazardous	89	89	74	120	120
Nonhazardous					
Liquid	55,000	57,000	416,100	13	14
Solid	850	850	6,670	13	13

[a] See definitions in Appendix F.8.
[b] UC 1999c, 1999d. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

TRU wastes generated during operations include metal cladding from fuel elements, spent filters, contaminated beryllium pieces and cuttings, used containers and equipment, paper and cloth wipes, analytical and quality-control samples, and solidified inorganic solutions. Lead-lined gloves are likely to be managed as mixed TRU waste. It is anticipated that all TRU waste would be contact-handled waste. TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facility (UC 1999c, 1999d). Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU Waste Characterization and Certification Facility at SRS. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for this facility is estimated to be 22 to 30 percent of existing annual site waste generation and 6 to 8 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 950 to 1,300 m^3 (1,240 to 1,700 yd^3) of TRU waste would be generated over the 10-year operation period. This would be 14 to 19 percent of the 6,977 m^3 (9,126 yd^3) of contact-handled TRU waste currently in storage, and 3 to 4 percent of the 34,400-m^3 (44,995-yd^3) storage capacity available at SRS. Assuming that the waste were stored in 208-l (55-gal) drums each with a capacity of 0.21 m^3 (0.27 yd^3), about 4,500 to 6,000 drums would be required to store this waste. Assuming that these drums can be stacked two high, that each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space, a storage area of about 1,400 to 1,800 m^2 (1,670 to 2,150 yd^2) would be required. Impacts of the storage of additional quantities of TRU waste on 0.14 to 0.18 ha (0.35 to 0.44 acre) of land at SRS should not be major.

The 950 to 1,300 m^3 (1,240 to 1,700 yd^3) of TRU waste generated by this facility would be 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500 m^3 (220,400 yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW includes used equipment, wipes, protective clothing, and solidified inorganic solutions. It is likely that the LLW generated during operations would originate from activities in the processing areas containing the glovebox lines but not from operations within the gloveboxes. Operations within the gloveboxes are likely to generate mostly TRU waste. LLW would be treated, packaged, certified, and accumulated at the new facilities before being transferred for additional treatment and/or disposal in existing onsite facilities (UC 1999c, 1999d). A total

of 810 to 1,100-m^3 (1,060- to 1,440-yd^3) LLW would be generated over the operation period. LLW generation for this facility is estimated to be 1 percent of existing annual site waste generation, 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 3 to 4 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687-m^3/ha (4,598-yd^3/acre) disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 810 to 1,080 m^3 (1,060 to 1,413 yd^3) of waste would require approximately 0.1 to 0.12 ha (0.25 to 0.30 acre) of disposal space at SRS. Therefore, impacts of the management of this additional LLW at SRS should not be major.

Mixed LLW includes leaded shielding, solvents contaminated with plutonium, and scintillation vials from the analytical laboratory (UC 1999c, 1999d). Mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan for SRS. Mixed LLW generation for this facility is estimated to be less than 1 percent of existing annual site waste generation, and less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility. Over the operating life of this facility, the 10 m^3 (13 yd^3) of mixed LLW generated would be 1 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations includes spent cleaning solutions, lubricants, oils, film processing fluids, hydraulic fluids, coolants, paints, chemicals, batteries, fluorescent light tubes, and contaminated rags or wipes. Hazardous waste would be packaged for treatment and disposal at a combination of onsite and offsite permitted facilities (UC 1999c, 1999d). Assuming that all hazardous waste is managed on the site, hazardous waste generation for this facility is estimated to be 120 percent of existing annual site waste generation, but less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 17 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage buildings. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system.

Nonhazardous solid waste includes office garbage, coal ash, machine shop waste, and other industrial wastes from utility and maintenance operations. Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. Ash from the coal-fired steam generating plant would be disposed of in the onsite ash disposal landfills (UC 1999c, 1999d). The remaining solid sanitary waste would be sent to the Three Rivers Landfill (DOE 1998a:3-42). Nonrecyclable, nonhazardous solid waste generated by this facility is estimated to be 13 percent of existing annual site waste generation. This additional waste load should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets and wastewater from cooling tower blowdown and steam condensate. Nonhazardous wastewater would be treated, if necessary, before being discharged to the F-Area sanitary sewer system that connects to the Central Sanitary Wastewater Treatment Facility (UC 1999c, 1999d). Nonhazardous liquid waste generated for this facility is estimated to be 13 to 14 percent of the existing annual site waste generation, 20 to 21 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, and 4 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, the management of this additional waste should not have a major impact on the system.

H.4.2.3 MOX Facility

H.4.2.3.1 Construction of MOX Facility

Table H–31 compares the expected construction waste generation rates for the facility that may be constructed at SRS with the existing site waste generation rates. No radioactive waste would be generated during the 3-year construction period because this action involves new construction only (UC 1998h). In addition, no soil contaminated with hazardous or radioactive constituents would be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and all applicable Federal and State regulations.

Table H–31. Potential Waste Management Impacts From Construction of New MOX Facility at SRS

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
Hazardous	19	74	26
Nonhazardous			
Liquid	20,000	416,100	5
Solid	8,600	6,670	128

[a] See definitions in Appendix F.8.
[b] DOE 1999a; UC 1998h. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.

Hazardous waste generated during construction includes liquids such as spent cleaning solutions, oils, hydraulic fluids, antifreeze solutions, paints and chemicals, and rags or wipes contaminated with these materials. These wastes are typically generated during construction of an industrial facility. Any hazardous waste generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial treatment and disposal facilities (UC 1998h). Hazardous waste generation for construction of this facility is estimated to be 26 percent of existing annual site waste generation. Because these wastes would be treated and disposed at offsite commercial facilities, the additional waste load generated during construction should not have a major impact on the SRS hazardous waste management system.

Nonhazardous solid waste includes office garbage, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice and shipped to commercial or municipal facilities for recycling or disposal (UC 1998h). Waste metals would be sent off the site for recycling and, therefore, were not included in the waste volumes. Nonhazardous-solid-waste generation during construction of this facility is estimated to be 128 percent of existing annual site waste generation. Because these wastes would be managed at commercial or municipal facilities, the additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets and wastewater from dewatering (UC 1998h). To be conservative, it was assumed that all nonhazardous liquid waste generated during construction would be managed at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and managed at offsite facilities. Nonhazardous liquid waste generated for construction of this facility is estimated to be 5 percent of existing annual site waste generation, 7 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 1 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary

Wastewater Treatment Facility (Sessions 1997). Therefore, impacts on the system during construction should not be major.

H.4.2.3.2 Operation of MOX Facility

The waste management facilities within the MOX facility would process, temporarily store, and ship all wastes generated. Table H–32 compares the expected waste generation rates from operating the new facility at SRS with the existing site waste generation rates. No HLW would be generated by the facility (UC 1998h). Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with the current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995b).

Table H–32. Potential Waste Management Impacts From Operation of New MOX Facility at SRS

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	68	427	16
LLW	94	10,043	1
Mixed LLW	3	1,135	<1
Hazardous	3	74	4
Nonhazardous			
Liquid	26,000	416,100	6
Solid	440	6,670	7

[a] See definitions in Appendix F.8.
[b] DOE 1999a; UC 1998h. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

TRU wastes generated during operations include spent filters, used containers and equipment, paper and cloth wipes, analytical and quality-control samples, solidified inorganic solutions, and dirty plutonium oxide scrap. Lead-lined gloves are likely to be managed as mixed TRU waste. It is anticipated that all TRU waste would be contact-handled waste. TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facility (UC 1998h). Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU Waste Characterization and Certification Facility at SRS. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for this combination of facilities is estimated to be 16 percent of existing annual site waste generation and 4 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 680 m^3 (890 yd^3) of TRU waste would be generated over the 10-year operation period. This would be 10 percent of the 6,977 m^3 (9,126 yd^3) of contact-handled TRU waste currently

in storage, and 2 percent of the 34,400-m^3 (44,995-yd^3) storage capacity available at SRS. Assuming that the waste were stored in 208-l (55-gal) drums each with a capacity of 0.21 m^3 (0.27 yd^3), about 3,200 drums would be required to store this waste. Assuming that these drums can be stacked two high, that each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space, a storage area of about 960 m^2 (1,150 yd^2) would be required. Impacts of the storage of additional quantities of TRU waste on 0.1 ha (0.25 acre) of land at SRS should not be major.

The 960 m^3 (1,150 yd^3) of TRU waste generated by this facility would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500 m^3 (220,400 yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW includes used equipment, wipes, protective clothing, and solidified inorganic solutions. It is likely that the LLW generated during operations would originate from activities in the processing areas containing the glovebox lines but not from operations within the gloveboxes. Operations within the gloveboxes are likely to generate mostly TRU waste. LLW would be treated, packaged, certified, and accumulated at the new facility before being transferred for additional treatment and/or disposal in existing onsite facilities (UC 1998h). A total of 940 m^3 (1,230 yd^3) of LLW would be generated over the operation period. LLW generation for this facility is estimated to be 1 percent of existing annual site waste generation, 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 3 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687-m^3/ha (4,598-yd^3/acre) disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 940 m^3 (1,230 yd^3) of waste would require less than 0.11 ha (0.27 acre) of disposal space at SRS. Therefore, management of this additional LLW at SRS should have no major impact.

Mixed LLW includes solvents contaminated with plutonium, and scintillation vials from the analytical laboratory (UC 1998h). Mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan for SRS. Mixed LLW generation for this facility is estimated to be less than 1 percent of existing annual site waste generation, and less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility. Over the operating life of this facility, the 30-m^3 (39-yd^3) mixed LLW generated would be 2 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations includes spent cleaning solutions, lubricants, oils, film processing fluids, hydraulic fluids, antifreeze solutions, paints, chemicals, batteries, fluorescent light tubes, lead packaging, and contaminated rags or wipes. Hazardous waste would be packaged for treatment and disposal at a combination of onsite and offsite permitted facilities (UC 1998h). Assuming that all hazardous waste is managed on the site, hazardous waste generation for this facility is estimated to be 4 percent of existing annual site waste generation, less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 1 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage building. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system.

Nonhazardous solid waste includes office garbage, machine shop waste, and other industrial wastes from utility and maintenance operations. Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling (UC 1998h). The remaining solid sanitary waste would be sent to the Three Rivers Landfill (DOE 1998a:3-42). Nonrecyclable, nonhazardous solid waste generated by this facility is

estimated to be less than 7 percent of existing annual site waste generation. This additional waste load should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets; process wastewater from lab sinks and drains, mop water, cooling tower blowdown and steam condensate; and treated wastewater from the liquid effluent treatment system. Nonhazardous wastewater would be treated, if necessary, before being discharged to the F-Area sanitary sewer system that connects to the Central Sanitary Wastewater Treatment Facility (UC 1998h). Nonhazardous liquid waste generated for this facility is estimated to be 6 percent of the existing annual site waste generation, 10 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, and 2 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, impacts on the system should not be major.

H.4.2.4 Pit Conversion and Immobilization Facilities

H.4.2.4.1 Construction of Pit Conversion and Immobilization Facilities

Table H–33 compares the expected construction waste generation rates for the facilities that may be constructed at SRS with the existing site waste generation rates. No radioactive waste would be generated during the 3-year construction period because this action involves new construction only (UC 1998g, 1999c, 1999d). In addition, no soil contaminated with hazardous or radioactive constituents would be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and all applicable Federal and State regulations. Construction waste generation would be the same for the ceramic and glass immobilization technologies and the 17-t (19-ton) and 50-t (55-ton) immobilization scenarios (UC 1999c, 1999d).

[Text deleted.]

Table H–33. Potential Waste Management Impacts of Construction of New Pit Conversion and Immobilization Facilities at SRS

	Estimated Waste Generation (m^3/yr)[b]		SiteWaste	Percent of Site Waste Generation		
Waste Type[a]	Pit Conversion	Immobilization (Ceramic or Glass)	Generation (m^3/yr)[c]	Pit Conversion	Immobilization (Ceramic or Glass)	Both Facilities
Hazardous	50	35	74	68	47	115
Nonhazardous						
Liquid	5,300	21,000	416,100	1	5	6
Solid	120	2,200	6,670	2	33	35

[a] See definitions in Appendix F.8.
[b] UC 1998g, 1999c, 1999d. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[Text deleted.]

[Text deleted.]

Hazardous waste generated during construction includes liquids such as spent cleaning solutions, oils, hydraulic fluids, antifreeze solutions, paints and chemicals, and rags or wipes contaminated with these materials. These wastes are typically generated during construction of an industrial facility. Any hazardous waste generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial treatment and disposal facilities (UC 1998g, 1999c, 1999d). Hazardous waste generation for construction of this

combination of facilities is estimated to be 115 percent of existing annual site waste generation. Because these wastes would be treated and disposed at offsite commercial facilities, the additional waste load generated during construction should not have a major impact on the SRS hazardous waste management system.

Nonhazardous solid waste includes office garbage, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice, and shipped to commercial or municipal facilities for recycling or disposal (UC 1998g, 1999c, 1999d). Waste metals would be sent off the site for recycling, and therefore were not included in the waste volumes. Nonhazardous-solid-waste generation during construction of this combination of facilities is estimated to be 35 percent of existing annual site waste generation. Because these wastes would be managed at commercial or municipal facilities, the additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets (UC 1998g, 1999c, 1999d). To be conservative, it was assumed that all nonhazardous liquid waste generated during construction would be managed at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and managed at offsite facilities. Nonhazardous liquid waste generated for construction of this combination of facilities is estimated to be 6 percent of existing annual site waste generation, 9 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 2 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, impacts on the system during construction should not be major.

H.4.2.4.2 Operation of Pit Conversion and Immobilization Facilities

The waste management facilities within the pit conversion and immobilization facilities would process, temporarily store, and ship all wastes generated. Table H–34 compares the expected waste generation rates from operating the new facilities at SRS with the existing site waste generation rates. Although HLW would be used in the immobilization process, no HLW would be generated by the facilities (UC 1998g, 1999c, 1999d). Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed in accordance with current site practices. Waste generation would be the same for the ceramic and glass immobilization technologies, although the amount of waste generated would vary between the 17-t (19-ton) and 50-t (55-ton) immobilization cases (UC 1999c, 1999d). Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995b).

TRU wastes generated during operations include metal cladding from fuel elements, spent filters, contaminated beryllium pieces and cuttings, used containers and equipment, paper and cloth wipes, analytical and quality-control samples, and solidified inorganic solutions. Lead-lined gloves are likely to be managed as mixed TRU waste. It is anticipated that all TRU waste would be contact-handled waste. TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities (UC 1998g, 1999c, 1999d). Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU

Table H–34. Potential Waste Management Impacts of Operation of New Pit Conversion and Immobilization Facilities at SRS

	Estimated Waste Generation (m^3/yr)[b]			Site Waste Generation	Percent of Site Waste Generation			
	Pit	Immobilization			Pit	Immobilization		Both
Waste Type[a]	Conversion	17 t	50 t	(m^3/yr)[c]	Conversion	17 t	50 t	Facilities
TRU[d]	18	95	130	427	4	22	30	26 to 34
LLW	60	81	110	10,043	1	1	1	1 to 2
Mixed LLW	1	1	1	1,135	<1	<1	<1	<1
Hazardous	2	89	89	74	3	120	120	123
Nonhazardous								
Liquid	25,000	55,000	57,000	416,100	6	13	14	19 to 20
Solid	1,800	850	850	6,670	27	13	13	40

[a] See definitions in Appendix F.8.
[b] UC 1998g, 1999c, 1999d. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

Waste Characterization and Certification Facility at SRS. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for this combination of facilities is estimated to be 26 to 34 percent of existing annual site waste generation and 7 to 8 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 1,130 to 1,480 m^3 (1,478 to 1,936 yd^3) of TRU waste would be generated over the 10-year operation period. This would be 16 to 21 percent of the 6,977 m^3 (9,126 yd^3) of contact-handled TRU waste currently in storage, and 3 to 4 percent of the 34,400-m^3 (44,995-yd^3) storage capacity available at SRS. Assuming that the waste were stored in 208-l (55-gal) drums each with a capacity of 0.21 m^3 (0.27 yd^3), about 5,400 to 6,900 drums would be required to store this waste. Assuming that these drums can be stacked two high, that each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space, a storage area of about 1,600 to 2,100 m^2 (1,910 to 2,510 yd^2) would be required. Impacts of the storage of additional quantities of TRU waste on 0.16 to 0.21 ha (0.40 to 0.52 acre) of land at SRS should not be major.

The 1,130 to 1,480 m^3 (1,478 to 1,936 yd^3) of TRU waste generated by these facilities would be approximately 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500 m^3 (220,400 yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW includes used equipment, wipes, protective clothing, solidified inorganic solutions, and tritium. It is likely that the LLW generated during operations would originate from activities in the processing areas containing the glovebox lines but not from operations within the gloveboxes. Operations within the gloveboxes are likely to generate mostly TRU waste. LLW would be treated, packaged, certified, and accumulated at the new facilities before being transferred for additional treatment and/or disposal in existing onsite facilities (UC 1998g, 1999c, 1999d). Tritium recovered from pit disassembly would be disposed of as LLW (UC 1999d). A total of 1,410 to 1,700-m^3 (1,844 to 2,220-yd^3) LLW would be generated over the operation period. LLW generation for this combination of facilities is estimated to be 1 to 2 percent of existing annual site waste generation, 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 5 to 6 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687-m^3/ha (4,598-yd^3/acre) disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 1,410 to

1,700 m^3 (1,844 to 2,220 yd^3) of waste would require 0.16 to 0.19 ha (0.40 to 0.47 acre) of disposal space at SRS. Therefore, impacts of the management of this additional LLW at SRS should not be major.

Mixed LLW includes leaded shielding, solvents contaminated with plutonium, scintillation vials from the analytical laboratory, and hazardous constituents that were introduced as part of the incoming pits (UC 1998g, 1999c, 1999d). Mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan for SRS. Mixed LLW generation for this combination of facilities is estimated to be less than 1 percent of existing annual site waste generation, and less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility. Over the operating life of these facilities, the 20 m^3 (26 yd^3) of mixed LLW generated would be 1 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations includes spent cleaning solutions, vacuum pump oils, film processing fluids, hydraulic fluids, antifreeze solutions, paints, chemicals, batteries, fluorescent light tubes, lead packaging, and contaminated rags or wipes. Hazardous waste would be packaged for treatment and disposal at a combination of onsite and offsite permitted facilities (UC 1998g, 1999c, 1999d). Assuming that all hazardous waste is managed on the site, hazardous waste generation for this combination of facilities is estimated to be 123 percent of existing annual site waste generation, but only 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 18 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage building. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system.

Nonhazardous solid waste includes office garbage, coal ash, machine shop waste, and other industrial wastes from utility and maintenance operations. Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling (UC 1998g, 1999c, 1999d). Ash from the coal-fired steam generating plant would be disposed of in the onsite ash disposal landfills (UC 1999c, 1999d). The remaining solid sanitary waste would be sent to the Three Rivers Landfill (DOE 1998a:3-42). Nonrecyclable, nonhazardous solid waste generated by this combination of facilities is estimated to be 40 percent of existing annual site waste generation. This additional waste load should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets and process wastewater from lab sinks and drains, mop water, cooling tower blowdown, and steam condensate. Nonhazardous wastewater would be treated, if necessary, before being discharged to the F-Area sanitary sewer system that connects to the Central Sanitary Wastewater Treatment Facility (UC 1998g, 1999c, 1999d). Nonhazardous liquid waste generated for this combination of facilities is estimated to be 19 to 20 percent of the existing annual site waste generation, 29 to 30 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, and 6 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, impacts on the system should not be major.

H.4.2.5 Pit Conversion and MOX Facilities

H.4.2.5.1 Construction of Pit Conversion and MOX Facilities

Table H–35 compares the expected construction waste generation rates for the facilities that may be constructed at SRS with the existing site waste generation rates. No radioactive waste would be generated because all construction would involve new buildings (UC 1998g, 1998h). In addition, no soil contaminated with hazardous

or radioactive constituents would be generated during the 3-year construction period. However, if any were generated, the waste would be managed in accordance with site practice and all applicable Federal and State regulations.

Table H–35. Potential Waste Management Impacts of Construction of New Pit Conversion and MOX Facilities at SRS

	Estimated Waste Generation (m^3/yr)[b]		Site Waste	Percent of Site Waste Generation		
Waste Type[a]	Pit Conversion	MOX	Generation (m^3/yr)[c]	Pit Conversion	MOX	Both Facilities
Hazardous	50	19	74	68	26	94
Nonhazardous						
Liquid	5,300	20,000	416,100	1	5	6
Solid	120	8,600	6,670	2	128	130

[a] See definitions in Appendix F.8.
[b] DOE 1999a; UC 1998g, 1998h. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.

Hazardous waste generated during construction includes liquids such as spent cleaning solutions, oils, hydraulic fluids, antifreeze solutions, paints and chemicals, and rags or wipes contaminated with these materials. These wastes are typically generated during construction of an industrial facility. Any hazardous waste generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial treatment and disposal facilities (UC 1998g, 1998h). Hazardous waste generation for construction of this combination of facilities is estimated to be 94 percent of existing annual site waste generation. Because these wastes would be treated and disposed at offsite commercial facilities, the additional waste load generated during construction should not have a major impact on the SRS hazardous waste management system.

Nonhazardous solid waste includes office garbage, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice, and shipped to commercial or municipal facilities for recycling or disposal (UC 1998g, 1998h). Waste metals would be sent off the site for recycling and, therefore, were not included in the waste volumes. Nonhazardous-solid-waste generation during construction of this combination of facilities is estimated to be 130 percent of existing annual site waste generation. Because these wastes would be managed at commercial or municipal facilities, the additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets and wastewater from dewatering (UC 1998g, 1998h). To be conservative, it was assumed that all nonhazardous liquid waste generated during construction would be managed at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and managed at offsite facilities. Nonhazardous-liquid-waste generation for construction of this combination of facilities is estimated to be 6 percent of existing annual site waste generation, 9 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 2 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, impacts on the system during construction should not be major.

H.4.2.5.2 Operation of Pit Conversion and MOX Facilities

The waste management facilities within the pit conversion and MOX facilities would process, temporarily store, and ship all wastes generated. Table H–36 compares the expected waste generation rates from operating the new facilities at SRS with the existing site waste generation rates. No HLW would be generated by the facilities (UC 1998g, 1998h). Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995b).

Table H–36. Potential Waste Management Impacts of Operation of New Pit Conversion and MOX Facilities at SRS

	Estimated Waste Generation (m^3/yr)[b]		Site Waste Generation	Percent of Site Waste Generation		
Waste Type[a]	Pit Conversion	MOX	(m^3/yr)[c]	Pit Conversion	MOX	Both Facilities
TRU[d]	18	68	427	4	16	20
LLW	60	94	10,043	1	1	2
Mixed LLW	1	3	1,135	<1	<1	<1
Hazardous	2	3	74	3	4	7
Nonhazardous						
Liquid	25,000	26,000	416,100	6	6	12
Solid	1,800	440	6,670	27	7	34

[a] See definitions in Appendix F.8.
[b] DOE 1999a; UC 1998g, 1998h. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

TRU wastes generated during operations include spent filters, contaminated beryllium pieces and cuttings, used containers and equipment, paper and cloth wipes, analytical and quality-control samples, solidified inorganic solutions, and dirty plutonium oxide scrap. Lead-lined gloves are likely to be managed as mixed TRU waste. It is anticipated that all TRU waste would be contact-handled waste. TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities (UC 1998g, 1998h). Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU Waste Characterization and Certification Facility at SRS. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for this combination of facilities is estimated to be 20 percent of existing annual site waste generation, and 5 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 860 m^3 (1,120 yd^3) of TRU waste would be generated over the 10-year operation period. This would be 12 percent of the 6,977 m^3 (9,126 yd^3) of contact-handled TRU waste currently in storage, and 2 percent of the 34,400-m^3 (44,995-yd^3) storage capacity available at SRS. Assuming that the waste were stored in 208-l (55-gal) drums each with a capacity of 0.21 m^3 (0.27 yd^3), about 4,100 drums would be required to store this waste. Assuming that these drums can be stacked two high, that each drum occupies an

area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space, a storage area of about 1,200 m^2 (1,440 yd^2) would be required. Impacts of the storage of additional quantities of TRU waste on 0.12 ha (0.30 acre) of land at SRS should not be major.

The 860 m^3 (1,120 yd^3) of TRU waste generated by these facilities would be 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500 m^3 (220,400 yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW includes used equipment, wipes, protective clothing, solidified inorganic solutions, and tritium. It is likely that the LLW generated during operations would originate from activities in the processing areas containing the glovebox lines but not from operations within the gloveboxes. Operations within the gloveboxes are likely to generate mostly TRU waste. LLW would be treated, packaged, certified, and accumulated at the new facilities before being transferred for additional treatment and/or disposal in existing onsite facilities (UC 1998g, 1998h). Tritium recovered from pit disassembly would be disposed of as LLW (UC 1998g). A total of 1,540-m^3 (2,014-yd^3) LLW would be generated over the operation period. LLW generation for this combination of facilities is estimated to be 2 percent of existing annual site waste generation, 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 5 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687-m^3/ha (4,598-yd^3/acre) disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 1,540 m^3 (2,014 yd^3) of waste would require 0.18 ha (0.44 acre) of disposal space at SRS. Therefore, the management of this additional LLW at SRS should have no major impact.

Mixed LLW includes leaded shielding, solvents contaminated with plutonium, scintillation vials from the analytical laboratory, and hazardous constituents that were introduced as part of the incoming pits (UC 1998g, 1998h). Mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan for SRS. Mixed LLW generation for this combination of facilities is estimated to be less than 1 percent of existing annual site waste generation, and less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility. Over the operating life of these facilities, the 40 m^3 (52 yd^3) of mixed LLW generated would be 2 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations includes spent cleaning solutions, vacuum pump oils, film processing fluids, hydraulic fluids, antifreeze solutions, paints, chemicals, batteries, fluorescent light tubes, lead packaging, and contaminated rags or wipes. Hazardous waste would be packaged for treatment and disposal at a combination of onsite and offsite facilities (UC 1998g, 1998h). Assuming that all hazardous waste is managed on the site, hazardous waste generation for this combination of facilities is estimated to be 7 percent of existing annual site waste generation, less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 1 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage building. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system.

Nonhazardous solid waste includes office garbage, coal ash, machine shop waste, and other industrial wastes from utility and maintenance operations. Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling (UC 1998g, 1998h). The remaining solid sanitary waste would be sent to the Three Rivers Landfill (DOE 1998a:3-42). Nonrecyclable, nonhazardous solid waste generated by this combination of facilities is estimated to be less than 34 percent of existing annual site waste generation. This

additional waste load should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets; process wastewater from lab sinks and drains, mop water, cooling tower blowdown, and steam condensate; and treated wastewater from the liquid effluent treatment system. Nonhazardous wastewater would be treated, if necessary, before being discharged to the F-Area sanitary sewer system that connects to the Central Sanitary Wastewater Treatment Facility (UC 1998g, 1998h). Nonhazardous liquid waste generated for this combination of facilities is estimated to be 12 percent of the existing annual site waste generation, 19 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 4 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, the management of this additional waste should not have a major impact on the system.

H.4.2.6 Immobilization and MOX Facilities

H.4.2.6.1 Construction of Immobilization and MOX Facilities

Table H–37 compares the expected construction waste generation rates for the facilities that may be constructed at SRS with the existing site waste generation rates. No radioactive waste would be generated during the 3-year construction period because this action involves new construction only (UC 1998h, 1999c, 1999d). In addition, no soil contaminated with hazardous or radioactive constituents would be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and all applicable Federal and State regulations. Construction waste generation would be the same for the ceramic and glass immobilization technologies (UC 1999c, 1999d).

Table H–37. Potential Waste Management Impacts of Construction of New Immobilization and MOX Facilities at SRS

	Estimated Waste Generation (m^3/yr)[b]		Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation		
Waste Type[a]	Immobilization (Ceramic or Glass)	MOX		Immobilization (Ceramic or Glass)	MOX	Both Facilities
Hazardous	35	19	74	47	26	73
Nonhazardous						
Liquid	21,000	20,000	416,100	5	5	10
Solid	2,200	8,600	6,670	33	128	161

[a] See definitions in Appendix F.8.
[b] DOE 1999a; UC 1998h, 1999c, 1999d. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[Text deleted.]

[Text deleted.]

Hazardous waste generated during construction includes liquids such as spent cleaning solutions, oils, hydraulic fluids, antifreeze solutions, paints and chemicals, and rags or wipes contaminated with these materials. These wastes are typically generated during construction of an industrial facility. Any hazardous waste generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial treatment and disposal facilities (UC 1998h, 1999c, 1999d). Hazardous waste generation for construction of this combination of facilities is estimated to be 73 percent of existing annual site waste generation. Because these

wastes would be treated and disposed at offsite commercial facilities, the additional waste load generated during construction should not have a major impact on the SRS hazardous waste management system.

Nonhazardous solid waste includes office garbage, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice, and shipped to commercial or municipal facilities for recycling or disposal (UC 1998h, 1999c, 1999d). Waste metals would be sent off the site for recycling and, therefore, were not included in the waste volumes. Nonhazardous-solid-waste generation during construction of this combination of facilities is estimated to be 161 percent of existing annual site waste generation. Because these wastes would be managed at commercial or municipal facilities, the additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets and wastewater from dewatering (UC 1998h, 1999c, 1999d). To be conservative, it was assumed that all nonhazardous liquid waste generated during construction would be managed at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and managed at offsite facilities. Nonhazardous liquid waste generated for construction of this combination of facilities is estimated to be 10 percent of existing annual site waste generation, 15 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 3 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, impacts on the system during construction should not be major.

H.4.2.6.2 Operation of Immobilization and MOX Facilities

The waste management facilities within the immobilization and MOX facilities would process, temporarily store, and ship all wastes generated. Table H–38 compares the expected waste generation rates from operating the new facilities at SRS with the existing site waste generation. Although HLW would be used in the immobilization process, no HLW would be generated by the facilities (UC 1998h, 1999c, 1999d). Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed in accordance with current site practices. Waste generation would be the same for the ceramic and glass immobilization technologies (UC 1999c, 1999d). Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995b).

TRU wastes generated during operations include metal cladding from fuel elements, spent filters, used containers and equipment, paper and cloth wipes, analytical and quality-control samples, solidified inorganic solutions, and dirty plutonium oxide scrap. Lead-lined gloves are likely to be managed as mixed TRU waste.

Table H–38. Potential Waste Management Impacts of Operation of New Immobilization and MOX Facilities at SRS

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b] Immobilization (Ceramic or Glass)	MOX	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation Immobilization (Ceramic or Glass)	MOX	Both Facilities
TRU[d]	95	68	427	22	16	38
LLW	81	94	10,043	1	1	2
Mixed LLW	1	3	1,135	<1	<1	<1
Hazardous	89	3	74	120	4	124
Nonhazardous						
Liquid	55,000	26,000	416,100	13	6	20
Solid	850	440	6,670	13	7	19

[a] See definitions in Appendix F.8.
[b] DOE 1999a; UC 1998h, 1999c, 1999d. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

It is anticipated that all TRU waste would be contact-handled waste. TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities (UC 1998h, 1999c, 1999d). Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU Waste Characterization and Certification Facility at SRS. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for this combination of facilities is estimated to be 38 percent of existing annual site waste generation and 9 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 1,630 m^3 (2,132 yd^3) of TRU waste would be generated over the 10-year operation period. This would be 23 percent of the 6,977 m^3 (9,126 yd^3) of contact-handled TRU waste currently in storage, and 5 percent of the 34,400-m^3 (44,995-yd^3) storage capacity available at SRS. Assuming that the waste were stored in 208-l (55-gal) drums each with a capacity of 0.21 m^3 (0.27 yd^3), about 7,700 drums would be required to store this waste. Assuming that these drums can be stacked two high, that each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space, a storage area of about 2,300 m^2 (2,750 yd^2) would be required. Impacts of the storage of additional quantities of TRU waste on 0.23 ha (0.57 acre) of land at SRS should not be major.

The 1,630 m^3 (2,132 yd^3) of TRU waste generated by these facilities would be 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500 m^3 (220,400 yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW includes used equipment, wipes, protective clothing, and solidified inorganic solutions. It is likely that the LLW generated during operations would originate from activities in the processing areas containing the glovebox lines but not from operations within the gloveboxes. Operations within the gloveboxes are likely to generate mostly TRU waste. LLW would be treated, packaged, certified, and accumulated at the new facilities before being transferred for additional treatment and/or disposal in existing onsite facilities (UC 1998h, 1999c, 1999d). A total of 1,750-m^3 (2,289-yd^3) LLW would be generated over the operation period. LLW generation for this combination of facilities is estimated to be 2 percent of existing annual site waste generation, 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 6 percent of the 30,500-m^3

(39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687-m^3/ha (4,598-yd^3/acre) disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 1,750-m^3 (2,289-yd^3) waste would require 0.2 ha (0.49 acre) of disposal space at SRS. Therefore, impacts of the management of this additional LLW at SRS should not be major.

Mixed LLW includes lead shielding, solvents contaminated with plutonium, and scintillation vials from the analytical laboratory (UC 1998h, 1999c, 1999d). Mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan for SRS. Mixed LLW generation for this combination of facilities is estimated to be less than 1 percent of existing annual site waste generation, and less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility. Over the operating life of these facilities, the 40-m^3 (52-yd^3) mixed LLW generated would be 2 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations includes spent cleaning solutions, lubricants, oils, film processing fluids, hydraulic fluids, antifreeze solutions, paints, chemicals, batteries, fluorescent light tubes, lead packaging, and contaminated rags or wipes. Hazardous waste would be packaged for treatment and disposal at a combination of onsite and offsite permitted facilities (UC 1998h, 1999c, 1999d). Assuming that all hazardous waste is managed on the site, hazardous waste generation for this combination of facilities is estimated to be 124 percent of existing annual site waste generation, but only 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 18 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage buildings. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system.

Nonhazardous solid waste includes office garbage, coal ash, machine shop waste, and other industrial wastes from utility and maintenance operations. Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling (UC 1998h, 1999c, 1999d). Ash from the coal-fired steam generating plant would be disposed of in the onsite ash disposal landfills (UC 1999c, 1999d). The remaining solid sanitary waste would be sent to the Three Rivers Landfill (DOE 1998a:3-42). Nonrecyclable, nonhazardous solid waste generated by this combination of facilities is estimated to be less than 19 percent of existing annual site waste generation. This additional waste load should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets; process wastewater from lab sinks and drains, mop water, cooling tower blowdown, and steam condensate; and treated wastewater from the liquid effluent treatment system. Nonhazardous wastewater would be treated, if necessary, before being discharged to the F-Area sanitary sewer system that connects to the Central Sanitary Wastewater Treatment Facility (UC 1998h, 1999c, 1999d). Nonhazardous liquid waste generated for this combination of facilities is estimated to be 20 percent of the existing annual site waste generation, 29 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 6 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore the management of this additional waste should not have a major impact on the system.

H.4.2.7 Pit Conversion, Immobilization, and MOX Facilities

H.4.2.7.1 Construction of Pit Conversion, Immobilization, and MOX Facilities

Table H–39 compares the expected construction waste generation rates for the facilities that may be constructed at SRS with the existing site waste generation rates. No radioactive waste would be generated during the 3-year construction period because this action involves new construction only (UC 1998g, 1998h, 1999c, 1999d). In addition, no soil contaminated with hazardous or radioactive constituents would be generated during construction. However, if any were generated, the waste would be managed in accordance with site practice and all applicable Federal and State regulations. Construction waste generation would be the same for the ceramic and glass immobilization technologies (UC 1999c, 1999d).

Table H–39. Potential Waste Management Impacts of Construction of New Pit Conversion, Immobilization, and MOX Facilities at SRS

	Estimated Waste Generation (m^3/yr)[b]			Site Waste	Percent of Site Waste Generation			
Waste Type[a]	PCF	IF (Ceramic or Glass)	MOX	Generation (m^3/yr)[c]	PCF	IF (Ceramic or Glass)	MOX	All Facilities
Hazardous	50	35	19	74	68	47	26	141
Nonhazardous								
Liquid	5,300	21,000	20,000	416,100	1	5	5	11
Solid	120	2,200	8,600	6,670	2	33	128	163

[a] See definitions in Appendix F.8.
[b] DOE 1999a; UC 1998g, 1998h, 1999c, 1999d. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[Text deleted.]
Key: IF, immobilization facility; PCF, pit conversion facility.

[Text deleted.]

Hazardous waste generated during construction includes liquids such as spent cleaning solutions, lubricants, oils, hydraulic fluids, antifreeze solutions, paints and chemicals, and rags or wipes contaminated with these materials. These wastes are typically generated during construction of an industrial facility. Any hazardous waste generated during construction would be packaged in DOT-approved containers and shipped off the site to permitted commercial treatment and disposal facilities (UC 1998g, 1999c, 1999d). Hazardous waste generation for construction of this combination of facilities is estimated to be 141 percent of existing annual site waste generation. Because these wastes would be treated and disposed at offsite commercial facilities, the additional waste load generated during construction should not have a major impact on the SRS hazardous waste management system.

Nonhazardous solid waste includes office garbage, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice and shipped to commercial or municipal facilities for recycling or disposal (UC 1998g, 1999c, 1999d). Waste metals would be sent off the site for recycling, and therefore were not included in the waste volumes. Nonhazardous-solid-waste generation during construction of these facilities is estimated to be 163 percent of existing annual site waste generation. Because these wastes would be managed at commercial or municipal facilities, the additional waste load generated during construction should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets and wastewater from dewatering (UC 1998g, 1999c, 1999d). To be conservative, it was assumed that all nonhazardous liquid waste generated during construction would be managed at the Central Sanitary Wastewater Treatment Facility, even though it is likely that much of this waste would be collected in portable toilets and managed at offsite facilities. Nonhazardous liquid waste generated during construction of these facilities is estimated to be 11 percent of existing annual site waste generation, 17 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 3 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore the management of this additional waste should not have a major impact on the system.

H.4.2.7.2 Operation of Pit Conversion, Immobilization, and MOX Facilities

The waste management facilities within the pit conversion, immobilization, and MOX facilities would process, temporarily store, and ship all wastes generated. Table H–40 compares the expected waste generation rates from operating the new facilities at SRS with the existing site waste generation rates. Although HLW would be used in the immobilization process, no HLW would be generated by the facilities (UC 1998g, 1998h, 1999c, 1999d). Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that the LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Waste generation would be the same for the ceramic and glass immobilization technologies (UC 1999c, 1999d). Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995b).

Table H–40. Potential Waste Management Impacts of Operation of New Pit Conversion, Immobilization, and MOX Facilities at SRS

	Estimated Waste Generation (m^3/yr)[b]			Site Waste	Percent of Site Waste Generation			
Waste Type[a]	PCF	Immobilization (Ceramic or Glass)	MOX	Generation (m^3/yr)[c]	PCF	Immobilization (Ceramic or Glass)	MOX	All Facilities
TRU[d]	18	95	68	427	4	22	16	42
LLW	60	81	94	10,043	1	1	1	2
Mixed LLW	1	1	3	1,135	<1	<1	<1	<1
Hazardous	2	89	3	74	3	120	4	127
Nonhazardous								
Liquid	25,000	55,000	26,000	416,100	6	13	6	26
Solid	1,800	850	440	6,670	27	13	7	46

[a] See definitions in Appendix F.8.
[b] DOE 1999a; UC 1998g, 1998h, 1999c, 1999d. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; PCF, pit conversion facility; TRU, transuranic.

TRU wastes generated during operations include metal cladding from fuel elements, spent filters, contaminated beryllium pieces and cuttings, used containers and equipment, paper and cloth wipes, analytical and quality-control samples, solidified inorganic solutions, and dirty plutonium oxide scrap. Lead-lined gloves are likely to be managed as mixed TRU waste. It is anticipated that all TRU waste would be contact-handled waste. TRU

wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the new facilities (UC 1998g, 1998h, 1999c, 1999d). Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU Waste Characterization and Certification Facility at SRS. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for this combination of facilities is estimated to be 42 percent of existing annual site waste generation and 10 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 1,810 m^3 (2,367 yd^3) of TRU waste would be generated over the 10-year operation period. This would be 26 percent of the 6,977 m^3 (9,126 yd^3) of contact-handled TRU waste currently in storage, and 5 percent of the 34,400-m^3 (44,995-yd^3) storage capacity available at SRS. Assuming that the waste were stored in 208-l (55-gal) drums each with a capacity of 0.21 m^3 (0.27 yd^3), about 8,600 drums would be required to store this waste. Assuming that these drums can be stacked two high, that each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space, a storage area of about 2,600 m^2 (3,110 yd^2) would be required. Impacts of the storage of additional quantities of TRU waste on 0.26 ha (0.64 acre) of land at SRS should not be major.

The 2,600 m^3 (3,110 yd^3) of TRU waste generated by these facilities would be 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500 m^3 (220,400 yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW includes used equipment, wipes, protective clothing, solidified inorganic solutions, and tritium. It is likely that the LLW generated during operations would originate from activities in the processing areas containing the glovebox lines but not from operations within the gloveboxes. Operations within the gloveboxes are likely to generate mostly TRU waste. LLW would be treated, packaged, certified, and accumulated at the new facilities before being transferred for additional treatment and/or disposal in existing onsite facilities (UC 1998g, 1998h, 1999c, 1999d). Tritium recovered from pit disassembly would be disposed of as LLW (UC 1998g). A total of 2,350-m^3(3,074-yd^3) LLW would be generated over the operation period. LLW generation for this combination of facilities is estimated to be 2 percent of existing annual site waste generation, 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 8 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687-m^3/ha (4,598-yd^3/acre) disposal land usage factor for SRS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 2,350 m^3 (3,074 yd^3) of waste would require 0.27 ha (0.67 acre) of disposal space at SRS. Therefore, the management of this additional LLW at SRS should have no major impact.

Mixed LLW includes leaded shielding, solvents contaminated with plutonium, scintillation vials from the analytical laboratory, and hazardous constituents that were introduced as part of the incoming pits (UC 1998g, 1998h, 1999c, 1999d). Mixed LLW would be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan for SRS. Mixed LLW generation for this combination of facilities is estimated to be less than 1 percent of existing annual site waste generation, and less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility. Over the operating life of these facilities, the 50 m^3 (65 yd^3) of mixed LLW generated would be 3 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations includes spent cleaning solutions, vacuum pump oils, film processing fluids, hydraulic fluids, antifreeze solutions, paints, chemicals, batteries, fluorescent light tubes, lead packaging, and contaminated rags or wipes. Hazardous waste would be packaged for treatment and disposal at

a combination of onsite and offsite permitted facilities (UC 1998g, 1998h, 1999c, 1999d). Assuming that all hazardous waste is managed on the site, hazardous waste generation for this combination of facilities is estimated to be 127 percent of existing annual site waste generation, but only 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 18 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage buildings. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system.

Nonhazardous solid waste includes office garbage, coal ash, machine shop waste, and other industrial wastes from utility and maintenance operations. Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling (UC 1998g, 1998h, 1999c, 1999d). Ash from the coal-fired steam generating plant would be disposed of in the onsite ash disposal landfills (UC 1999c, 1999d). The remaining solid sanitary waste would be sent to the Three Rivers Landfill (DOE 1998a:3-42). Nonrecyclable, nonhazardous solid waste generated by this combination of facilities is estimated to be 46 percent of existing annual site waste generation. Because most of this waste would be managed at commercial or municipal facilities, this additional waste load should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets; process wastewater from lab sinks and drains, mop water, cooling tower blowdown, and steam condensate; and treated wastewater from the liquid effluent treatment system. Nonhazardous wastewater would be treated, if necessary, before being discharged to the F-Area sanitary sewer system that connects to the Central Sanitary Wastewater Treatment Facility (UC 1998g, 1998h, 1999c, 1999d). Nonhazardous liquid waste generated for this combination of facilities is estimated to be 26 percent of the existing annual site waste generation, 40 percent of the 276,000-m^3/yr (361,000-yd^3/yr) capacity of the F-Area sanitary sewer, 8 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, impacts on the system should not be major.

H.5 LEAD ASSEMBLY FABRICATION

This section describes the impacts on the waste management infrastructure that may occur if lead assembly fabrication were to occur at ANL–W, Hanford, LLNL, LANL, or SRS. For each site, separate sections are presented for construction and operations.

H.5.1 ANL–W

H.5.1.1 Construction

Wastes would be generated during modification of the Fuel Manufacturing Facility (FMF) and the Zero Power Physics Reactor (ZPPR) for lead assembly fabrication. Table H–41 compares the expected waste generation rates for the modification of facilities at ANL–W with the existing generation rates for INEEL waste. LLW would be generated during modification of contaminated areas of FMF and ZPPR, although no TRU waste, mixed waste, or hazardous wastes should be generated (O'Connor et al. 1998a).

Table H–41. Potential Waste Management Impacts of Modification of Facilities for Lead Assembly Fabrication at ANL–W

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
LLW	18	2,624	1
Nonhazardous			
Liquid	37	2,000,000	<1
Solid	11	62,000	<1

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998a. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3; waste generation rates for INEEL.
Key: ANL–W, Argonne National Laboratory–West; LLW, low-level waste.

LLW generated during modification of the FMF and ZPPR buildings would include used equipment, decontamination wastes, and protective clothing (O'Connor et al. 1998a). A total of 36 m^3 (47 yd^3) of LLW would be generated during the 2-year modification period. LLW generation for these activities is estimated to be 1 percent of existing annual waste generation, less than 1 percent of the 112,400-m^3 (147,000-yd^3) storage capacity at the RWMC, and less than 1 percent of the 37,700-m^3/yr (49,300-yd^3/yr) disposal capacity of the RWMC. Using the 6,264-m^3/ha (3,315-yd^3/acre) disposal land usage factor for the RWMC published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 36 m^3 (47 yd^3) of waste would require less than 0.1 ha (0.25 acre) of disposal space at INEEL. Therefore, impacts of the management of this additional LLW at ANL–W and INEEL should not be major.

Nonhazardous solid waste would include office garbage, construction debris, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice, and would be disposed of in the onsite CFA landfill complex or shipped to offsite facilities for recycling. Nonrecyclable nonhazardous solid waste generated during modification is estimated to be less than 1 percent of existing annual site waste generation and less than 1 percent of the 48,000-m^3/yr (62,800-yd^3/yr) capacity of the CFA landfill complex. The additional waste load generated during the modification period should not have a major impact on the nonhazardous solid waste management system at ANL–W or INEEL.

Nonhazardous liquid waste would include sanitary waste from sinks, showers, urinals, and water closets. To be conservative, it was assumed that all nonhazardous liquid waste generated during modification would be managed

at the ANL–W sanitary wastewater treatment facility. Nonhazardous liquid waste generated for modification is estimated to be less than 1 percent of the existing annual waste generation for the INEEL, and 1 percent of the 6,057-m^3/yr (7,923-yd^3/yr) capacity of the ANL–W sanitary wastewater treatment facility. Therefore, this waste load should not have a major impact on the ANL–W sanitary wastewater treatment system.

H.5.1.2 Operations

Table H–42 compares the expected waste generation rates from lead assembly fabrication at ANL–W with the existing INEEL waste generation rates. No HLW would be generated by the proposed activities. Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. This SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at ANL–W and INEEL are described in the *DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final EIS* (DOE 1995a).

Table H–42. Potential Waste Management Impacts of Operation of Facilities for Lead Assembly Fabrication at ANL–W

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	41	NA	NA
LLW	200	2,624	8
Mixed LLW	1	180	1
Hazardous	<1	835	<1
Nonhazardous			
Liquid	1,600	2,000,000	<1
Solid	1,300	62,000	2

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998a. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3; waste generation rates for INEEL.
[d] Includes mixed TRU waste.
Key: ANL–W, Argonne National Laboratory–W; LLW, low-level waste; NA, not applicable; TRU, transuranic.

TRU wastes generated during lead assembly fabrication would include glovebox gloves, spent filters, used containers and equipment, paper and cloth wipes, analytical and quality control samples, metallography waste, and sludges (O'Connor et al. 1998a). It is anticipated that all TRU waste would be contact-handled waste. Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Long-term storage, drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned Waste Characterization Facility at INEEL. TRU waste is not routinely generated at INEEL. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for these activities at ANL–W is estimated to be 41 m^3/yr (54 yd^3/yr), or 1 percent of the 6,500-m^3/yr (8,500-yd^3/yr) capacity of the planned Advanced Mixed Waste Treatment Project. A total of 132 m^3 (173 yd^3) of waste would be generated over the 3-year operation period. This would be less than 1 percent

of the 39,300 m^3 (51,404 yd^3) of contact-handled TRU waste currently in storage, and less than 1 percent of the 177,300-m^3 (231,908-yd^3) storage capacity available at INEEL.

The 132 m^3 (173 yd^3) of TRU waste generated by these activities would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW may include room trash (e.g., blotter paper, wipes, mop heads); protective clothing; solidified sludges; ion exchange resins; metal cans and rods; and wastewater from the laundry, analytical laboratory, and decontamination process (O'Connor et al. 1998a). LLW would be packaged, certified, and accumulated before being transferred for treatment and disposal in existing onsite facilities. A total of 700 m^3 (916 yd^3) of LLW would be generated over the 3-year operation period. LLW generation for these activities is estimated to be 8 percent of existing annual site waste generation, less than 1 percent of the 49,610-m^3/yr (64,880-yd^3/yr) capacity of the WERF, 1 percent of the 112,400-m^3 (147,000-yd^3) storage capacity at the the RWMC, and 1 percent of the 37,700-m^3/yr (49,300-yd^3/yr) disposal capacity of the RWMC. Using the 6,264-m^3/ha (3,315-yd^3/acre) disposal land usage factor for the RWMC published in the *Storage and Disposition Final PEIS* (DOE 1996a:E-9), 700 m^3 (916 yd^3) of waste would require 0.11 ha (0.27 acre) of disposal space at INEEL. Therefore, impacts of the management of this additional LLW at ANL–W and INEEL should not be major.

Mixed LLW may include sludges, cleaning solvents, and analytical waste (O'Connor et al. 1998a). Mixed LLW will be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan for ANL–W. INEEL currently treats mixed LLW onsite and ships some mixed LLW to Envirocare of Utah. Onsite disposal is planned in a new mixed LLW disposal facility. These facilities or other treatment or disposal facilities that meet DOE criteria would be used. Mixed LLW generation for these activities is estimated to be 1 percent of existing annual waste generation and less than 1 percent of the 6,500-m^3/yr (8,500-yd^3/yr) planned capacity of the Advanced Mixed Waste Treatment Project. The 4 m^3 (5.2 yd^3) of mixed LLW expected to be generated would be less than 1 percent of the 112,400-m^3 (147,000-yd^3) storage capacity at the RWMC. Therefore, the management of this additional waste at ANL–W and INEEL should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations would include small quantities of process ends. Hazardous waste would be packaged for treatment and disposal at offsite permitted commercial facilities (O'Connor et al. 1998a). Hazardous waste generation for these activities is estimated to be less than 1 percent of existing annual waste generation and less than 1 percent of the 1,600-m^3 (2,090-yd^3) onsite storage capacity, and therefore should not have a major impact on the hazardous waste management system at ANL–W or INEEL.

Nonhazardous solid waste would include office and lunch room garbage, packaging materials, sewage sludges, and other industrial wastes from utility and maintenance operations (O'Connor et al. 1998a). Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent off the site for disposal in the Bonneville County landfill. Nonrecyclable, nonhazardous solid waste generated by these activities is estimated to be 2 percent of existing annual site waste generation. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at ANL–W or INEEL.

Nonhazardous liquid waste would include sanitary waste from sinks, showers, urinals and water closets, and wastewater from cooling tower blowdown (O'Connor et al. 1998a). Nonhazardous liquid waste generated for

these activities is estimated to be less than 1 percent of the existing annual waste generation for INEEL and 26 percent of the 6,057-m^3/yr (7,923-yd^3/yr) capacity of the ANL–W sanitary wastewater treatment facility. Therefore, this additional waste should not have a major impact on the ANL–W sanitary wastewater treatment system.

H.5.2 Hanford

H.5.2.1 Construction

Table H–43 compares the expected waste generation rates for the modification of Hanford facilities for lead assembly fabrication with the existing generation rates for Hanford waste. No radioactive waste would be generated during modification because this action involves modification of uncontaminated buildings only (O'Connor et al. 1998b).

Table H–43. Potential Waste Management Impacts of Modification of Facilities for Lead Assembly Fabrication at Hanford

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
Nonhazardous			
Liquid	15	200,000	<1
Solid	50	43,000	<1

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998b. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.

Nonhazardous solid waste includes office garbage, construction debris, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice and shipped to offsite facilities for recycling or disposal. Waste metals and other recyclable solid wastes would be sent off the site for recycling, and therefore were not included in the waste volumes. Nonrecyclable solid sanitary waste would be sent off the site and would likely be disposed of in the Richland Sanitary Landfill. Nonrecyclable nonhazardous solid waste generated during modification is estimated to be less than 1 percent of existing annual waste generation. The additional waste load generated during the 2-year modification period should not have a major impact on the nonhazardous solid waste management system at Hanford.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets. To be conservative, it was assumed that all nonhazardous liquid waste generated during modification would be managed at onsite facilities. Nonhazardous liquid waste generated during modification is estimated to be less than 1 percent of existing annual site waste generation, less than 1 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, and less than 1 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest (formerly WPPSS) Sewage Treatment Facility. Therefore, this waste load is unlikely to have a major impact on the system during the modification period.

H.5.2.2 Operations

Table H–44 compares the expected waste generation rates from lead assembly fabrication at Hanford with the existing site waste generation rates. No HLW would be generated during lead assembly fabrication. Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998,

Table H–44. Potential Waste Management Impacts of Operation of Facilities for Lead Assembly Fabrication at Hanford

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	41	450	9
LLW	200	3,902	5
Mixed LLW	1	847	<1
Hazardous	<1	560	<1
Nonhazardous			
Liquid	1,600	200,000	1
Solid	1,300	43,000	3

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998b. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste
Key: LLW, low-level waste; TRU, transuranic.

TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at Hanford are being evaluated in the *Hanford Site Solid (Radioactive and Hazardous) Waste Program EIS* that is being prepared by the DOE Richland Operations Office (DOE 1997c).

TRU wastes generated during operations would include glovebox gloves, spent filters, used containers and equipment, paper and cloth wipes, analytical and quality control samples, metallography waste, and sludges (O'Connor et al. 1998b). It is anticipated that all TRU waste would be contact-handled waste. Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the Waste Receiving and Processing Facility at Hanford. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for these activities is estimated to be 9 percent of existing annual site waste generation and 2 percent of the 1,820-m^3/yr (2,380-yd^3/yr) planned capacity of the Waste Receiving and Processing Facility. A total of 132 m^3 (173 yd^3) of TRU waste would be generated over the 3-year operation period. This would be 1 percent of the 11,450 m^3 (14,977 yd^3) of contact-handled TRU waste currently in storage and 1 percent of the 17,000-m^3 (22,200-yd^3) storage capacity available at Hanford.

The 132 m^3 (173 yd^3) of TRU waste generated by these activities would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW may include room trash (e.g., blotter paper, wipes, mop heads); protective clothing; solidified sludges; ion exchange resins; metal cans and rods; and wastewater from the laundry, analytical laboratory, and decontamination process (O'Connor et al. 1998b). LLW would be packaged, certified, and accumulated before being transferred for treatment and disposal in existing onsite facilities. A total of 700 m^3 (916 yd^3) of LLW would be generated over the 3-year operation period. LLW generation for these activities is estimated to be 5

percent of existing annual site waste generation, less than 1 percent of the 1,740,000-m^3 (2,280,000-yd^3) disposal capacity of the LLW Burial Grounds, and less than 1 percent of the 230,000-m^3 (301,000-yd^3) capacity of the Grout Vaults. Using the 3,480-m^3/ha (1,842-yd^3/acre) disposal land usage factor for Hanford published in the *Final Storage and Disposition PEIS* (DOE 1996a:E-9), 700 m^3 (916 yd^3) of waste would require 0.2 ha (0.49 acre) of disposal space at Hanford. Therefore, impacts of the management of this additional LLW at Hanford should not be major.

Mixed LLW may include sludges, cleaning solvents, and analytical waste (O'Connor et al. 1998b). Mixed LLW will be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan for Hanford. Mixed LLW generation for these activities is estimated to be less than 1 percent of existing annual waste generation and less than 1 percent of the 1,820-m^3/yr (2,380-yd^3/yr) capacity of the Waste Receiving and Processing Facility. Over the operating life of this facility, the 4 m^3 (5.2 yd^3) of mixed LLW expected to be generated would be less than 1 percent of the 16,800-m^3 (21,970-yd^3) storage capacity of the Central Waste Complex and less than 1 percent of the 14,200 m^3 (18,600-yd^3) disposal capacity in the Radioactive Mixed Waste Disposal Facility. Therefore, the management of this additional waste at Hanford should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations would include small quantities of process ends. Hazardous waste would be packaged for treatment and disposal at offsite permitted commercial facilities (O'Connor et al. 1998b). Hazardous waste generation for these activities is estimated to be less than 1 percent of existing annual waste generation. These wastes should not have a major impact on the hazardous waste management system at Hanford.

Nonhazardous solid waste would include office and lunch room garbage, packaging materials, sewage sludges, and other industrial wastes from utility and maintenance operations (O'Connor et al. 1998b). Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent off the site for disposal in the Richland Sanitary Landfill. Nonrecyclable, nonhazardous solid waste generated by these activities is estimated to be 3 percent of existing annual site waste generation. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at Hanford.

Nonhazardous liquid waste would include sanitary waste from sinks, showers, urinals and water closets, and wastewater from cooling tower blowdown (O'Connor et al. 1998b). Nonhazardous liquid waste generated for these activities is estimated to be 1 percent of the existing annual site waste generation, 1 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the 400 Area sanitary sewer, and 1 percent of the 235,000-m^3/yr (307,000-yd^3/yr) capacity of the Energy Northwest (formerly WPPSS) Sewage Treatment Facility. Therefore, this additional waste load should not have a major impact on the system.

H.5.3 LLNL

H.5.3.1 Construction

Table H–45 compares the expected waste generation rates for the modification of LLNL facilities for lead assembly fabrication with the existing generation rates for LLNL waste. No radioactive waste would be generated during modification because this action involves modification of uncontaminated buildings only (O'Connor et al. 1998c).

Table H–45. Potential Waste Management Impacts of Modification of Facilities for Lead Assembly Fabrication at LLNL

WasteType[a]	Estimated Waste Generation (m^3/yr) [b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
Nonhazardous			
Liquid	17	456,000	<1
Solid	12	4,282	<1

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998c. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.

Nonhazardous solid waste includes office garbage, construction debris, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice and shipped to offsite facilities for recycling or disposal. Waste metals and other recyclable solid wastes would be sent off the site for recycling, and therefore were not included in the waste volumes. Nonrecyclable solid sanitary waste would be sent off the site and would likely be disposed of in the Vasco Road Landfill. Nonrecyclable nonhazardous solid waste generated during modification is estimated to be 1 percent of existing annual waste generation. The additional waste load generated during the 2-year modification period should not have major impact on the nonhazardous solid waste management system at LLNL.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals, and water closets. To be conservative, it was assumed that all nonhazardous liquid waste generated during modification would be discharged to the LLNL sewer system. Nonhazardous liquid waste generated during modification is estimated to be less than 1 percent of existing annual site waste generation and less than 1 percent of the 2,327,800-m^3/yr (3,044,762-yd^3/yr) capacity of the LLNL sanitary sewer, and therefore is unlikely to have a major impact on the LLNL sewer system or the city of Livermore Water Reclamation Plant during the modification period.

H.5.3.2 Operations

Table H–46 compares the expected waste generation rates from lead assembly fabrication at LLNL with the existing site waste generation rates. No HLW would be generated during lead assembly fabrication. Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment and storage of radioactive, hazardous, and mixed wastes at LLNL are described in the *Final EIS for Continued Operation of LLNL and SNL, Livermore* (DOE 1992).

TRU wastes generated during operations would include glovebox gloves, spent filters, used containers and equipment, paper and cloth wipes, analytical and quality control samples, metallography waste, and sludges (O'Connor et al. 1998c). It is anticipated that all TRU waste would be contact-handled waste. Liquid TRU wastes would be evaporated or solidified before being packaged for storage. It is likely that drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned Decontamination and Waste Treatment Facility. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

Table H–46. Potential Waste Management Impacts of Operation of Facilities for Lead Assembly Fabrication at LLNL

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	41	27	152
LLW	200	124	161
Mixed LLW	1	353	<1
Hazardous	<1	579	<1
Nonhazardous			
Liquid	1,600	456,000	<1
Solid	1,300	4,282	30

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998c. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste
Key: LLW, low-level waste; TRU, transuranic.

TRU waste generation for these activities is estimated to be 152 percent of existing annual site waste generation. A total of 132 m^3 (173 yd^3) of TRU waste would be generated over the 3-year operation period. This would be 51 percent of the 257 m^3 (336 yd^3) of contact-handled TRU waste currently in storage, and 4 percent of the 3,335 m^3 (4,362 yd^3) of onsite storage capacity. Assuming that the waste is stored in 208-l (55-gal) drums each with a capacity of 0.21 m^3 (0.27 yd^3), about 630 drums would be needed to store this waste. Assuming that these drums can be stacked two high, each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space and shipping and receiving space, a storage area of about 190 m^2 (227 yd^2) would be required. Impacts of the storage of additional quantities of TRU waste on less than 0.1 ha (0.25 acre) of land at LLNL should not be major.

The 132 m^3 (173 yd^3) of TRU waste generated by these activities would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW may include room trash (e.g., blotter paper, wipes, mop heads); protective clothing; solidified sludges; ion exchange resins; metal cans and rods; and wastewater from the laundry, analytical laboratory, and decontamination process (O'Connor et al. 1998c). LLW would be packaged, certified, and accumulated before being transferred for treatment and storage in existing facilities on the site. LLW generation for these activities is estimated to be 161 percent of existing annual site waste generation and 26 percent of the 771-m^3/yr (1,008-yd^3/yr) capacity of the size reduction facility. A total of 700 m^3 (916 yd^3) of LLW would be generated over the 3-year operation period. This would be 13 percent of the 5,255-m^3 (6,874-yd^3) onsite storage capacity, and would not be expected to require LLNL to build additional storage capacity because this waste would be shipped to a disposal facility on a routine basis. If additional storage space were required, and assuming that the waste is stored in 208-l (55-gal) drums each with a capacity of 0.21 m^3 (0.27 yd^3), about 3,300 drums would be needed to store this waste. Assuming that these drums can be stacked two high, each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space and shipping and receiving space, a storage area of about 1,000 m^2 (1,196 yd^2) would be required. Impacts of the storage of additional quantities of LLW on 0.1 ha (0.25 acre) of land at LLNL should not be major.

LLW from LLNL is currently shipped to NTS for disposal. The additional LLW from conduct of lead assembly fabrication at LLNL would be 4 percent of the 20,000 m^3 (26,000 yd^3) of LLW disposed at NTS in 1995 and less

than 1 percent of the 500,000-m^3 (650,000-yd^3) disposal capacity at NTS. Using the 6,085-m^3/ha (3,221-yd^3/acre) disposal land usage factor for NTS published in the *Final Storage and Disposition PEIS* (DOE 1996a:E-9), 700 m^3 (916 yd^3) of waste would require 0.12 ha (0.30 acre) of disposal space at NTS or a similar facility. Therefore, impacts of the management of this additional LLW at the disposal site should not be major. Impacts of disposal of LLW at NTS are described in the *Final EIS for the NTS and Off-Site Locations in the State of Nevada* (DOE 1996c).

Mixed LLW may include sludges, cleaning solvents, and analytical waste (O'Connor et al. 1998c). Mixed LLW will be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan for LLNL. Mixed LLW disposal would occur off the site. Mixed LLW generation for these activities is estimated to be less than 1 percent of existing annual waste generation and less than 1 percent of the 2,012-m^3/yr (2,632-yd^3/yr) capacity of the Building 513 and 514 Waste Treatment Facility. Over the operating life of this facility, the 4 m^3 (5.2 yd^3) of mixed LLW expected to be generated would be less than 1 percent of the 2,825-m^3 (3,695-yd^3) onsite storage capacity. Therefore, the management of this additional waste at LLNL should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations would include small quantities (< 1 m^3/yr [< 1.3 yd^3/yr]) of process ends. Hazardous waste would be packaged for treatment and disposal at offsite permitted commercial facilities (O'Connor et al. 1998c). Hazardous waste generated by these activities is estimated to be less than 1 percent of existing annual waste generation and less than 1 percent of the 2,825-m^3 (3,695-yd^3) hazardous waste storage capacity. Because the additional waste load is very small, management of this waste should not have a major impact on the hazardous waste management system at LLNL.

Nonhazardous solid waste would include office and lunch room garbage, packaging materials, sewage sludges, and other industrial wastes from utility and maintenance operations (O'Connor et al. 1998c). Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent off the site for disposal in the Vasco Road Landfill. Nonrecyclable, nonhazardous solid waste generated by these activities is estimated to be 30 percent of existing annual site waste generation. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at LLNL.

Nonhazardous liquid waste would include sanitary waste from sinks, showers, urinals and water closets, and wastewater from cooling tower blowdown (O'Connor et al. 1998c). After monitoring to ensure that the wastewater meets discharge limits, sanitary wastewaters from lead assembly fabrication along with other sanitary wastewaters from LLNL and Sandia National Laboratory–Livermore, would be routed to the city of Livermore Water Reclamation Plant. Nonhazardous liquid waste generated for these activities is estimated to be less than 1 percent of the existing annual site waste generation, and less than 1 percent of the 2,327,800-m^3/yr (3,044,762-yd^3/yr) capacity of the LLNL sanitary sewer and therefore should not have a major impact on LLNL and the city of Livermore sanitary wastewater treatment systems.

H.5.4 LANL

H.5.4.1 Construction

Table H–47 compares the expected waste generation rates for the modification of LANL facilities for lead assembly fabrication with the existing generation rates for LANL waste. TRU waste and LLW would be generated during modification of the glovebox line in Building PF–4, although no mixed waste or hazardous wastes would be generated (O'Connor et al. 1998d).

Table H–47. Potential Waste Management Impacts of Modification of Facilities for Lead Assembly Fabrication at LANL

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	3	262	1
LLW	3	1,585	<1
Nonhazardous Liquid	10	692,857	<1

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998d:33. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

TRU wastes generated during modification of Building PF–4 would include contaminated equipment and gloveboxes. It is anticipated that all TRU waste would be contact-handled waste. No liquid TRU waste is anticipated (O'Connor et al. 1998d). Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the Radioactive Materials Research, Operations and Demonstration (RAMROD) Facility and the Radioactive Assay and Nondestructive Test (RANT) Facility (DOE 1999b:2-108, 2-112, 2-113). Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b).

TRU waste generation for modification of Building PF–4 is estimated to be 1 percent of existing annual site waste generation, and less than 1 percent of the 1,050-m^3/yr (1,373-yd^3/yr) TRU-waste-processing capacity of the RAMROD and RANT facilities. A total of 5 m^3 (6.5 yd^3) of TRU waste would be generated over the 2-year modification period. This would be less than 1 percent of the 11,262 m^3 (14,731 yd^3) of contact-handled TRU waste currently in storage, and less than 1 percent of the 24,355-m^3 (31,856-yd^3) storage capacity available at LANL.

In addition, the 5 m^3 (6.5 yd^3) of TRU waste generated by modification of this building would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW generated during modification of Building PF–4 would include decontamination wastes and protective clothing. It is expected that no radioactive liquid LLW would be generated (O'Connor et al. 1998d). A total of 5 m^3 (6.5 yd^3) of LLW would be generated during the modification period. LLW generation for these activities is estimated to be less than 1 percent of existing annual waste generation, 1 percent of the 663-m^3 (867-yd^3) LLW storage capacity, and less than 1 percent of the 252,000-m^3 (329,616-yd^3) capacity of the TA–54 LLW disposal area. Using the 12,562-m^3/ha (6,649-yd^3/acre) disposal land usage factor for LANL published in the *Final Stockpile Stewardship and Management PEIS* (SSM PEIS) (DOE 1996d:H-9), 5 m^3 (6.5 yd^3) of waste would require less than 0.1 ha (0.25 acre) of disposal space at LANL. Therefore, impacts of the management of this additional LLW at LANL should not be major.

Nonhazardous liquid waste would include sanitary waste from sinks, showers, urinals, and water closets. To be conservative, it was assumed that all nonhazardous liquid waste generated during modification would be managed at the LANL sanitary wastewater treatment plant. Nonhazardous liquid waste generated for modification is estimated to be less than 1 percent of the existing annual waste generation, less than 1 percent of the 1,060,063-m^3/yr (1,386,562-yd^3/yr) capacity of the sanitary wastewater treatment plant, and less than 1 percent

of the 567,750-m^3/yr (742,617-yd^3/yr) capacity of the sanitary tile fields. Therefore, this waste load would not have a major impact on the LANL sanitary wastewater treatment system.

H.5.4.2 Operations

Table H–48 compares the expected waste generation rates from lead assembly fabrication at LANL with the existing site waste generation rates. No HLW would be generated during lead assembly fabrication. Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998,TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of treatment, storage, and disposal of waste at LANL, including expansion of the LLW disposal facility, are evaluated in the *Site-Wide EIS for Continued Operation of LANL* (DOE 1999b).

Table H–48. Potential Waste Management Impacts of Operation of Facilities for Lead Assembly Fabrication at LANL

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	41	262	16
LLW	200	1,585	13
Mixed LLW	1	90	1
Hazardous	<1	942	<1
Nonhazardous			
Liquid	1,600	692,857	<1
Solid	1,300	5,453	24

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998d:34. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

TRU wastes generated during operations would include glovebox gloves, spent filters, used containers and equipment, paper and cloth wipes, analytical and quality control samples, metallography waste, and sludges (O'Connor et al.1998d). It is anticipated that all TRU waste would be contact-handled waste. Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the RAMROD and RANT facilities (DOE 1999:2-108, 2-112, 2-113). Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for these activities is estimated to be 16 percent of existing annual site waste generation and 4 percent of the 1,050 m^3/yr (1,373-yd^3/yr) TRU-waste-processing capacity of the RAMROD and RANT facilities. A total of 132 m^3 (173 yd^3) of TRU waste would be generated over the 3-year operation period. This would be 1 percent of the 11,262 m^3 (14,731 yd^3) of contact-handled TRU waste currently in storage, and less than 1 percent of the 24,355-m^3 (31,856-yd^3) storage capacity available at LANL.

The 132 m^3 (173 yd^3) of TRU waste generated by these activities would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500-m^3 (220,400-yd^3) limit for WIPP (DOE 1997d:3-3). Impacts from disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW may include room trash (e.g., blotter paper, wipes, mop heads); protective clothing; solidified sludges; ion exchange resins; metal cans and rods; and wastewater from the laundry, analytical laboratory, and decontamination process (O'Connor et al. 1998d). LLW would be packaged, certified, and accumulated before being transferred for treatment and disposal in existing onsite facilities. A total of 700 m^3 (916 yd^3) of LLW would be generated over the 3-year operation period. LLW generation for these activities is estimated to be 13 percent of existing annual site waste generation, 106 percent of the 663-m^3 (867-yd^3) LLW storage capacity, and less than 1 percent of the 252,000-m^3 (329,616-yd^3) capacity of the TA–54 LLW disposal area. Because the waste would be sent for disposal on a regular basis, storage should not be a problem. Using the 12,562-m^3/ha (6,649-yd^3/acre) disposal land usage factor for LANL published in the SSM PEIS (DOE 1996d:H-9), 700 m^3 (916 yd^3) of waste would require 0.1 ha (0.25 acre) of disposal space at LANL. It is estimated that without any waste contribution from lead assembly fabrication, the existing disposal space in the TA–54 LLW disposal facility will be exhausted within the next 10 years. Expansion of the LLW disposal capacity at LANL is evaluated in the *Site-Wide EIS for Continued Operation of LANL* (DOE 1999b). Impacts from the management of the additional SPD LLW at LANL should not be major.

Mixed LLW may include sludges, cleaning solvents, and analytical waste (O'Connor et al. 1998d). Mixed LLW will be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan for LANL. Mixed LLW disposal would occur off the site. Mixed LLW generation for these activities is estimated to be 1 percent of existing annual waste generation, and 1 percent of the 583-m^3 (762.6-yd^3) mixed LLW storage capacity. Therefore, the management of this additional waste at LANL should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations would include small quantities of process ends. Hazardous waste would be packaged for treatment and disposal at offsite permitted commercial facilities (O'Connor et al. 1998d). Hazardous waste generation for these activities is estimated to be less than 1 percent of existing annual waste generation and less than 1 percent of the 1,864-m^3 (2,438-yd^3) hazardous waste storage capacity. These wastes should not have a major impact on the hazardous waste management system at LANL.

Nonhazardous solid waste would include office and lunch room garbage, packaging materials, sewage sludges, and other industrial wastes from utility and maintenance operations (O'Connor et al. 1998d). Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be disposed of in the Los Alamos County Landfill. Nonrecyclable, nonhazardous solid waste generated by these activities is estimated to be 24 percent of existing annual site waste generation. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at LANL.

Nonhazardous liquid waste would include sanitary waste from sinks, showers, urinals and water closets, and wastewater from cooling tower blowdown (O'Connor et al. 1998d). Nonhazardous liquid waste generated for these activities is estimated to be less than 1 percent of the existing annual site waste generation, less than 1 percent of the 1,060,063-m^3/yr (1,386,562-yd^3/yr) capacity of the sanitary wastewater treatment plant, and less than 1 percent of the 567,750-m^3/yr (742,617-yd^3/yr) capacity of the sanitary tile fields, and therefore should not have a major impact on the system.

H.5.5 SRS

H.5.5.1 Construction

Table H–49 compares the expected waste generation rates for the modification of facilities at SRS with the existing generation rates for SRS waste. No radioactive or mixed waste would be generated during modification because the areas of the buildings that will be modified are uncontaminated.

Table H–49. Potential Waste Management Impacts of Modification of Facilities for Lead Assembly Fabrication at SRS

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
Hazardous	1	74	1
Nonhazardous			
Liquid	2,400	416,100	1
Solid	19	6,670	<1

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998e:35. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.

The small amount of hazardous waste generated during building modification would include batteries, fluorescent light tubes, and liquids such as cleaning solutions, lubricants, oils, and hydraulic fluids (O'Connor et al. 1998e). These wastes are typical of those generated during construction of an industrial facility. Any hazardous waste generated during modification would be packaged in DOT-approved containers and shipped off the site to permitted commercial treatment and disposal facilities. Hazardous waste generationfor modification of this facility is estimated to be 1 percent of existing annual site waste generation. The additional waste load generated during the 2-year modification period should not have a major impact on the SRS hazardous waste management system.

Nonhazardous solid waste would include office garbage, construction debris, scrap lumber, concrete and steel waste, and other construction trash. Nonhazardous solid waste would be packaged in conformance with standard industrial practice and shipped to commercial facilities for recycling or disposal. Waste metals would be sent off the site for recycling, and therefore, were not included in the waste volumes. Nonhazardous-solid-waste generation during modification of this facility is estimated to be less than 1 percent of existing annual site waste generation. The additional waste load generated during the modification period should not have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste would include sanitary waste from any sinks, showers, urinals, and water closets. To be conservative, it was assumed that all nonhazardous liquid waste generated during modification would be managed at the Central Sanitary Wastewater Treatment Facility. Nonhazardous liquid waste generated for modification of this facility is estimated to be 1 percent of existing annual site waste generation, 2 percent of the 136,274-m^3/yr (178,246-yd^3/yr) capacity of the H-Area sanitary sewer, less than 1 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, the management of this additional waste should not have a major impact on the system during the modification period.

H.5.5.2 Operations

Table H–50 compares the expected waste generation rates from lead assembly fabrication at SRS with the existing site waste generation rates. No HLW would be generated during lead assembly fabrication. Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated and disposed of on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated on the site in the Consolidated Incineration Facility and treated and disposed of at offsite commercial facilities. This EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts from treatment, storage, and disposal of radioactive, hazardous, and mixed wastes at SRS are described in the *SRS Waste Management Final EIS* (DOE 1995b).

Table H–50. Potential Waste Management Impacts of Operation of Facilities for Lead Assembly Fabrication at SRS

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	41	427	10
LLW	200	10,043	2
Mixed LLW	1	1,135	<1
Hazardous	<1	74	<1
Nonhazardous			
Liquid	1,600	416,100	<1
Solid	1,300	6,670	19

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998e:38. Values rounded to two significant figures.
[c] From the waste management section in Chapter 3.
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

TRU wastes generated during operations would include glovebox gloves, spent filters, used containers and equipment, paper and cloth wipes, analytical and quality control samples, metallography waste, and sludges (O'Connor et al. 1998e). It is anticipated that all TRU waste would be contact-handled waste. Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading the TRUPACT for shipment to WIPP would occur at the planned TRU Waste Characterization and Certification Facility at SRS. Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for these activities is estimated to be 10 percent of existing annual site waste generation, and 2 percent of the 1,720-m^3/yr (2,250-yd^3/yr) planned capacity of the TRU Waste Characterization and Certification Facility. A total of 132 m^3 (173 yd^3) of TRU waste would be generated over the 3-year operation period. This would be 2 percent of the 6,977 m^3 (9,125 yd^3) of contact-handled TRU waste currently in storage, and less than 1 percent of the 34,400-m^3 (44,995-yd^3) storage capacity available at SRS.

The 132 m^3 (173 yd^3) of TRU waste generated by these activities would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP, and within the 168,500-m^3

(220,400-yd^3) limit for WIPP (DOE 1997d:3-3). Impacts from disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW may include room trash (e.g., blotter paper, wipes, mop heads); protective clothing; solidified sludges; ion exchange resins; metal cans and rods; and wastewater from the laundry, analytical laboratory, and decontamination process (O'Connor et al. 1998e). LLW would be packaged, certified, and accumulated before being transferred for treatment and disposal in existing onsite facilities. A total of 700 m^3 (916 yd^3) of LLW would be generated over the 3-year operation period. LLW generation for these activities is estimated to be 2 percent of existing annual site waste generation, 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and 2 percent of the 30,500-m^3 (39,900-yd^3) capacity of the Low-Activity Waste Vaults. Using the 8,687-m^3/ha (4,598-yd^3/acre) disposal land usage factor for SRS published in the *Final Storage and Disposition PEIS* (DOE 1996a:E-9), 700 m^3 (916 yd^3) of waste would require 0.1 ha (0.25 acre) of disposal space at SRS. Therefore, impacts from the management of this additional LLW at SRS should not be major.

Mixed LLW may include sludges, cleaning solvents, and analytical waste (O'Connor et al. 1998e). Mixed LLW will be stabilized, packaged, and stored on the site for treatment and offsite disposal in a manner consistent with the site treatment plan for SRS. Mixed LLW generation for these activities is estimated to be less than 1 percent of existing annual site waste generation and less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility. Over the operating life of this facility, the 4 m^3 (5.2 yd^3) of mixed LLW expected to be generated would be less than 1 percent of the 1,900-m^3 (2,490-yd^3) capacity of the Mixed Waste Storage Buildings. Therefore, the management of this additional waste at SRS should not have a major impact on the mixed LLW management system.

Hazardous waste generated during operations would include small quantities of process ends (O'Connor et al. 1998e). Hazardous waste would be packaged for treatment and disposal at a combination of onsite and offsite permitted facilities. Assuming that all hazardous waste is managed on the site, hazardous waste generation for these activities is estimated to be less than 1 percent of existing annual site waste generation, less than 1 percent of the 17,830-m^3/yr (23,320-yd^3/yr) capacity of the Consolidated Incineration Facility, and less than 1 percent of the 5,200-m^3 (6,800-yd^3) capacity of the hazardous waste storage buildings. The management of these additional hazardous wastes at SRS should not have a major impact on the hazardous waste management system.

Nonhazardous solid waste would include office and lunch room garbage, packaging materials, sewage sludges, and other industrial wastes from utility and maintenance operations (O'Connor et al. 1998e). Nonhazardous solid waste would be packaged in conformance with standard industrial practice. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent to the Three Rivers Landfill (DOE 1998a:3-42). Nonrecyclable, nonhazardous solid waste generated by these activities is estimated to be 19 percent of existing annual site waste generation. It is unlikely that this additional waste load would have a major impact on the nonhazardous solid waste management system at SRS.

Nonhazardous liquid waste includes sanitary waste from sinks, showers, urinals and water closets, and wastewater from cooling tower blowdown (O'Connor et al. 1998e). Nonhazardous liquid waste generated for these activities is estimated to be less than 1 percent of the existing annual site waste generation, 1 percent of the 136,274-m^3/yr (178,246-yd^3/yr) capacity of the H-Area sanitary sewer, less than 1 percent of the 1,449,050-m^3/yr (1,895,357-yd^3/yr) capacity of the Central Sanitary Wastewater Treatment Facility, and within the 1,032,950-m^3/yr (1,351,099-yd^3/yr) excess capacity of the Central Sanitary Wastewater Treatment Facility (Sessions 1997). Therefore, impacts on the system should not be major.

H.6 POSTIRRADIATION EXAMINATION

This section describes the impacts on the waste management infrastructure that may occur if postirradiation examination were to occur at ANL–W or ORNL. For each site, separate sections are presented for construction and operations.

H.6.1 ANL–W

H.6.1.1 Construction

It is expected that postirradiation examination could be performed at ANL–W without the need for facility modifications that would generate waste (O'Connor et al. 1998a). Therefore, there would be no construction waste to impact the waste management infrastructure.

H.6.1.2 Operations

The waste management facilities within the postirradiation examination facilities would process, temporarily store, and ship all wastes generated. Table H–51 compares the expected waste generation rates from postirradiation examination at ANL–W with the existing generation rates for INEEL. No HLW would be generated by the postirradiation examination facilities. Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices. Impacts of the treatment, storage and disposal of radioactive, hazardous, and mixed wastes at INEEL are described in the *DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final EIS* (DOE 1995a).

Table H–51. Potential Waste Management Impacts at INEEL of Conducting Postirradiation Examination at ANL–W

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	3	0[e]	NA
LLW	35	2,624	1
Mixed LLW	<1	181	<1
Hazardous	<1	835	<1
Nonhazardous			
Liquid	380	2,000,000	<1
Solid	51	62,000	<1

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998a. Values rounded to two significant figures.
[c] From the INEEL section of Chapter 3.
[d] Includes mixed TRU waste.
[e] In 1997, 2 m^3 (2.6 yd^3) of TRU wastes were generated at ANL–W (DOE 1998b:A-4).
Key: LLW, low-level waste; NA, not applicable; TRU, transuranic.

TRU wastes generated during operations would include used containers, paper and cloth wipes, fuel debris, clad pieces, and radiochemical solutions. Mixed TRU waste would include oil, solvents, and lead shielding

contaminated with TRU materials (O'Connor et al. 1998a). TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the postirradiation examination facilities. Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading of the TRUPACT for shipment to WIPP would occur at the planned Waste Characterization Facility at INEEL (UC 1998c). Impacts from the treatment of TRU waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for postirradiation examination is estimated to be 3 m^3/yr (3.9 yd^3/yr), less than 1 percent of the 6,500-m^3/yr (8,500-yd^3/yr) capacity of the planned Advanced Mixed Waste Treatment Project. A total of 11 m^3 (14.4 yd^3) of waste is expected to be generated over the operations period. This would be less than 1 percent of the 177,300-m^3 (231,900-yd^3) storage capacity of the RWMC, and less than 1 percent of the 39,300 m^3 (51,404 yd^3) of contact-handled TRU waste currently in storage at INEEL. Assuming that the waste were stored in 208-l (55-gal) drums, each with a capacity of 0.21 m^3 (0.27 yd^3), approximately 52 drums would be required. Assuming that these drums can be stacked two high, and that each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space, a storage area of approximately 16 m^2 (19 yd^2) would be required. Impacts of the storage of these additional quantities of TRU waste on less than 0.1 ha (0.25 acre) of land at INEEL should not be major.

The 11 m^3 (14.4 yd^3) of TRU waste generated by postirradiation examination activities would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500-m^3 (220,400-yd^3) limit for this facility (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW may include wipes, used containers and equipment, clad pieces, and protective clothing (O'Connor et al. 1998a). LLW would be packaged, certified, and accumulated before being transferred for treatment or disposal in existing onsite facilities. A total of 140 m^3 (183 yd^3) of LLW would be generated over the operations period. LLW generation for these activities is estimated to be 1 percent of existing annual INEEL waste generation, less than 1 percent of the 49,610-m^3/yr (64,880-yd^3/yr) capacity of WERF, less than 1 percent of the 112,400-m^3 (146,500-yd^3) storage capacity at the RWMC, and less than 1 percent of the 37,700-m^3/yr (49,300-yd^3/yr) disposal capacity of the RWMC.

Using the 6,264-m^3/ha (3,315-yd^3/acre) disposal land usage factor for the RWMC published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 140 m^3 (183 yd^3) of waste would require less than 0.1 ha (0.25 acre) of disposal space at INEEL. Therefore, impacts of the management of this additional LLW at ANL–W and INEEL are not expected to be major. Impacts of the disposal of LLW at INEEL are described in the *DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Programs Final EIS* (DOE 1995a).

Mixed LLW may include small quantities of oils, solvents, and lead shielding contaminated with fission products (O'Connor et al. 1998a). Mixed LLW would be treated and disposed of in a manner consistent with the site treatment plan for ANL–W and INEEL. INEEL currently treats mixed LLW on the site and ships some mixed LLW to Envirocare of Utah. Onsite disposal is planned in a new mixed LLW disposal facility. These facilities or other treatment or disposal facilities that meet DOE criteria would be used. Mixed LLW generation for these activities is estimated to be less than 1 percent of existing annual INEEL waste generation, and less than 1 percent of the planned 6,500-m^3/yr (8,500-yd^3/yr) capacity of the Advanced Mixed Waste Treatment Project. The 1 m^3 (1.3 yd^3) of mixed LLW expected to be generated would be less than 1 percent of the 112,400-m^3 (146,500-yd^3) storage capacity of the RWMC. Therefore, the management of this additional waste would not be expected to have major impacts on the mixed LLW management systems at ANL–W or INEEL.

Hazardous waste generated during operations would include small quantities of used oils, solvents, resins, glues, and contaminated containers (O'Connor et al. 1998a). Hazardous waste would be packaged for treatment and disposal at offsite facilities. Hazardous waste generation for these activities is estimated to be less than 1 percent of existing annual INEEL waste generation, and less than 1 percent of the 1,600-m^3 (2,100-yd^3) onsite storage capacity. Therefore, impacts on the hazardous waste management systems at ANL–W or INEEL should not be major.

Nonhazardous solid waste would include paper, plastic, and metal garbage; oils; cleaners; and scrap wood and metal (O'Connor et al. 1998a). Nonhazardous solid waste would be packaged in conformance with standard industrial practice and shipped to onsite and offsite disposal and recycling facilities. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be sent offsite for disposal in the Bonneville County landfill. Nonrecyclable, nonhazardous solid waste generated by these activities is estimated to be 2 percent of existing annual INEEL waste generation. This additional waste load should not have a major impact on the nonhazardous solid waste management systems at ANL–W or INEEL.

Nonhazardous liquid waste would include sanitary waste from sinks, showers, urinals, and water closets (O'Connor et al. 1998a). Nonhazardous liquid waste generation for these activities is estimated to be less than 1 percent of the existing annual INEEL waste generation, and 6 percent of the 6,057-m^3/yr (7,923-yd^3/yr) capacity of the ANL–W sewage treatment facility, and therefore would not be expected to have major impacts.

H.6.2 ORNL

H.6.2.1 Construction

It is expected that postirradiation examination could be performed at ORNL without the need for facility modifications that would generate waste (O'Connor et al. 1998a). Therefore, there would be no construction waste to impact the waste management infrastructure.

H.6.2.2 Operations

The waste management facilities within the postirradiation examination facilities would process, temporarily store, and ship all wastes generated. Table H–52 compares the expected waste generation rates from postirradiation examination at ORNL with the existing generation rates for ORR. No HLW would be generated by the postirradiation examination facilities. Depending in part on decisions in the RODs for the WM PEIS, wastes could be treated on the site or at other DOE sites or commercial facilities. Per the ROD for TRU waste issued on January 20, 1998, TRU and mixed TRU waste would be certified on the site to current WIPP waste acceptance criteria and shipped to WIPP for disposal. Per the ROD for hazardous waste issued on August 5, 1998, nonwastewater hazardous waste would continue to be treated at the TSCA Incinerator, and treated and disposed of at offsite commercial facilities. The SPD EIS also assumes that LLW, mixed LLW, and nonhazardous waste would be treated, stored, and disposed of in accordance with current site practices.

TRU wastes generated during operations would include used containers, paper and cloth wipes, fuel debris, clad pieces, and radiochemical solutions. Mixed TRU waste would include oil, solvents, and lead shielding contaminated with TRU materials. (O'Connor et al. 1998a). TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria at the postirradiation examination facilities. Liquid TRU wastes would be evaporated or solidified before being packaged for storage. Drum-gas testing, real-time radiography, and loading of the TRUPACT for shipment to WIPP would occur at the Waste Examination and Assay Facility or the planned Waste Handling and Packaging Plant (DOE 1996a;E-72). Impacts from the treatment of TRU

Table H–52. Potential Waste Management Impacts of Conducting Postirradiation Examination at ORNL

Waste Type[a]	Estimated Waste Generation (m^3/yr)[b]	Site Waste Generation (m^3/yr)[c]	Percent of Site Waste Generation
TRU[d]	3	9	30
LLW	35	5,181	1
Mixed LLW	<1	1,122	<1
Hazardous	<1	34,048	<1
Nonhazardous			
Liquid	380	2,406,300	<1
Solid	51	49,470	<1

[a] See definitions in Appendix F.8.
[b] O'Connor et al. 1998a. Values rounded to two significant figures.
[c] Includes ORNL, Y–12 and East Tennessee Technology Park (formerly K–25). Data for radioactive wastes from DOE 1996e:15, 16. Data for hazardous and nonhazardous wastes from DOE 1996a:3-220–3-225).
[d] Includes mixed TRU waste.
Key: LLW, low-level waste; TRU, transuranic.

waste to WIPP waste acceptance criteria are described in the WM PEIS (DOE 1997b) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

TRU waste generation for postirradiation examination is estimated to be 3 m^3/yr (3.9 yd^3/yr), 30 percent of existing ORR waste generation and less than 1 percent of the planned 620-m^3/yr (811-yd^3/yr) capacity of the TRU Waste Treatment Plant (DOE 1996a:E-86). A total of 11 m^3 (14.4 yd^3) of waste is expected to be generated over the operations period. This would be 1 percent of the 1,760 m^3 (2,302 yd^3) of the capacity of contact-handled TRU waste storage space (DOE 1996a:3-219). Assuming that the waste were stored in 208-l (55-gal) drums, each with a capacity of 0.21 m^3 (0.27 yd^3), approximately 52 drums would be required. Assuming that these drums can be stacked two high, and that each drum occupies an area of 0.4 m^2 (4 ft^2), and adding a 50 percent factor for aisle space, a storage area of approximately 16 m^2 (19 yd^2) would be required. Impacts of the storage of these additional quantities of TRU waste on less than 0.1 ha (0.25 acre) of land at the ORR should not be major.

The 11 m^3 (14.4 yd^3) of TRU waste generated by postirradiation examination activities would be less than 1 percent of the 143,000 m^3 (187,000 yd^3) of contact-handled TRU waste that DOE plans to dispose of at WIPP and within the 168,500-m^3 (220,400-yd^3) limit for this facility (DOE 1997d:3-3). Impacts of disposal of TRU waste at WIPP are described in the *WIPP Disposal Phase Final Supplemental EIS* (DOE 1997d).

LLW may include wipes, used containers and equipment, clad pieces, and protective clothing (O'Connor et al. 1998a). Wastes would be treated and stored on the site before being transferred for onsite or offsite disposal. LLW generation for these activities is estimated to be 1 percent of existing annual ORR waste generation, and less than 1 percent of the 11,300-m^3/yr (14,780-yd^3/yr) capacity of the Waste Compactor Facility (DOE 1996a:E-86).

LLW generated at ORR is currently disposed of on the site or stored for offsite disposal at DOE's NTS or commercial disposal facilities. If the shipment of LLW for disposal were delayed, a maximum of approximately 140 m^3 (183 yd^3) of LLW may have to be stored at ORR. This would be less than 1 percent of the 51,850 m^3 (67,820 yd^3) of LLW storage capacity at ORR (DOE 1996a:3-222, 3-224). Assuming that the waste were stored in 208-l (55-gal) drums, each with a capacity of 0.21 m^3 (0.27 yd^3), about 670 drums would be required. Assuming that these drums can be stacked two high, and that each drum occupies an area of 0.4 m^2 (4 ft^2), and

adding a 50 percent factor for aisle space, a storage area of about 200 m^2 (239 yd^2) would be required. Impacts of the storage of additional quantities of LLW on less than 0.1 ha (0.25 acre) of land at ORR would not be major.

As stated above, a total of 140 m^3 (183 yd^3) of LLW would be generated over the operation period. Using the 6,085-m^3/ha (3,221-yd^3/acre) disposal land usage factor for NTS published in the *Storage and Disposition PEIS* (DOE 1996a:E-9), 140 m^3 (183 yd^3) of waste would require less than 0.1 ha (0.25 acre) of disposal space at NTS or some other similar facility. Impacts at the disposal site from the use of this small area for disposal should not be major. Impacts of disposal of LLW at NTS are described in the *Final EIS for the NTS and Off-Site Locations in the State of Nevada* (DOE 1996c).

Mixed LLW may include small quantities of oils, solvents, and lead shielding contaminated with fission products (O'Connor et al. 1998a). Mixed LLW would be treated and disposed of in a manner consistent with the site treatment plan for ORR. Mixed LLW generation for these activities is estimated to be less than 1 percent of existing annual ORR waste generation, and less than 1 percent of the 15,700-m^3/yr (20,536-yd^3/yr) capacity of the TSCA incinerator (DOE 1996a:E-90). The 1 m^3 (1.3 yd^3) of mixed LLW expected to be generated would be less than 1 percent of the 231,753-m^3 (303,133-yd^3) storage capacity at ORR (DOE 1996a:3-220, 3-222, 3-224). Therefore, the management of this additional waste at ORR would not be expected to have major impacts on the mixed LLW management system.

Hazardous waste generated during operations would include small quantities of used oils, solvents, resins, glues, and contaminated containers (O'Connor et al. 1998a). Hazardous waste would be packaged for treatment and disposal at onsite and offsite facilities. Hazardous waste generation for these activities is estimated to be less than 1 percent of existing annual ORR waste generation, and less than 1 percent of the 1,051-m^3 (1,375-yd^3) onsite storage capacity (DOE 1996a:3-220, 3-222). Assuming that all the hazardous waste were to be treated at the TSCA incinerator, this additional waste would be less than 1 percent of the 15,700-m^3/yr (20,536-yd^3/yr) capacity of the system (DOE 1996a:E-90), and therefore would not be expected to have major impacts on the hazardous waste management system at ORNL or ORR.

Nonhazardous solid waste would include paper, plastic, and metal garbage; oils; cleaners; and scrap wood and metal (O'Connor et al. 1998a). Nonhazardous solid waste would be packaged in conformance with standard industrial practice and shipped to onsite and offsite disposal and recycling facilities. Recyclable solid wastes such as office paper, metal cans, and plastic and glass bottles would be sent off the site for recycling. The remaining solid sanitary waste would be disposed of in the Industrial and Sanitary Landfill located at Y–12. Nonrecyclable, nonhazardous solid waste generated by these activities is estimated to be less than 1 percent of existing annual ORR waste generation, and less than 1 percent of the 1,100,000-m^3 (1,438,800-yd^3) capacity of the Industrial and Sanitary Landfill (DOE 1996a:3-220). It is unlikely that this small additional waste load would have major impacts on the nonhazardous solid waste management system at ORNL or ORR.

Nonhazardous liquid waste would include sanitary waste from sinks, showers, urinals, and water closets (O'Connor et al. 1998a). Nonhazardous liquid waste generation for these activities is estimated to be less than 1 percent of the existing annual ORR waste generation, and less than 1 percent of the 414,000-m^3/yr (541,512-yd^3/yr) capacity of the ORNL Sanitary Wastewater Treatment Facility (DOE 1996a:3-223), and therefore would not be expected to have major impacts.

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Appendix I
Socioeconomics

This appendix presents detailed information on the potential socioeconomic impacts associated with the influx of construction workers during the construction of the proposed surplus plutonium disposition facilities as well as the workers needed to operate the proposed facilities. This information supports the socioeconomic assessments described in Chapter 4. Site-specific input data used in the evaluation of these socioeconomic impacts are provided or referenced where appropriate, including projections for employment, unemployment, population, housing units, student enrollment, teachers employed, police officers, firefighters, hospital beds, and doctors. Tables I–1 through I–40 present data[1] for the four candidate U.S. Department of Energy sites: the Hanford Site (Hanford), Idaho National Engineering and Environmental Laboratory (INEEL), the Pantex Plant (Pantex), and the Savannah River Site (SRS).

I.1 HANFORD

Table I–1. Hanford Projected Site Employment

Year	Employment	Change From Previous (%)	Change From 1997 (%)
1997	12,882	–	–
2000	10,800	-16.16	-16.16
2005	11,000	1.85	-14.61
2010	20,600	87.27	59.91
2015	12,100	-41.26	-6.07
2020	11,900	-1.65	-7.62

Source: Mecca 1997a, 1997b:Teal memo.

Table I–2. Hanford Regional Economic Area Projected Employment and Economy, 1996–2010

Regional Economic Area	1996	2000	2005	2010
Civilian labor force	344,611	369,570	393,230	418,465
Total employment	306,396	328,709	349,790	372,278
Unemployment rate (%)	11.1	11.1	11.0	11.0

Source: DOL 1999; Washington State Office of Financial Management 1995.

Table I–3. Hanford Region of Influence Projected Population, 1996–2010

County	1996	2000	2005	2010
Benton	134,359	149,100	157,549	166,476
Franklin	45,590	50,683	54,562	58,738
ROI total	179,949	199,783	212,111	225,214

Source: DOC 1997; Washington State Office of Financial Management 1995.

[1] Table totals may not add precisely due to rounding.

Table I–4. Hanford Region of Influence Projected Number of Owner and Renter Housing Units, 1990–2010

County	1990	1996	2000	2005	2010
Benton	44,877	52,462	58,217	61,516	65,002
Franklin	13,664	16,016	17,806	19,168	20,635
ROI total	58,541	68,478	76,023	80,684	85,637

Source: DOC 1994; Washington State Office of Financial Management 1995.

Table I–5. Hanford Region of Influence Projected Student Enrollment, 1997–2010

County	1997	Capacity (%)	2000	2005	2010
Benton County	28,142	90.7	30,427	32,151	33,973
Findley	1,130	100.0	1,222	1,291	1,364
Kennewick	13,462	83.0	14,555	15,380	16,251
Kiona-Benton	1,701	100.0	1,839	1,943	2,053
Patterson	73	80.0	79	83	88
Prosser	2,794	98.0	3,021	3,192	3,373
Richland	8,982	99.5	9,711	10,262	10,843
Franklin County	10,064	97.7	10,896	11,730	12,628
Kahlotus	98	85.0	106	114	123
North Franklin	1,905	90.0	2,062	2,220	2,390
Pasco	8,048	100.0	8,713	9,380	10,098
Star School	13	65.0	14	15	16
ROI total	38,206	92.5	41,323	43,881	46,601

Source: Nemeth 1997a; Washington State Office of Financial Management 1995.

Table I–6. Hanford Region of Influence Projected Number of Teachers, 1997–2010

County	1997	Student/Teacher Ratio	2000	2005	2010
Benton County	1,785	15.8	1,930	2,039	2,154
Findley	76	14.9	82	87	92
Kennewick	822	16.4	889	939	992
Kiona-Benton	94	18.1	102	107	113
Patterson	4.5	16.2	5	5	5
Prosser	164	17.0	177	187	198
Richland	624	14.4	675	713	753
Franklin County	598	16.8	647	697	750
Kahlotus	14	7.0	15	16	18
North Franklin	132	14.4	143	154	166
Pasco	450	17.9	487	524	565
Star School	2	6.5	2	2	3
ROI total	2,383	16.0	2,577	2,736	2,905

Source: Nemeth 1997a; Washington State Office of Financial Management 1995.

Table I–7. Hanford Region of Influence Projected Number of Sworn Police Officers, 1997–2010

County	1997	2000	2005	2010
Benton	208	225	238	251
Franklin	73	79	85	92
ROI total	281	304	323	343

Source: Nemeth 1997b; Washington State Office of Financial Management 1995.

Table I–8. Hanford Region of Influence Projected Number of Firefighters, 1997–2010

County	1997	2000	2005	2010
Benton	369	399	422	445
Franklin	247	267	288	310
ROI total	616	666	710	755

Source: Nemeth 1997b; Washington State Office of Financial Management 1995.

Table I–9. Hanford Region of Influence Projected Number of Hospital Beds, 1997–2010

County	1997	2000	2005	2010
Benton	251	271	287	303
Franklin	132	143	154	166
ROI total	383	414	441	469

Source: Nemeth 1997c; Washington State Office of Financial Management 1995.

Table I–10. Hanford Region of Influence Projected Number of Doctors, 1996–2010

County	1996	2000	2005	2010
Benton	208	225	238	251
Franklin	49	53	57	61
ROI total	257	278	295	313

Source: Randolph 1997; Washington State Office of Financial Management 1995.

I.2 INEEL

Table I–11. INEEL Projected Site Employment

Year	Employment	Change From Previous (%)	Change From 1997 (%)
1997	8,291	–	–
2000	7,250	-12.56	-12.56
2005	7,250	0.00	-12.56
2010	7,250	0.00	-12.56
2015	7,250	0.00	-12.56
2020	7,250	0.00	-12.56

Source: Abbott et al. 1997.

Table I–12. INEEL Regional Economic Area Projected Employment and Economy, 1996–2010

Regional Economic Area	1996	2000	2005	2010
Civilian labor force	150,403	161,149	168,979	177,199
Total employment	143,182	153,440	169,884	168,784
Unemployment rate (%)	4.8	4.8	4.8	4.7

Source: DOL 1999; Idaho Power 1996; State of Wyoming, Administration and Information 1996.

Table I–13. INEEL Region of Influence Projected Population, 1996–2010

County	1996	2000	2005	2010
Bannock	73,608	78,600	81,808	85,147
Bingham	41,366	44,426	46,236	48,120
Bonneville	79,670	85,650	89,154	92,802
Jefferson	18,903	20,609	21,646	22,736
ROI total	213,547	229,285	238,844	248,804

Source: DOC 1997; Idaho Power 1996; State of Wyoming, Administration and Information 1996.

Table I–14. INEEL Region of Influence Projected Number of Owner and Renter Housing Units, 1990–2010

County	1990	1996	2000	2005	2010
Bannock	25,694	28,352	30,275	31,510	32,796
Bingham	12,664	14,095	15,138	15,754	16,396
Bonneville	26,049	29,036	31,215	32,493	33,822
Jefferson	5,353	6,094	6,643	6,978	7,329
ROI total	69,760	77,576	83,271	86,735	90,344

Source: DOC 1994; Idaho Power 1996; State of Wyoming, Administration and Information 1996.

Table I–15. INEEL Region of Influence Projected Student Enrollment, 1997–2010

County	1997	Capacity (%)	2000	2005	2010
Bannock County	14,673	86.5	15,413	16,042	16,697
Marsh Valley	1,609	74.0	1,690	1,759	1,831
Pocatello	13,064	88.3	13,723	14,283	14,866
Bingham County	11,248	84.7	11,867	12,350	12,853
Aberdeen	1,019	90.0	1,075	1,119	1,164
Blackfoot	4,510	90.0	4,758	4,952	5,154
Firth	1,044	88.0	1,101	1,146	1,193
Shelley	2,300	100.0	2,426	2,525	2,628
Snake River	2,375	65.0	2,506	2,608	2,714
Bonneville County	18,737	91.8	19,782	20,592	21,434
Bonneville	7,750	95.0	8,182	8,517	8,866
Idaho Falls	10,927	90.0	11,536	12,009	12,500
Swan Valley	60	50.0	63	66	69
Jefferson County	5,510	90.6	5,879	6,175	6,486
Jefferson	4,033	90.0	4,303	4,520	4,747
Ririe	750	97.0	800	840	883
West Jefferson	727	88.0	776	815	856
ROI total	50,168	88.4	52,941	55,158	57,470

Source: Idaho Power 1996; Nemeth 1997a; State of Wyoming, Administration and Information 1996.

Table I–16. INEEL Region of Influence Projected Number of Teachers, 1997–2010

County	1997	Student/Teacher Ratio	2000	2005	2010
Bannock County	822	17.9	863	899	935
Marsh Valley	113	14.2	119	124	129
Pocatello	709	18.4	745	775	807
Bingham County	619	18.2	653	680	707
Aberdeen	61	16.7	64	67	70
Blackfoot	240	18.8	253	264	274
Firth	65	16.1	69	71	74
Shelley	121	19.0	128	133	138
Snake River	132	18.0	139	145	151
Bonneville County	930	20.1	982	1,022	1,064
Bonneville	425	18.2	449	467	486
Idaho Falls	500	21.9	528	549	572
Swan Valley	5	12.0	5	5	6
Jefferson County	299	18.4	319	335	352
Jefferson	212	19.0	226	238	250
Ririe	41	18.3	44	46	48
West Jefferson	46	15.8	49	52	54
ROI total	2,670	18.8	2,817	2,936	3,059

Source: Idaho Power 1996; Nemeth 1997a; State of Wyoming, Administration and Information 1996.

Table I–17. INEEL Region of Influence Projected Number of Sworn Police Officers, 1997–2010

County	1997	2000	2005	2010
Bannock	214	225	234	244
Bingham	53	56	58	61
Bonneville	181	191	199	207
Jefferson	27	29	30	32
ROI total	475	501	521	544

Source: Idaho Power 1996; Nemeth 1997b; State of Wyoming, Administration and Information 1996.

Table I–18. INEEL Region of Influence Projected Number of Firefighters, 1997–2010

County	1997	2000	2005	2010
Bannock	179	188	196	204
Bingham	144	152	158	165
Bonneville	149	157	164	170
Jefferson	88	94	99	104
ROI total	560	591	616	643

Source: Idaho Power 1996; Nemeth 1997b; State of Wyoming, Administration and Information 1996.

Table I–19. INEEL Region of Influence Projected Number of Hospital Beds, 1997–2010

County	1997	2000	2005	2010
Bannock	413	434	451	470
Bingham	254	268	279	290
Bonneville	312	329	343	357
Jefferson	–	–	–	–
ROI total	978	1,031	1,073	1,117

Source: Idaho Power 1996; Nemeth 1997c; State of Wyoming, Administration and Information 1996.

Table I–20. INEEL Region of Influence Projected Number of Doctors, 1996–2010

County	1996	2000	2005	2010
Bannock	139	146	152	158
Bingham	22	23	24	25
Bonneville	163	172	179	186
Jefferson	5	5	6	6
ROI total	329	347	361	375

Source: Idaho Power 1996; Randolph 1997; State of Wyoming, Administration and Information 1996.

I.3 PANTEX

Table I–21. Pantex Projected Site Employment

Year	Employment	Change From Previous (%)	Change From 1997 (%)
1997	2,944	–	–
2000	2,500	-15.08	-15.08
2005	1,750	-30.00	-40.56
2010	1,750	0.00	-40.56
2015	1,750	0.00	-40.56
2020	1,750	0.00	-40.56

Source: Mason & Hanger Corporation 1997.

Table I–22. Pantex Regional Economic Area Projected Employment and Economy, 1996–2010

Regional Economic Area	1996	2000	2005	2010
Civilian labor force	234,702	243,043	253,140	263,768
Total employment	223,237	231,799	241,453	251,614
Unemployment rate (%)	4.6	4.6	4.6	4.6

Source: DOC 1997; DOL 1999; Texas State Data Center 1996; University of New Mexico 1997.

Table I–23. Pantex Region of Influence Projected Population, 1996–2010

County	1996	2000	2005	2010
Carson	6,714	6,758	6,843	6,929
Potter	108,636	113,692	119,023	124,603
Randall	97,379	102,841	108,810	115,126
ROI total	212,729	223,291	234,676	246,658

Source: DOC 1997; Texas State Data Center 1996; University of New Mexico 1997.

Table I–24. Pantex Region of Influence Projected Number of Owner and Renter Housing Units, 1990–2010

County	1990	1996	2000	2005	2010
Carson	2,856	2,884	2,903	2,939	2,976
Potter	42,927	45,959	48,098	50,353	52,173
Randall	37,807	41,032	43,333	45,849	48,510
ROI total	83,590	89,875	94,334	99,141	104,200

Source: DOC 1994, 1997; Texas State Data Center 1996; University of New Mexico 1997.

Table I–25. Pantex Region of Influence Projected Student Enrollment, 1997–2010

County	1997	Capacity (%)	2000	2005	2010
Carson County	860	76.4	864	875	886
Groom	195	55.7	196	198	201
Panhandle	125	85.0	126	127	129
White Deer	540	86.0	543	549	556
Potter County	31,707	98.8	32,807	34,346	35,956
Amarillo	29,023	100.0	30,030	31,458	32,912
Bushland	447	85.1	463	484	507
Highland Park	787	85.0	814	852	892
River Road	1,450	90.0	1,500	1,571	1,644
Randall County	7,249	100.0	7,552	7,990	8,454
Canyon	7,249	100.0	7,552	7,990	8,454
ROI total	39,816	98.4	41,224	43,211	45,296

Source: DOC 1997; Nemeth 1997a; Texas State Data Center 1996; University of New Mexico 1997.

Table I–26. Pantex Region of Influence Projected Number of Teachers, 1997–2010

County	1997	Student/Teacher Ratio	2000	2005	2010
Carson County	106	8.2	108	111	115
Groom	20	10.0	20	20	20
Panhandle	59	2.1	61	64	67
White Deer	27	20.0	27	27	28
Potter County	2,122	14.9	2,196	2,299	2,406
Amarillo	1,913	15.2	1,979	2,072	2,169
Bushland	35	12.8	36	38	40
Highland Park	54	14.6	56	58	61
River Road	120	12.1	124	130	136
Randall County	436	16.6	454	481	508
Canyon	436	16.6	454	481	508
ROI total	2,664	14.9	2,758	2,890	3,030

Source: DOC 1997; Nemeth 1997a; Texas State Data Center 1996; University of New Mexico 1997.

Table I–27. Pantex Region of Influence Projected Number of Sworn Police Officers, 1997–2010

County	1997	2000	2005	2010
Carson	16	16	16	16
Potter	445	460	482	505
Randall	81	84	89	94
ROI total	542	560	587	615

Source: DOC 1997; Nemeth 1997b; Texas State Data Center 1996; University of New Mexico 1997.

Table I–28. Pantex Region of Influence Projected Number of Firefighters, 1997–2010

County	1997	2000	2005	2010
Carson	88	88	90	91
Potter	288	298	312	327
Randall	111	116	122	129
ROI total	487	502	524	547

Source: DOC 1997; Nemeth 1997b; Texas State Data Center 1996; University of New Mexico 1997.

Table I–29. Pantex Region of Influence Projected Number of Hospital Beds, 1997–2010

County	1997	2000	2005	2010
Carson	–	–	–	–
Potter	1,208	1,250	1,309	1,370
Randall	52	54	57	61
ROI total	1,260	1,304	1,366	1,431

Source: DOC 1997; Nemeth 1997c; Texas State Data Center 1996; University of New Mexico 1997.

Table I–30. Pantex Region of Influence Projected Number of Doctors, 1996–2010

County	1996	2000	2005	2010
Carson	–	–	–	–
Potter	515	533	558	584
Randall	16	17	18	19
ROI total	531	550	576	603

Source: DOC 1997; Randolph 1997; Texas State Data Center 1996; University of New Mexico 1997.

I.4 SRS

Table I–31. SRS Projected Employment

Year	Employment	Change From Previous (%)	Change From 1997 (%)
1997	15,032	–	–
2000	14,000	-6.87	-6.87
2005	12,000	-14.29	-20.17
2010	10,000	-16.67	-33.48
2015	10,000	0.00	-33.48
2020	10,000	0.00	-33.48

Source: Knox 1997.

Table I–32. SRS Regional Economic Area Projected Employment and Economy, 1996–2010

Regional Economic Area	1996	2000	2005	2010
Civilian labor force	257,101	272,378	287,049	302,663
Total employment	237,611	251,830	265,486	280,022
Unemployment rate (%)	7.6	7.5	7.5	7.5

Source: DOC 1997; DOL 1999; Georgia Institute of Technology 1997; South Carolina Budget & Control Board 1997.

Table I–33. SRS Region of Influence Projected Population, 1996–2010

County	1996	2000	2005	2010
Aiken	133,130	143,167	154,965	167,735
Barnwell	21,640	22,512	23,107	23,718
Columbia	86,173	97,936	104,636	111,795
Edgefield	19,051	19,786	20,318	20,864
Richmond	193,784	202,466	213,133	224,363
ROI total	453,778	485,867	516,159	548,475

Source: DOC 1997; Georgia Institute of Technology 1997; South Carolina Budget & Control Board 1997.

Table I–34. SRS Region of Influence Projected Number of Owner and Renter Housing Units, 1990–2010

County	1990	1996	2000	2005	2010
Aiken	49,266	54,941	59,083	63,952	69,222
Barnwell	7,854	8,334	8,669	8,899	9,134
Columbia	23,745	28,769	32,697	34,933	37,323
Edgefield	7,290	7,716	8,014	8,229	8,450
Richmond	77,288	82,540	86,238	90,781	95,564
ROI total	165,433	182,300	194,701	206,795	219,694

Source: DOC 1994, 1997; Georgia Institute of Technology 1997; South Carolina Budget & Control Board 1997.

Table I–35. SRS Region of Influence Projected Student Enrollment, 1997–2010

County	1997	Capacity (%)	2000	2005	2010
Aiken County	24,830	100.0	26,221	28,382	30,721
Barnwell County	5,055	92.6	5,207	5,345	5,486
District 45	2,770	99.0	2,854	2,929	3,007
District 19	1,230	85.0	1,267	1,300	1,335
District 29	1,055	87.0	1,087	1,115	1,145
Columbia County	18,178	100.0	20,009	21,378	22,840
Edgefield County	4,100	95.0	4,218	4,331	4,448
Richmond County	36,841	125.0	38,072	40,078	42,190
ROI total	89,004	108.2	93,728	99,514	105,685

Source: DOC 1997; Georgia Institute of Technology 1997; Nemeth 1997a; South Carolina Budget & Control Board 1997.

Table I–36. SRS Region of Influence Projected Number of Teachers, 1997–2010

County	1997	Student/Teacher Ratio	2000	2005	2010
Aiken County	1,343	18.5	1,418	1,535	1,662
Barnwell County	304	16.6	313	321	330
District 45	115	24.1	118	122	125
District 19	82	15.0	84	87	89
District 29	107	9.9	110	113	116
Columbia County	1,085	16.8	1,194	1,276	1,363
Edgefield County	312	13.1	321	330	338
Richmond County	2,159	17.1	2,231	2,349	2,472
ROI total	5,203	17.1	5,478	5,811	6,166

Source: DOC 1997; Georgia Institute of Technology 1997; Nemeth 1997a; South Carolina Budget & Control Board 1997.

Table I–37. SRS Region of Influence Projected Number of Sworn Police Officers, 1997–2010

County	1997	2000	2005	2010
Aiken	243	257	278	301
Barnwell	45	46	48	49
Columbia	170	187	200	214
Edgefield	43	44	45	47
Richmond	472	488	513	541
ROI total	973	1,022	1,084	1,150

Source: DOC 1997; Georgia Institute of Technology 1997; Nemeth 1997b; South Carolina Budget & Control Board 1997.

Table I–38. SRS Region of Influence Projected Number of Firefighters, 1997–2010

County	1997	2000	2005	2010
Aiken	875	924	1,000	1,083
Barnwell	130	134	137	141
Columbia	245	270	288	308
Edgefield	150	154	158	163
Richmond	312	322	339	357
ROI total	1,712	1,804	1,924	2,052

Source: DOC 1997; Georgia Institute of Technology 1997; Nemeth 1997b; South Carolina Budget & Control Board 1997.

Table I–39. SRS Region of Influence Projected Number of Hospital Beds, 1997–2010

County	1997	2000	2005	2010
Aiken	225	238	257	278
Barnwell	53	55	56	58
Columbia	–	–	–	–
Edgefield	40	41	42	43
Richmond	3,190	3,297	3,470	3,653
ROI total	3,508	3,630	3,826	4,032

Source: DOC 1997; Georgia Institute of Technology 1997; Nemeth 1997c; South Carolina Budget & Control Board 1997.

Table I–40. SRS Region of Influence Projected Number of Doctors, 1996–2010

County	1996	2000	2005	2010
Aiken	179	189	205	221
Barnwell	11	11	12	12
Columbia	297	327	349	373
Edgefield	13	13	14	14
Richmond	1,222	1,263	1,329	1,399
ROI total	1,722	1,803	1,909	2,020

Source: DOC 1997; Georgia Institute of Technology 1997; Randolph 1997; South Carolina Budget & Control Board 1997.

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Appendix J
Human Health Risks

This appendix presents detailed information on the potential impacts to humans associated with incident-free (normal) releases of radioactivity from the proposed surplus plutonium disposition facilities. This information supports the human health risk assessments described in Chapter 4. In addition, site-specific input data used in the evaluation of these human health impacts are also provided or referenced where appropriate. The proposed facilities would be at one or more of four candidate U.S. Department of Energy (DOE) sites: the Hanford Site (Hanford), Idaho National Engineering and Environmental Laboratory (INEEL), the Pantex Plant (Pantex), and the Savannah River Site (SRS). Information is also presented on the human health impacts of mixed oxide (MOX) fuel lead assembly fabrication activities at five potential DOE sites: Argonne National Laboratory–West (ANL–W) at INEEL, Hanford, Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), and SRS.

J.1 HANFORD

J.1.1 Assessment Data

To perform the dose assessments for the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS), different types of data were collected and generated. In addition, calculational assumptions were made. Appendix F.10 provides a summary of the methods and tools (e.g., the GENII computer code) used for the assessments.

J.1.1.1 Meteorological Data

The meteorological data used for the Hanford dose assessments was in the form of a joint frequency data (JFD) file. A JFD file is a table that lists the percentages of time the wind blows in a certain direction, at a certain speed, and within a certain stability class. The JFD file was based on measurements taken over a period of several years at a specific location and height. Average annual meteorological conditions, averaged over the measurement period, were used for normal operations. Table J–1 presents the JFD used in the dose assessments for Hanford.

J.1.1.2 Population Data

The Hanford population distribution was based on the *1990 Census of Population and Housing Data* (DOC 1992). Projections were determined for the year 2010 (about midlife of operations) for areas within 80 km (50 mi) of the locations for the proposed surplus plutonium disposition facilities. The site population in 2010 was assumed to be representative of the population over the operational period evaluated. The population was spatially distributed on a circular grid with 16 directions and 10 radial distances out to an 80-km (50-mi) distance. The grid was centered at the Fuels and Materials Examination Facility (FMEF) in the 400 Area, the location from which radionuclides are assumed to be released during incident-free operations. Table J–2 presents the population data used for the dose assessments at Hanford.

J.1.1.3 Agricultural Data

The 1987 Census of Agriculture was the source used to generate site-specific data for food production. Food production was spatially distributed on a circular grid similar to that used for the population distribution described previously. This food grid (or wheel) was generated by combining the fraction of a county in each segment (e.g., south, southwest, north-northeast) and the county production of the eight food categories analyzed by GENII—leafy vegetables, root vegetables, fruits, grains, beef, poultry, milk, and eggs. Each

Table J–1. Hanford 1983–1991 Joint Frequency Distributions at 61-m Height

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
0.89	A	0.12	0.1	0.08	0.11	0.14	0.15	0.1	0.08	0.14	0.08	0.05	0.06	0.07	0.05	0.05	0.07
	B	0.05	0.05	0.05	0.05	0.06	0.05	0.04	0.03	0.07	0.03	0.02	0.02	0.03	0.02	0.03	0.03
	C	0.06	0.04	0.04	0.04	0.06	0.04	0.07	0.05	0.04	0.04	0.03	0.01	0.05	0.03	0.04	0.04
	D	0.32	0.23	0.2	0.18	0.25	0.26	0.24	0.28	0.36	0.26	0.19	0.15	0.22	0.19	0.22	0.21
	E	0.19	0.14	0.1	0.1	0.13	0.13	0.14	0.19	0.37	0.22	0.18	0.17	0.23	0.19	0.19	0.19
	F	0.22	0.14	0.1	0.09	0.13	0.11	0.15	0.2	0.34	0.2	0.2	0.12	0.2	0.14	0.16	0.16
	G	0.13	0.08	0.06	0.03	0.06	0.07	0.07	0.18	0.22	0.13	0.09	0.07	0.12	0.09	0.12	0.09
2.7	A	0.32	0.28	0.28	0.28	0.39	0.37	0.37	0.34	0.55	0.32	0.16	0.09	0.17	0.13	0.13	0.15
	B	0.12	0.09	0.08	0.06	0.12	0.07	0.1	0.11	0.15	0.12	0.05	0.05	0.05	0.04	0.06	0.07
	C	0.13	0.08	0.08	0.05	0.09	0.08	0.1	0.11	0.16	0.08	0.04	0.03	0.05	0.03	0.06	0.08
	D	0.58	0.41	0.37	0.26	0.38	0.33	0.46	0.59	0.85	0.49	0.25	0.15	0.33	0.36	0.47	0.41
	E	0.32	0.2	0.19	0.12	0.21	0.21	0.25	0.45	0.68	0.46	0.31	0.24	0.37	0.29	0.38	0.33
	F	0.35	0.23	0.15	0.07	0.12	0.09	0.18	0.36	0.64	0.31	0.23	0.16	0.18	0.18	0.23	0.22
	G	0.18	0.12	0.06	0.03	0.04	0.04	0.08	0.2	0.3	0.16	0.1	0.04	0.08	0.1	0.15	0.16
4.7	A	0.39	0.31	0.21	0.1	0.13	0.13	0.15	0.19	0.77	0.51	0.17	0.13	0.19	0.15	0.16	0.17
	B	0.14	0.09	0.06	0.04	0.04	0.04	0.04	0.07	0.2	0.16	0.06	0.04	0.03	0.02	0.06	0.06
	C	0.1	0.1	0.06	0.03	0.03	0.03	0.04	0.06	0.16	0.16	0.04	0.02	0.05	0.04	0.06	0.07
	D	0.59	0.38	0.26	0.14	0.16	0.14	0.32	0.55	0.97	0.75	0.27	0.15	0.34	0.46	0.63	0.55
	E	0.41	0.21	0.15	0.09	0.1	0.11	0.28	0.6	1.02	0.71	0.37	0.27	0.5	0.53	0.6	0.43
	F	0.37	0.22	0.11	0.06	0.07	0.06	0.17	0.48	0.73	0.44	0.21	0.11	0.16	0.2	0.37	0.29
	G	0.19	0.11	0.05	0.02	0.02	0.01	0.04	0.19	0.26	0.14	0.06	0.02	0.04	0.07	0.19	0.13
7.2	A	0.22	0.17	0.08	0.02	0.02	0.01	0.03	0.05	0.32	0.63	0.28	0.17	0.23	0.11	0.19	0.15
	B	0.07	0.05	0.01	0.01	0	0	0.02	0.01	0.1	0.22	0.06	0.05	0.05	0.03	0.07	0.03
	C	0.04	0.05	0.02	0.01	0	0.01	0.02	0.02	0.07	0.18	0.06	0.04	0.03	0.03	0.05	0.04
	D	0.27	0.19	0.09	0.04	0.02	0.04	0.1	0.25	0.65	0.86	0.37	0.2	0.29	0.5	0.75	0.4
	E	0.27	0.18	0.07	0.02	0.02	0.04	0.15	0.43	0.73	0.74	0.34	0.2	0.39	0.73	0.94	0.44
	F	0.21	0.14	0.06	0.02	0.02	0.01	0.09	0.33	0.52	0.39	0.14	0.07	0.09	0.16	0.45	0.26
	G	0.13	0.08	0.04	0.01	0.01	0.01	0.03	0.11	0.19	0.13	0.04	0.02	0.01	0.04	0.14	0.13

Table J–1. Hanford 1983–1991 Joint Frequency Distributions at 61-m Height (Continued)

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
9.8	A	0.05	0.05	0.03	0.01	0	0	0	0.01	0.08	0.29	0.21	0.12	0.12	0.08	0.12	0.04
	B	0.02	0.01	0.01	0	0	0	0	0	0.02	0.08	0.04	0.04	0.04	0.02	0.03	0.02
	C	0.02	0.02	0.01	0	0	0	0	0.01	0.02	0.08	0.06	0.03	0.03	0.03	0.03	0.01
	D	0.09	0.08	0.02	0.01	0	0.01	0.03	0.04	0.24	0.58	0.32	0.16	0.19	0.33	0.57	0.14
	E	0.1	0.12	0.04	0.01	0	0.01	0.06	0.17	0.37	0.51	0.26	0.13	0.17	0.43	0.73	0.22
	F	0.1	0.11	0.03	0.01	0.01	0	0.03	0.14	0.21	0.2	0.07	0.02	0.03	0.08	0.23	0.16
	G	0.05	0.04	0.02	0	0	0	0.01	0.07	0.09	0.05	0.03	0	0	0.02	0.1	0.07
13.0	A	0.01	0.02	0	0	0	0	0	0	0.02	0.09	0.1	0.1	0.08	0.03	0.07	0.01
	B	0	0.01	0	0	0	0	0	0	0.01	0.03	0.04	0.04	0.02	0.01	0.03	0.01
	C	0	0.01	0	0	0	0	0	0	0.01	0.02	0.04	0.02	0.02	0.01	0.02	0.01
	D	0.03	0.03	0.01	0	0	0	0.01	0.02	0.07	0.27	0.24	0.12	0.09	0.19	0.32	0.05
	E	0.04	0.08	0.03	0.01	0	0	0.02	0.05	0.13	0.32	0.25	0.1	0.07	0.2	0.33	0.07
	F	0.04	0.05	0.02	0.01	0	0	0.02	0.06	0.08	0.13	0.05	0.01	0.01	0.02	0.1	0.06
	G	0.01	0.01	0	0	0	0	0	0.02	0.02	0.03	0.01	0	0	0.01	0.05	0.04
16.0	A	0	0.01	0	0	0	0	0	0	0	0.02	0.06	0.03	0.02	0.01	0.01	0
	B	0	0.01	0	0	0	0	0	0	0	0.01	0.02	0.01	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0.01	0.02	0.01	0.01	0	0.01	0
	D	0.02	0.03	0.01	0.01	0	0	0	0.01	0.01	0.11	0.19	0.06	0.03	0.06	0.1	0.01
	E	0.01	0.04	0.03	0	0	0	0.01	0.02	0.05	0.16	0.16	0.04	0.02	0.04	0.09	0.01
	F	0.01	0.03	0	0	0	0	0	0.03	0.04	0.05	0.02	0	0.01	0	0.01	0.02
	G	0	0	0	0	0	0	0	0.02	0.02	0.02	0	0	0	0	0.02	0
19.0	A	0.02	0.03	0	0	0	0	0	0	0	0.01	0.05	0.01	0.01	0	0.01	0
	B	0	0.03	0	0	0	0	0	0	0	0	0.02	0	0	0	0	0
	C	0.01	0.02	0	0	0	0	0	0	0	0	0.03	0	0	0	0	0
	D	0.03	0.09	0	0	0	0	0	0	0	0.09	0.22	0.04	0.03	0.01	0.02	0
	E	0.03	0.1	0.02	0	0	0	0	0.02	0.02	0.1	0.14	0.02	0.01	0.01	0.01	0
	F	0.02	0.04	0.01	0	0	0	0	0.03	0.03	0.04	0.02	0	0	0	0.01	0
	G	0	0.01	0	0	0	0	0	0.02	0.02	0.02	0	0	0	0	0.01	0

Source: Neitzel 1996.

county's food production was assumed to be distributed uniformly over the given county's land area. These categorized food wheels were then used in the assessment of doses to the Hanford population from the ingestion pathway. The consumption rates used in the dose assessments were those for the maximally exposed individual (MEI) and average exposed individual. People living within the 80-km (50-mi) assessment area were assumed to consume only food grown in that area. Hanford food production and consumption data used for the dose assessments in the SPD EIS were obtained from the *Health Risk Data for Storage and Disposition Final PEIS* (HNUS 1996).

Table J–2. Projected Hanford Population Surrounding FMEF for Year 2010

Direction	Distance (mi)										Total
	0–1	1–2	2–3	3–4	4–5	5–10	10–20	20–30	30–40	40–50	
S	0	0	0	0	0	4,265	44,747	1,141	7,041	19,608	**76,802**
SSW	0	0	0	0	2	1,515	2,758	438	2,976	3,951	**11,640**
SW	0	0	0	0	42	1,388	4,788	316	227	2,047	**8,808**
WSW	0	0	0	0	0	54	2,387	17,154	3,588	325	**23,508**
W	0	0	0	0	0	0	766	6,201	28,142	15,966	**51,075**
WNW	0	0	0	0	0	0	5	879	1,233	9,074	**11,191**
NW	0	0	0	0	0	0	0	645	411	178	**12,34**
NNW	0	0	0	0	0	0	0	1,097	1,437	1,491	**4,025**
N	0	0	0	0	0	0	0	1,153	3,773	2,749	**7,675**
NNE	0	0	0	0	0	18	468	5,523	1,514	25,879	**33,402**
NE	0	0	0	0	0	95	827	7,348	3,019	1,256	**12,545**
ENE	0	0	0	0	0	345	1,544	3,737	423	446	**6,495**
E	0	0	0	0	0	425	948	451	351	327	**2,502**
ESE	0	0	0	0	0	434	655	347	266	326	**2,028**
SE	0	0	0	0	0	419	1,313	1,736	396	1,459	**5,323**
SSE	0	0	0	0	0	6,989	87,249	33,689	608	986	**129,521**
Total	**0**	**0**	**0**	**0**	**44**	**15,947**	**148,455**	**81,855**	**55,405**	**86,068**	**387,774**

Key: FMEF, Fuels and Materials Examination Facility.
Source: DOC 1992.

J.1.1.4 Source Term Data

Estimated incident-free radiological releases associated with the pit conversion, immobilization, and MOX facilities are presented in Tables J–3 through J–5. Stack heights and release locations are provided in the facility data reports (DOE 1999; UC 1998a, 1998b, 1999a, 1999b).

Table J–3. Estimated Incident-Free Annual Radiological Releases From the Pit Conversion Facility at Hanford

Isotope	(μCi/yr)
Plutonium 236	9.3×10^{-11}
Plutonium 238	0.065
Plutonium 239	0.69
Plutonium 240	0.18
Plutonium 241	0.69
Plutonium 242	4.8×10^{-5}
Americium 241	0.37
Hydrogen 3	1.1×10^{9}

Source: UC 1998a.

Table J–4. Estimated Incident-Free Annual Radiological Releases From the Immobilization Facility at Hanford

Isotope	Ceramic (17 t) (μCi/yr)	Ceramic (50 t) (μCi/yr)	Glass (17 t) (μCi/yr)	Glass (50 t) (μCi/yr)
Plutonium 236	–	–	–	–
Plutonium 238	–	0.57	–	0.52
Plutonium 239	3.7	9.5	3.4	8.6
Plutonium 240	1.7	3.1	1.6	2.8
Plutonium 241	110	100	98	93
Plutonium 242	1.3×10^{-3}	1.6×10^{-3}	1.2×10^{-3}	1.5×10^{-3}
Americium 241	2.3	5.4	2.2	5.0
Uranium 234	–	–	–	–
Uranium 235	1.1×10^{-5}	4.5×10^{-5}	2.3×10^{-6}	2.3×10^{-6}
Uranium 238	8.8×10^{-5}	3.5×10^{-4}	1.9×10^{-5}	1.9×10^{-5}

Source: UC 1999a, 1999b.

Table J–5. Estimated Incident-Free Annual Radiological Releases From the MOX Facility at Hanford

Isotope	(μCi/yr)
Plutonium 236	1.3×10^{-8}
Plutonium 238	8.5
Plutonium 239	91
Plutonium 240	23
Plutonium 241	101
Plutonium 242	6.1×10^{-3}
Americium 241	48
Uranium 234	5.1×10^{-3}
Uranium 235	2.1×10^{-4}
Uranium 238	0.012

Source: UC 1998b.

J.1.1.5 Other Calculational Assumptions

To estimate radiological impacts of incident-free operation of the proposed facilities at Hanford, the following additional assumptions and factors were considered, in accordance with the guidelines established in U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.109 (NRC 1977).

Ground surfaces were assumed to have no previous deposition of radionuclides for the purposes of modeling the incremental radiological impacts associated with surplus plutonium disposition activities. However, doses associated with true instances of prior deposition are accounted for in the Affected Environment and Cumulative Impacts sections.

The annual external exposure time to the plume and to soil contamination was 0.7 year for the MEI (NRC 1977).

The annual external exposure time to the plume and to soil contamination was 0.5 year for the population (NRC 1977).

The annual inhalation exposure time to the plume was 1 year for the MEI and general population (NRC 1977).

The exposed individual or population was assumed to have the characteristics and habits (e.g., inhalation and ingestion rates) of the adult human.

A semi-infinite/finite plume model was used for air immersion doses. Other pathways evaluated were ground exposure, inhalation, ingestion of food crops, and ingestion of contaminated animal products. Drinking water, aquatic food ingestion, and any other pathway that may involve liquid exposure were not examined because all releases are to the air.

Reported stack heights were used for atmospheric releases. The resultant doses were conservative as use of the actual stack height instead of the effective stack height negates plume rise.

The calculated doses are 50-year committed doses from 1 year of intake.

J.1.2 Facilities

The following sections present all viable radiological impact scenarios that could be associated with different combinations of incident-free facility operations at Hanford.

J.1.2.1 Pit Conversion Facility

J.1.2.1.1 Construction of Pit Conversion Facility

No radiological risk would be incurred by members of the public from construction and modification of a pit conversion facility at Hanford. According to recent surveys conducted in the 400 Area, a construction worker would not be expected to receive any additional dose above natural background levels (Antonio 1998). Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

J.1.2.1.2 Operation of Pit Conversion Facility

Tables J–6 and J–7 present the incident-free radiological impacts of the operation of a pit conversion facility at Hanford.

Table J–6. Potential Radiological Impacts on the Public of Operation of Pit Conversion Facility in FMEF at Hanford

Population within 80 km for year 2010	
Dose (person-rem)	6.9
Percent of natural background[a]	5.9×10^{-3}
10-year latent fatal cancers	0.034
Maximally exposed individual	
Annual dose (mrem)	0.017
Percent of natural background[a]	5.7×10^{-3}
10-year latent fatal cancer risk	8.5×10^{-8}
Average exposed individual within 80 km[b]	
Annual dose (mrem)	0.017
10-year latent fatal cancer risk	8.5×10^{-8}

[a] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.
[b] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford in 2010 (387,800).
Key: FMEF, Fuels and Materials Examination Facility.
Source: Model results.

Table J–7. Potential Radiological Impacts on Involved Workers of Operation of Pit Conversion Facility in FMEF at Hanford

Number of badged workers	383
Total dose (person-rem/yr)	192
10-year latent fatal cancers	0.77
Average worker dose (mrem/yr)	500
10-year latent fatal cancer risk	2.0×10^{-3}

Key: FMEF, Fuels and Materials Examination Facility.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

J.1.2.2 Immobilization Facility

J.1.2.2.1 Construction of Immobilization Facility

No radiological risk would be incurred by members of the public from the construction and modification of an immobilization (ceramic or glass) facility at Hanford. According to recent radiation surveys conducted in the 400 Area, a construction worker would not be expected to receive any additional dose above natural background levels (Antonio 1998). Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

J.1.2.2.2 Operation of Immobilization Facility

Tables J–8 and J–9 present all possible incident-free radiological impact scenarios for the operation of a ceramic or glass immobilization facility at Hanford.

Table J–8. Potential Radiological Impacts on the Public of Operation of Immobilization Facility in FMEF at Hanford

	17 t		50 t	
Impact	**Ceramic**	**Glass**	**Ceramic**	**Glass**
Population within 80 km for year 2010				
Dose (person-rem)	7.8×10^{-3}	7.1×10^{-3}	0.016	0.015
Percent of natural background[a]	6.7×10^{-6}	6.1×10^{-6}	1.4×10^{-5}	1.3×10^{-5}
10-year latent fatal cancers	3.9×10^{-5}	3.6×10^{-5}	8.0×10^{-5}	7.5×10^{-5}
Maximally exposed individual				
Annual dose (mrem)	1.1×10^{-4}	9.7×10^{-5}	2.2×10^{-4}	2.0×10^{-4}
Percent of natural background[a]	3.7×10^{-5}	3.2×10^{-5}	7.3×10^{-5}	6.7×10^{-5}
10-year latent fatal cancer risk	5.5×10^{-10}	4.9×10^{-10}	1.1×10^{-9}	1.0×10^{-9}
Average exposed individual within 80 km[b]				
Annual dose (mrem)	2.0×10^{-5}	1.8×10^{-5}	4.1×10^{-5}	3.9×10^{-5}
10-year latent fatal cancer risk	1.0×10^{-10}	9.0×10^{-11}	2.1×10^{-10}	2.0×10^{-10}

[a] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.
[b] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford in 2010 (387,800).
Key: FMEF, Fuels and Materials Examination Facility.
Source: Model results.

Table J–9. Potential Radiological Impacts on Involved Workers of Operation of Immobilization Facility in FMEF at Hanford[a]

	17 t		50 t	
Impact	**Ceramic**	**Glass**	**Ceramic**	**Glass**
Number of badged workers	365	365	397	397
Total dose (person-rem/yr)	274	274	298	298
10-year latent fatal cancers	1.1	1.1	1.2	1.2
Average worker dose (mrem/yr)	750	750	750	750
10-year latent fatal cancer risk	3.0×10^{-3}	3.0×10^{-3}	3.0×10^{-3}	3.0×10^{-3}

[a] The presented values are representative of the largest possible number of workers regardless of collocation considerations.
Key: FMEF, Fuels and Materials Examination Facility.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: UC 1999a, 1999b.

J.1.2.3 MOX Facility

J.1.2.3.1 Construction of MOX Facility

No radiological risk would be incurred by members of the public from the construction and modification of a MOX facility at Hanford. According to recent radiation surveys conducted in the 400 Area, a construction worker would not be expected to receive any additional dose above natural background levels (Antonio 1998). Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

J.1.2.3.2 Operation of MOX Facility

Tables J–10 and J–11 present the incident-free radiological impacts of the operation of a MOX facility at Hanford. The facility would either be located within the existing FMEF or a new facility would be built adjacent to FMEF.

Table J–10. Potential Radiological Impacts on the Public of Operation of MOX Facility in FMEF or New Construction at Hanford

Impact	FMEF[a]	New[a]
Population dose within 80 km for year 2010		
Dose (person-rem)	0.14	0.29
Percent of natural background[b]	1.2×10^{-4}	2.5×10^{-4}
10-year latent fatal cancers	6.9×10^{-4}	1.5×10^{-3}
Maximally exposed individual		
Annual dose (mrem)	1.8×10^{-3}	4.8×10^{-3}
Percent of natural background[b]	6.1×10^{-4}	1.6×10^{-3}
10-year latent fatal cancer risk	9.3×10^{-9}	2.4×10^{-8}
Average exposed individual within 80 km[c]		
Annual dose (mrem)	3.5×10^{-4}	7.5×10^{-4}
10-year latent fatal cancer risk	1.7×10^{-9}	3.7×10^{-9}

[a] The difference in impacts is attributable to different stack heights. As described in Section 4.26.1.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford in 2010 (387,800).

Key: FMEF, Fuels and Materials Examination Facility.

Source: Model results.

Table J–11. Potential Radiological Impacts on Involved Workers of Operation of MOX Facility in FMEF or New Construction at Hanford

Number of badged workers	331
Total dose (person-rem/yr)	22
10-year latent fatal cancers	0.088
Average worker dose (mrem/yr)	65
10-year latent fatal cancer risk	2.6×10^{-4}

Key: FMEF, Fuels and Materials Examination Facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999; UC 1998b.

J.1.2.4 Pit Conversion and Immobilization Facilities

J.1.2.4.1 Construction of Pit Conversion and Immobilization Facilities

No radiological risk would be incurred by members of the public from the construction and modification of pit conversion and immobilization (ceramic or glass) facilities at Hanford. According to recent radiation surveys conducted in the 400 Area, a construction worker would not be expected to receive any additional dose above

natural background levels (Antonio 1998). Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

J.1.2.4.2 Operation of Pit Conversion and Immobilization Facilities

Tables J–12 and J–13 present all possible incident-free radiological impact scenarios for the operation of the pit conversion and immobilization facilities at Hanford.

Table J–12. Potential Radiological Impacts on the Public of Operation of Pit Conversion and Immobilization Facilities in FMEF at Hanford

Impact	Pit Conversion	Immobilization (50 t) Ceramic	Immobilization (50 t) Glass	Total[a]
Population within 80 km for year 2010				
Dose (person-rem)	6.9	0.016	0.015	6.9
Percent of natural background[b]	5.9×10^{-3}	1.4×10^{-5}	1.3×10^{-5}	5.9×10^{-3}
10-year latent fatal cancers	0.034	8.0×10^{-5}	7.5×10^{-5}	0.034
Maximally exposed individual				
Annual dose (mrem)	0.017	2.2×10^{-4}	2.0×10^{-4}	0.017
Percent of natural background[b]	5.7×10^{-3}	7.3×10^{-5}	6.7×10^{-5}	5.8×10^{-3}
10-year latent fatal cancer risk	8.5×10^{-8}	1.1×10^{-9}	1.0×10^{-9}	8.6×10^{-8}
Average exposed individual within 80 km[c]				
Annual dose (mrem)	0.017	4.1×10^{-5}	3.9×10^{-5}	0.017
10-year latent fatal cancer risk	8.5×10^{-8}	2.1×10^{-10}	2.0×10^{-10}	8.5×10^{-8}

[a] Totals represent the largest possible sums for each public category. Totals are additive in all cases because the same groups or individuals would receive doses from both facilities.
[b] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.
[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford in 2010 (387,800).
Key: FMEF, Fuels and Materials Examination Facility.
Source: Model results.

Table J–13. Potential Radiological Impacts on Involved Workers of Operation of Pit Conversion and Immobilization Facilities in FMEF at Hanford

Impact	Pit Conversion	Immobilization (50 t)[a] Ceramic or Glass	Total
Number of badged workers	383	397	780
Total dose (person-rem/yr)	192	298	490
10-year latent fatal cancers	0.77	1.2	2.0
Average worker dose (mrem/yr)	500	750	628[b]
10-year latent fatal cancer risk	2.0×10^{-3}	3.0×10^{-3}	2.5×10^{-3}

[a] The presented values are representative of the largest possible number of workers regardless of collocation considerations.
[b] Represents an average of the doses for both facilities.
Key: FMEF, Fuels and Materials Examination Facility.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: UC 1998a, 1999a, 1999b.

J.1.2.5 Pit Conversion and MOX Facilities

J.1.2.5.1 Construction of Pit Conversion and MOX Facilities

No radiological risk would be incurred by members of the public from the modification of FMEF for pit disassembly and conversion and MOX fuel fabrication or construction of new MOX facility at Hanford. According to recent radiation surveys conducted in the 400 Area, a construction worker would not be expected to receive any additional dose above natural background levels (Antonio 1998). Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

J.1.2.5.2 Operation of Pit Conversion and MOX Facilities

Tables J–14 and J–15 present the incident-free radiological impacts of the operation of the pit conversion and MOX facilities at Hanford.

Table J–14. Potential Radiological Impacts on the Public of Operation of Pit Conversion and MOX Facilities in FMEF or New MOX Facility at Hanford

		MOX[a]		
Impact	**Pit Conversion**	**FMEF**	**New**	**Total[b]**
Population within 80 km for year 2010				
Dose (person-rem)	6.9	0.14	0.29	7.2
Percent of natural background[c]	5.9×10^{-3}	1.2×10^{-4}	2.5×10^{-4}	6.2×10^{-3}
10-year latent fatal cancers	0.034	7.0×10^{-4}	1.5×10^{-3}	0.036
Maximally exposed individual				
Annual dose (mrem)	0.017	1.8×10^{-3}	4.8×10^{-3}	0.022
Percent of natural background[c]	5.7×10^{-3}	6.1×10^{-4}	1.6×10^{-3}	7.3×10^{-3}
10-year latent fatal cancer risk	8.5×10^{-8}	9.3×10^{-9}	2.4×10^{-8}	1.1×10^{-7}
Average exposed individual within 80 km[d]				
Annual dose (mrem)	0.017	3.5×10^{-4}	7.5×10^{-4}	0.018
10-year latent fatal cancer risk	8.5×10^{-8}	1.7×10^{-9}	3.7×10^{-9}	8.9×10^{-8}

[a] As described in Section 4.26.1.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.
[b] Totals represent the largest possible sums for each public category. Totals are additive in all cases because the same groups or individuals would receive doses from both facilities.
[c] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.
[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford in 2010 (387,800).
Key: FMEF, Fuels and Materials Examination Facility.
Source: Model results.

Table J–15. Potential Radiological Impacts on Involved Workers of Operation of Pit Conversion and MOX Facilities in FMEF or New MOX Facility at Hanford

Impact	Pit Conversion	MOX (FMEF or New)	Total
Number of badged workers	383	331	714
Total dose (person-rem/yr)	192	22	214
10-year latent fatal cancers	0.77	0.088	0.86
Average worker dose (mrem/yr)	500	65	300[a]
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	1.2×10^{-3}

[a] Represents an average of the doses for both facilities.

Key: FMEF, Fuels and Materials Examination Facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999; UC 1998a, 1998b.

J.1.2.6 Immobilization and MOX Facilities

J.1.2.6.1 Construction of Immobilization and MOX Facilities

No radiological risk would be incurred by members of the public from the modification of FMEF for collocating plutonium conversion and immobilization (ceramic or glass) and MOX fuel fabrication or construction of a new MOX facility at Hanford. According to recent radiation surveys conducted in the 400 Area, a construction worker would not be expected to receive any additional dose above natural background levels (Antonio 1998). Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

J.1.2.6.2 Operation of Immobilization and MOX Facilities

Tables J–16 and J–17 present the incident-free radiological impacts of the operation of the immobilization and MOX facilities at Hanford.

Table J–16. Potential Radiological Impacts on the Public of Operation of Collocating Immobilization and MOX Facilities in FMEF or New MOX Facility at Hanford

	Immobilization (17 t)		MOX[a]		
Impact	**Ceramic**	**Glass**	**FMEF**	**New**	**Total[b]**
Population within 80 km for year 2010					
Dose (person-rem)	7.8×10^{-3}	7.1×10^{-3}	0.14	0.29	0.30
Percent of natural background[c]	6.7×10^{-6}	6.1×10^{-6}	1.2×10^{-4}	2.5×10^{-4}	2.6×10^{-4}
10-year latent fatal cancers	3.9×10^{-5}	3.6×10^{-5}	6.9×10^{-4}	1.5×10^{-3}	1.5×10^{-3}
Maximally exposed individual					
Annual dose (mrem)	1.1×10^{-4}	9.7×10^{-5}	1.8×10^{-3}	4.8×10^{-3}	4.9×10^{-3}
Percent of natural background[c]	3.7×10^{-5}	3.2×10^{-5}	6.1×10^{-4}	1.6×10^{-3}	1.6×10^{-3}
10-year latent fatal cancer risk	5.5×10^{-10}	4.9×10^{-10}	9.3×10^{-9}	2.4×10^{-8}	2.5×10^{-8}
Average exposed individual within 80 km[d]					
Annual dose (mrem)	2.0×10^{-5}	1.8×10^{-5}	3.5×10^{-4}	7.5×10^{-4}	7.7×10^{-4}
10-year latent fatal cancer risk	1.0×10^{-10}	9.0×10^{-11}	1.7×10^{-9}	3.7×10^{-9}	3.9×10^{-9}

[a] As described in Section 4.26.1.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.
[b] Totals represent the largest possible sums for each public category. Totals are additive in all cases because the same groups or individuals would receive doses from both facilities.
[c] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.
[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford in 2010 (387,800).
Key: FMEF, Fuels and Materials Examination Facility.
Source: Model results.

Table J–17. Potential Radiological Impacts on Involved Workers of Operation of Collocating Immobilization and MOX Facilities in FMEF or New MOX Facility at Hanford

	Immobilization (17 t)[a]	MOX	
Impact	**Ceramic or Glass**	**(FMEF or New)**	**Total**
Number of badged workers	365	331	696
Total dose (person-rem/yr)	274	22	296
10-year latent fatal cancers	1.1	0.088	1.2
Average worker dose (mrem/yr)	750	65	425[b]
10-year latent fatal cancer risk	3.0×10^{-3}	2.6×10^{-4}	1.7×10^{-3}

[a] The presented values are representative of the largest possible number of workers regardless of collocation considerations.
[b] Represents an average of the doses for both facilities.
Key: FMEF, Fuels and Materials Examination Facility.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1999; UC 1998b, 1999a, 1999b.

J.1.2.7 Pit Conversion, Immobilization, and MOX Facilities

J.1.2.7.1 Construction of Pit Conversion, Immobilization, and MOX Facilities

No radiological risk would be incurred by members of the public from the modification of FMEF for pit disassembly and conversion and plutonium conversion and immobilization (ceramic or glass) and construction of a new MOX facility at Hanford. According to recent radiation surveys conducted at the 400 Area, a construction worker would not be expected to receive any additional dose above natural background levels (Antonio 1998). Nonetheless, if deemed necessary, workers may be monitored (badged) as a precautionary measure.

J.1.2.7.2 Operation of Pit Conversion, Immobilization, and MOX Facilities

Tables J–18 and J–19 present all possible incident-free radiological impact scenarios for operating all three facilities at Hanford.

Table J–18. Potential Radiological Impacts on the Public of Operation of Pit Conversion and Immobilization Facilities in FMEF and New MOX Facility at Hanford

Impact	Pit Conversion	Immobilization (17 t)		MOX[a]		Total[b]
		Ceramic	Glass	FMEF	New	
Population within 80 km for year 2010						
Dose (person-rem)	6.9	7.8×10^{-3}	7.1×10^{-3}	0.14	0.29	7.2
Percent of natural background[c]	5.9×10^{-3}	6.7×10^{-6}	6.1×10^{-6}	1.2×10^{-4}	2.5×10^{-4}	6.2×10^{-3}
10-year latent fatal cancers	0.034	3.9×10^{-5}	3.6×10^{-5}	6.9×10^{-4}	1.5×10^{-3}	0.036
Maximally exposed individual						
Annual dose (mrem)	0.017	1.1×10^{-4}	9.7×10^{-5}	1.8×10^{-3}	4.8×10^{-3}	0.022
Percent of natural background[c]	5.7×10^{-3}	3.7×10^{-5}	3.2×10^{-5}	6.1×10^{-4}	1.6×10^{-3}	7.3×10^{-3}
10-year latent fatal cancer risk	8.5×10^{-8}	5.5×10^{-10}	4.9×10^{-10}	9.3×10^{-9}	2.4×10^{-8}	1.1×10^{-7}
Average exposed individual within 80 km[d]						
Annual dose (mrem)	0.017	2.0×10^{-5}	1.8×10^{-5}	3.5×10^{-4}	7.5×10^{-4}	0.018
10-year latent fatal cancer risk	8.5×10^{-8}	1.0×10^{-10}	9.0×10^{-11}	1.7×10^{-9}	3.7×10^{-9}	8.9×10^{-8}

[a] As described in Section 4.26.1.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.
[b] Totals represent the largest possible sums for each public category. Totals are additive in all cases because the same groups or individuals would receive doses from all three facilities.
[c] The annual natural background radiation level at Hanford is 300 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 116,300 person-rem.
[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Hanford in 2010 (387,800).
Key: FMEF, Fuels and Materials Examination Facility.
Source: Model results.

Table J–19. Potential Radiological Impacts on Involved Workers of Operation of Pit Conversion and Immobilization Facilities in FMEF and New MOX Facility at Hanford

Impact	Pit Conversion	Immobilization (17 t)[a] Ceramic or Glass	MOX (FMEF or New)	Total
Number of badged workers	383	365	331	1,079
Total dose (person-rem/yr)	192	274	22	488
10-year latent fatal cancers	0.77	1.1	0.088	2.0
Average worker dose (mrem/yr)	500	750	65	452[b]
10-year latent fatal cancer risk	2.0×10^{-3}	3.0×10^{-3}	2.6×10^{-4}	1.8×10^{-3}

[a] The presented values are representative of the largest possible number of workers regardless of collocation considerations.
[b] Represents an average of the doses for all three facilities.

Key: FMEF, Fuels and Materials Examination Facility.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999; UC 1998b, 1999a, 1999b.

J.2 INEEL

J.2.1 Assessment Data

To perform the dose assessments for the SPD EIS, different types of data were collected and generated. In addition, calculational assumptions were made. Appendix F.10 provides a summary of the methods and tools (e.g., the GENII computer code) that were used for the assessments.

J.2.1.1 Meteorological Data

The meteorological data used for the INEEL dose assessments was in the form of JFD file. A JFD file is a table listing the percentages of time the wind blows in a certain direction, at a certain speed, and within a certain stability class. The JFD file was based on measurements taken over a period of several years at a specific location and height. Average annual meteorological conditions, averaged over the measurement period, were used for normal operations. Table J–20 presents the JFD used in the dose assessments for INEEL.

J.2.1.2 Population Data

The INEEL population distribution was based on the *1990 Census of Population and Housing Data* (DOC 1992). Projections were determined for the year 2010 (about midlife of operations) for areas within 80 km (50 mi) of the locations for the proposed surplus plutonium disposition facilities. The site population in 2010 was assumed to be representative of the population over the operational period evaluated. The population was spatially distributed on a circular grid with 16 directions and 10 radial distances out to an 80-km (50-mi) distance. The grid was centered at the Idaho Nuclear Technology and Engineering Center (INTEC), the location from which radionuclides are assumed to be released during incident-free operations. Table J–21 presents the population data used for the dose assessments at INEEL.

J.2.1.3 Agricultural Data

The 1987 Census of Agriculture was the source used to generate site-specific data for food production. Food production was spatially distributed on a circular grid similar to that used for the population distribution described previously. This food grid (or wheel) was generated by combining the fraction of a county in each segment (e.g., south, southwest, north-northeast) and the county production of the eight food categories analyzed by GENII–leafy vegetables, root vegetables, fruits, grains, beef, poultry, milk, and eggs. Each county's food production was assumed to be distributed uniformly over the given county's land area. These categorized food wheels were then used in the assessment of doses to the INEEL population from the ingestion pathway. The consumption rates used in the dose assessments were those for the MEI and average exposed individual. People living within the 80-km (50-mi) assessment area were assumed to consume only food grown in that area. INEEL food production and consumption data used for the dose assessments in the SPD EIS were obtained from the *Health Risk Data for Storage and Disposition Final PEIS* (HNUS 1996).

Table J–20. INEEL 1987–1991 Joint Frequency Distributions at 61-m Height

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
1.0	A	0.2	0.31	0.28	0.21	0.2	0.19	0.24	0.22	0.17	0.16	0.11	0.11	0.1	0.11	0.09	0.15
	B	0.04	0.06	0.03	0.01	0.01	0.01	0.01	0.02	0.03	0.02	0.01	0.01	0.01	0	0	0.01
	C	0.04	0.07	0.07	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
	D	0.15	0.26	0.15	0.08	0.03	0.05	0.04	0.07	0.07	0.07	0.04	0.05	0.05	0.05	0.05	0.08
	E	0.14	0.17	0.15	0.08	0.07	0.07	0.04	0.06	0.05	0.07	0.06	0.04	0.04	0.05	0.06	0.06
	F	0.4	0.46	0.44	0.3	0.23	0.2	0.16	0.18	0.13	0.16	0.15	0.16	0.17	0.16	0.18	0.27
2.5	A	0.25	0.45	0.58	0.49	0.4	0.34	0.31	0.49	0.63	0.66	0.57	0.32	0.24	0.14	0.18	0.18
	B	0.06	0.18	0.21	0.11	0.03	0.02	0.02	0.05	0.08	0.12	0.08	0.05	0.03	0.01	0.01	0.02
	C	0.15	0.35	0.4	0.09	0.02	0.01	0.02	0.05	0.11	0.1	0.12	0.03	0.04	0.02	0.01	0.03
	D	0.55	1.78	1.05	0.2	0.07	0.04	0.08	0.1	0.17	0.3	0.32	0.2	0.1	0.07	0.08	0.12
	E	0.32	0.75	0.52	0.15	0.07	0.04	0.06	0.09	0.09	0.17	0.15	0.18	0.07	0.06	0.07	0.09
	F	0.77	1.65	1.38	0.67	0.34	0.24	0.21	0.27	0.31	0.51	0.47	0.48	0.35	0.32	0.34	0.38
4.5	A	0.02	0.05	0.05	0.03	0.02	0.01	0.02	0.04	0.08	0.1	0.09	0.08	0.02	0.02	0.02	0.01
	B	0.07	0.12	0.16	0.09	0.04	0.03	0.04	0.12	0.2	0.39	0.4	0.2	0.1	0.05	0.08	0.06
	C	0.07	0.19	0.33	0.13	0.02	0.02	0.02	0.08	0.14	0.33	0.58	0.21	0.07	0.05	0.03	0.06
	D	0.45	2.59	2.36	0.33	0.07	0.05	0.08	0.22	0.36	0.91	1.18	0.7	0.22	0.12	0.12	0.21
	E	0.34	1.26	0.93	0.17	0.04	0.03	0.06	0.11	0.21	0.34	0.49	0.38	0.15	0.08	0.12	0.17
	F	0.35	1.2	1.25	0.37	0.12	0.06	0.04	0.15	0.17	0.33	0.43	0.34	0.18	0.08	0.12	0.16
6.9	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0
	C	0.06	0.07	0.08	0.03	0.02	0.01	0.02	0.07	0.1	0.23	0.46	0.27	0.1	0.04	0.05	0.04
	D	0.67	1.47	1.6	0.35	0.06	0.03	0.08	0.26	0.4	1.28	2.95	1.78	0.44	0.16	0.08	0.4
	E	0.15	0.8	0.8	0.16	0.03	0.01	0.06	0.13	0.13	0.33	0.88	0.69	0.11	0.02	0.01	0.08
	F	0.05	0.2	0.25	0.07	0.01	0.01	0	0.02	0.02	0.01	0.1	0.11	0.01	0.01	0	0.01
9.6	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0.01	0.01	0.01	0	0	0
	D	0.64	0.61	0.74	0.16	0.02	0.01	0.04	0.16	0.29	1.1	3.53	1.98	0.38	0.12	0.07	0.26
	E	0.03	0.12	0.17	0.07	0	0	0.01	0.03	0.03	0.06	0.37	0.28	0.04	0.01	0	0
	F	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0
13.2	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D	0.25	0.25	0.18	0.05	0	0	0.02	0.08	0.16	0.55	2.88	2.13	0.18	0.11	0.01	0.05
	E	0	0	0	0	0	0	0	0	0	0	0.01	0.01	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table J–20. INEEL 1987–1991 Joint Frequency Distributions at 61-m Height (Continued)

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
19.0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D	0.01	0.05	0.01	0.01	0	0	0	0	0	0.04	0.47	0.48	0.01	0.01	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25.0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Sagendorf 1992.

Table J–21. Projected INEEL Population Surrounding INTEC for Year 2010

Direction	Distance (mi)										Total
	0–1	1–2	2–3	3–4	4–5	5–10	10–20	20–30	30–40	40–50	
S	0	0	0	0	0	32	204	340	1,222	3,624	**5,422**
SSW	0	0	0	0	0	22	92	182	335	445	**1,076**
SW	0	0	0	0	0	22	87	117	163	304	**693**
WSW	0	0	0	0	0	0	87	136	149	262	**634**
W	0	0	0	0	0	0	87	180	392	280	**939**
WNW	0	0	0	0	0	0	269	519	445	311	**1,544**
NW	0	0	0	0	0	6	384	620	772	720	**2,502**
NNW	0	0	0	0	0	6	96	97	315	173	**687**
N	0	0	0	0	0	0	25	45	77	100	**247**
NNE	0	0	0	0	0	0	25	48	170	161	**404**
NE	0	0	0	0	0	0	0	285	652	342	**1,279**
ENE	0	0	0	0	0	0	0	332	575	1,057	**1,964**
E	0	0	0	0	0	0	0	506	1,203	12,055	**13,764**
ESE	0	0	0	0	0	0	208	947	1,536	103,127	**105,818**
SE	0	0	0	0	0	0	219	374	16,764	11,931	**29,288**
SSE	0	0	0	0	0	20	212	346	7,427	8,500	**16,505**
Total	**0**	**0**	**0**	**0**	**0**	**108**	**1,995**	**5,074**	**32,197**	**143,392**	**182,766**

Key: INTEC, Idaho Nuclear Technology and Engineering Center.
Source: DOC 1992.

J.2.1.4 Source Term Data

Estimated incident-free radiological releases associated with the pit conversion and MOX facilities are presented in Tables J–22 and J–23. Stack heights and release locations are provided in the facility data reports (DOE 1999; UC 1998c, 1998d).

Table J–22. Estimated Incident-Free Annual Radiological Releases From the Pit Conversion Facility at INEEL

Isotope	(μCi/yr)
Plutonium 236	9.3×10^{-11}
Plutonium 238	0.065
Plutonium 239	0.69
Plutonium 240	0.18
Plutonium 241	0.69
Plutonium 242	4.8×10^{-5}
Americium 241	0.37
Hydrogen 3	1.1×10^{9}

Source: UC 1998c.

Table J–23. Estimated Incident-Free Annual Radiological Releases From the MOX Facility at INEEL

Isotope	(μCi/yr)
Plutonium 236	1.3×10^{-8}
Plutonium 238	8.5
Plutonium 239	91
Plutonium 240	23
Plutonium 241	101
Plutonium 242	6.1×10^{-3}
Americium 241	48
Uranium 234	5.1×10^{-3}
Uranium 235	2.1×10^{-4}
Uranium 238	0.012

Source: UC 1998d.

J.2.1.5 Other Calculational Assumptions

To estimate radiological impacts of incident-free operation of the proposed facilities at INEEL, the following additional assumptions and factors were considered, in accordance with the guidelines established in NRC Regulatory Guide 1.109 (NRC 1977).

Ground surfaces were assumed to have no previous deposition of radionuclides for the purposes of modeling the incremental radiological impacts associated with surplus plutonium disposition activities. However, doses associated with true instances of prior deposition are accounted for in the Affected Environment and Cumulative Impacts sections.

The annual external exposure time to the plume and to soil contamination was 0.7 year for the MEI (NRC 1977).

The annual external exposure time to the plume and to soil contamination was 0.5 year for the population (NRC 1977).

The annual inhalation exposure time to the plume was 1 year for the MEI and general population (NRC 1977).

The exposed individual or population was assumed to have the characteristics and habits (e.g., inhalation and ingestion rates) of the adult human.

A semi-infinite/finite plume model was used for air immersion doses. Other pathways evaluated were ground exposure, inhalation, ingestion of food crops, and ingestion of contaminated animal products. Drinking water, aquatic food ingestion, and any other pathway that may involve liquid exposure were not examined because all releases are to the air.

Reported stack heights were used for atmospheric releases. The resultant doses were conservative as use of the actual stack height instead of the effective stack height negates plume rise.

The calculated doses are 50-year committed doses from 1 year of intake.

J.2.2 Facilities

The following sections present all viable radiological impact scenarios that could be associated with different combinations of incident-free facility operations at INEEL.

J.2.2.1 Pit Conversion Facility

J.2.2.1.1 Construction of Pit Conversion Facility

No radiological risk would be incurred by members of the public from construction and modification of a pit conversion facility in the Fuel Processing Facility (FPF) at INEEL. According to a recent radiation survey (Mitchell et al. 1997) conducted in the INTEC area, a construction worker could receive about 5 mrem/yr above natural background levels from exposure to radiation deriving from other activities, past or present, at the site. Construction worker exposures would be kept as low as is reasonably achievable, and workers would be monitored (badged) as appropriate.

J.2.2.1.2 Operation of Pit Conversion Facility

Tables J–24 and J–25 present the incident-free radiological impacts of the operation of a pit conversion facility at INEEL.

Table J–24. Potential Radiological Impacts on the Public of Operation of Pit Conversion Facility in FPF at INEEL

Population within 80 km for year 2010	
Dose (person-rem)	2.2
Percent of natural background[a]	3.3×10^{-3}
10-year latent fatal cancers	0.011
Maximally exposed individual	
Annual dose (mrem)	0.015
Percent of natural background[a]	4.2×10^{-3}
10-year latent fatal cancer risk	7.5×10^{-8}
Average exposed individual within 80 km[b]	
Annual dose (mrem)	0.012
10-year latent fatal cancer risk	6.0×10^{-8}

[a] The annual natural background radiation level at INEEL is 361 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 66,000 person-rem.
[b] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of INEEL in 2010 (182,800).
Key: FPF, Fuel Processing Facility.
Source: Model results.

Table J–25. Potential Radiological Impacts on Involved Workers of Operation of Pit Conversion Facility in FPF at INEEL

Number of badged workers	341
Total dose (person-rem/yr)	170
10-year latent fatal cancers	0.68
Average worker dose (mrem/yr)	500
10-year latent fatal cancer risk	2.0×10^{-3}

Key: FPF, Fuel Processing Facility.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: UC 1998c.

J.2.2.2 MOX Facility

J.2.2.2.1 Construction of MOX Facility

No radiological risk would be incurred by members of the public from the construction of a new MOX facility at INEEL. According to a recent radiation survey (Mitchell et al. 1997) conducted in the INTEC area, a construction worker could receive about 5 mrem/yr above natural background levels from exposure to radiation deriving from other activities, past or present, at the site. Construction worker exposures would be kept as low as is reasonably achievable, and workers would be monitored (badged) as appropriate.

J.2.2.2.2 Operation of MOX Facility

Tables J–26 and J–27 present the incident-free radiological impacts of the operation of a new MOX facility at INEEL.

Table J–26. Potential Radiological Impacts on the Public of Operation of New MOX Facility at INEEL[a]

Population within 80 km for year 2010	
Dose (person-rem)	0.037
Percent of natural background[b]	5.6×10^{-5}
10-year latent fatal cancers	1.9×10^{-4}
Maximally exposed individual	
Annual dose (mrem)	3.2×10^{-3}
Percent of natural background[b]	8.8×10^{-4}
10-year latent fatal cancer risk	1.6×10^{-8}
Average exposed individual within 80 km[c]	
Annual dose (mrem)	2.1×10^{-4}
10-year latent fatal cancer risk	1.0×10^{-9}

[a] As described in Section 4.26.2.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] The annual natural background radiation level at INEEL is 361 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 66,000 person-rem.

[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of INEEL in 2010 (182,800).

Source: Model results.

Table J–27. Potential Radiological Impacts on Involved Workers of Operation of New MOX Facility at INEEL

Number of badged workers	331
Total dose (person-rem/yr)	22
10-year latent fatal cancers	0.088
Average worker dose (mrem/yr)	65
10-year latent fatal cancer risk	2.6×10^{-4}

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999; UC 1998d.

J.2.2.3 Pit Conversion and MOX Facilities

J.2.2.3.1 Construction of Pit Conversion and MOX Facilities

No radiological risk would be incurred by members of the public from the construction and modification of a pit conversion facility in FPF and construction of a new MOX facility at INEEL. According to a recent radiation survey (Mitchell et al. 1997) conducted in the INTEC area, a construction worker could receive about 5 mrem/yr above natural background levels from exposure to radiation deriving from other activities, past or present, at the site. Construction worker exposures would be kept as low as is reasonably achievable, and workers would be monitored (badged) as appropriate.

J.2.2.3.2 Operation of Pit Conversion and MOX Facilities

Tables J–28 and J–29 present the incident-free radiological impacts of operation of pit conversion and MOX facilities at INEEL.

Table J–28. Potential Radiological Impacts on the Public of Operation of Pit Conversion Facility in FPF and New MOX Facility at INEEL

Impact	Pit Conversion	MOX[a]	Total[b]
Population within 80 km for year 2010			
Dose (person-rem)	2.2	0.037	2.2
Percent of natural background[c]	3.3×10^{-3}	5.6×10^{-5}	3.4×10^{-3}
10-year latent fatal cancers	0.011	1.9×10^{-4}	0.011
Maximally exposed individual			
Annual dose (mrem)	0.015	3.2×10^{-3}	0.018
Percent of natural background[c]	4.2×10^{-3}	8.8×10^{-4}	5.1×10^{-3}
10-year latent fatal cancer risk	7.5×10^{-8}	1.6×10^{-8}	9.1×10^{-8}
Average exposed individual within 80 km[d]			
Annual dose (mrem)	0.012	2.1×10^{-4}	0.012
10-year latent fatal cancer risk	6.0×10^{-8}	1.0×10^{-9}	6.1×10^{-8}

[a] As described in Section 4.26.2.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.
[b] Totals are additive in all cases because the same groups or individuals would receive doses from both facilities.
[c] The annual natural background radiation level at INEEL is 361 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 66,000 person-rem.
[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of INEEL in 2010 (182,800).
Key: FPF, Fuel Processing Facility.
Source: Model results.

Table J–29. Potential Radiological Impacts on Involved Workers of Operation of Pit Conversion Facility in FPF and New MOX Facility at INEEL

Impact	Pit Conversion	MOX	Total
Number of badged workers	341	331	672
Total dose (person-rem/yr)	170	22	192
10-year latent fatal cancers	0.68	0.088	0.77
Average worker dose (mrem/yr)	500	65	286[a]
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	1.1×10^{-3}

[a] Represents an average of the doses for both facilities.
Key: FPF, Fuel Processing Facility.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1999; UC 1998c, 1998d.

J.3 PANTEX

J.3.1 Assessment Data

To perform the dose assessments for the SPD EIS, different types of data were collected and generated. In addition, calculational assumptions were made. Appendix F.10 provides a summary of the methods and tools (e.g., the GENII computer code) that were used for the assessments.

J.3.1.1 Meteorological Data

The meteorological data used for the Pantex dose assessments was in the form of a JFD file. A JFD file is a table listing the percentages of time the wind blows in a certain direction, at a certain speed, and within a certain stability class. The JFD file was based on measurements taken over a period of several years at a specific location

and height. Average annual meteorological conditions, averaged over the measurement period, were used for normal operations. Table J–30 presents the JFD used in the dose assessments for Pantex.

J.3.1.2 Population Data

The Pantex population distribution was based on the *1990 Census of Population and Housing Data* (DOC 1992). Projections were determined for the year 2010 (about midlife of operations) for areas within 80 km (50 mi) of the locations for the proposed plutonium disposition facilities. The site population in 2010 was assumed to be representative of the population over the operational period evaluated. The population was spatially distributed on a circular grid with 16 directions and 10 radial distances out to an 80-km (50-mi) distance. The grid was centered at Zone 4, the location from which radionuclides are assumed to be released during incident-free operations. Table J–31 presents the population data used for the dose assessments at Pantex.

J.3.1.3 Agricultural Data

The 1987 Census of Agriculture was the source used to generate site-specific data for food production. Food production was spatially distributed on a circular grid similar to that used for the population distribution described previously. This food grid (or wheel) was generated by combining the fraction of a county in each segment (e.g., south, southwest, north-northeast) and the county production of the eight food categories analyzed by GENII—leafy vegetables, root vegetables, fruits, grains, beef, poultry, milk, and eggs. Each county's food production was assumed to be distributed uniformly over the given county's land area. These categorized food wheels were then used in the assessment of doses to the Pantex population from the ingestion pathway. The consumption rates used in the dose assessments were those for the MEI and average exposed individual. People living within the 80-km (50-mi) assessment area were assumed to consume only food grown in that area. Pantex food production and consumption data used for the dose assessments in the SPD EIS were obtained from the *Health Risk Data for Storage and Disposition Final PEIS* (HNUS 1996).

Table J–30. 1985–1989 Joint Frequency Distributions at 7-m Height for Pantex[a]

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
0.89	A	0.02	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01
	B	0.02	0.01	0.01	0.02	0.03	0.02	0.02	0.02	0.05	0.01	0.03	0.02	0.04	0.02	0.03	0.02
	C	0.02	0	0.01	0.01	0.01	0	0.01	0	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01
	D	0.03	0.01	0.03	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.01	0.02	0.03	0.02	0.02	0.03
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0.12	0.04	0.04	0.05	0.04	0.04	0.07	0.08	0.17	0.11	0.16	0.09	0.13	0.13	0.11	0.08
2.5	A	0.03	0.01	0.02	0.02	0.03	0.02	0.02	0.01	0.02	0.02	0.01	0.03	0.02	0.02	0.02	0.01
	B	0.12	0.06	0.08	0.06	0.14	0.06	0.07	0.05	0.13	0.06	0.09	0.05	0.11	0.09	0.11	0.07
	C	0.12	0.05	0.07	0.07	0.06	0.05	0.04	0.05	0.12	0.11	0.09	0.11	0.13	0.13	0.15	0.09
	D	0.22	0.12	0.13	0.14	0.18	0.12	0.12	0.16	0.19	0.16	0.12	0.14	0.18	0.13	0.16	0.16
	E	0.23	0.1	0.09	0.1	0.12	0.14	0.16	0.14	0.31	0.21	0.23	0.18	0.21	0.15	0.19	0.12
	F	0.41	0.16	0.13	0.14	0.18	0.2	0.25	0.23	0.62	0.49	0.64	0.39	0.48	0.49	0.43	0.28
4.5	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0.08	0.04	0.07	0.07	0.07	0.06	0.06	0.09	0.17	0.13	0.13	0.09	0.1	0.08	0.07	0.08
	C	0.45	0.21	0.18	0.2	0.27	0.16	0.22	0.22	0.63	0.45	0.54	0.39	0.47	0.37	0.48	0.32
	D	1.14	0.72	0.64	0.59	0.72	0.66	1.02	1.1	2.19	1.21	1	0.5	0.41	0.32	0.6	0.5
	E	0.72	0.33	0.28	0.27	0.41	0.39	0.79	1.16	2.75	1.85	1.83	0.93	0.55	0.56	0.79	0.38
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.9	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0.13	0.1	0.07	0.05	0.04	0.04	0.05	0.13	0.52	0.5	0.39	0.22	0.16	0.08	0.05	0.04
	D	3.07	1.76	1	0.67	0.9	0.83	1.73	2.59	7.3	4.2	3.32	1.83	1.19	0.57	0.89	0.95
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9.6	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0.03	0.02	0.03	0.01	0	0.01	0.01	0.03	0.18	0.19	0.09	0.04	0.03	0.01	0	0.01
	D	1.49	0.82	0.29	0.13	0.11	0.13	0.33	0.48	2.24	1.48	1.01	0.76	0.49	0.12	0.15	0.34
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.1	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0.01	0.01	0	0	0	0	0	0	0.04	0.01	0.01	0.02	0.01	0	0	0
	D	0.73	0.32	0.05	0.03	0.01	0.02	0.05	0.1	0.41	0.22	0.2	0.25	0.24	0.05	0.09	0.2
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Joint frequency distribution data was compiled by the National Weather Service Station at Amarillo Airport; it was assumed that this data satisfactorily represented the atmospheric conditions at the Pantex site.

Source: NWS 1997.

Table J–31. Projected Pantex Population Surrounding Zone 4 for Year 2010

Direction	Distance (mi)										Total
	0–1	1–2	2–3	3–4	4–5	5–10	10–20	20–30	30–40	40–50	
S	0	0	0	4	5	41	100	96	104	268	**618**
SSW	0	0	0	0	5	117	441	1,095	361	1,013	**3,032**
SW	0	0	0	3	3	901	18,330	14,816	13,199	1,137	**48,389**
WSW	0	0	3	2	3	49	88,209	65,959	1,189	528	**15,5942**
W	0	0	2	2	3	25	3,372	683	227	897	**5,211**
WNW	0	0	3	2	3	25	148	360	517	834	**1,892**
NW	0	2	3	3	3	25	98	253	547	542	**1,476**
NNW	0	2	3	4	5	30	88	344	519	16,924	**17,919**
N	0	2	3	4	5	41	151	5,476	176	225	**6,083**
NNE	0	2	3	4	5	41	162	18,764	2,998	233	**22,212**
NE	0	2	3	4	5	41	163	396	295	165	**1,074**
ENE	0	2	3	4	5	41	324	724	22,852	176	**24,131**
E	0	2	3	4	5	961	2,016	884	372	1,085	**5,332**
ESE	0	2	3	4	5	41	273	512	248	401	**1,489**
SE	0	0	3	4	5	41	303	370	115	2,182	**3,023**
SSE	0	0	0	4	5	41	677	311	69	109	**1,216**
Total	**0**	**16**	**35**	**52**	**70**	**2,461**	**114,855**	**111,043**	**43,788**	**26,719**	**299,039**

Source: DOC 1992.

J.3.1.4 Source Term Data

Estimated incident-free radiological releases associated with the new pit conversion and MOX facilities at Pantex are presented in Tables J–32 and J–33. Stack heights and release locations are provided in the facility data reports (DOE 1999; UC 1998e, 1998f).

Table J–32. Estimated Incident-Free Annual Radiological Releases From the New Pit Conversion Facility at Pantex

Isotope	(μCi/yr)
Plutonium 236	9.3×10^{-11}
Plutonium 238	0.065
Plutonium 239	0.69
Plutonium 240	0.18
Plutonium 241	0.69
Plutonium 242	4.8×10^{-5}
Americium 241	0.37
Hydrogen 3	1.1×10^{9}

Source: UC 1998e.

Table J–33. Estimated Incident-Free Annual Radiological Releases From the New MOX Facility at Pantex

Isotope	(μCi/yr)
Plutonium 236	1.3×10^{-8}
Plutonium 238	8.5
Plutonium 239	91
Plutonium 240	23
Plutonium 241	101
Plutonium 242	6.1×10^{-3}
Americium 241	48
Uranium 234	5.1×10^{-3}
Uranium 235	2.1×10^{-4}
Uranium 238	0.012

Source: UC 1998f.

J.3.1.5 Other Calculational Assumptions

To estimate radiological impacts of incident-free operation of the proposed facilities at Pantex, the following additional assumptions and factors were considered, in accordance with the guidelines established in NRC Regulatory Guide 1.109 (NRC 1977).

Ground surfaces were assumed to have no previous deposition of radionuclides for the purposes of modeling the incremental radiological impacts associated with surplus plutonium disposition activities. However, doses associated with true instances of prior deposition are accounted for in the Affected Environment and Cumulative Impacts sections.

The annual external exposure time to the plume and to soil contamination was 0.7 year for the MEI (NRC 1977).

The annual external exposure time to the plume and to soil contamination was 0.5 year for the population (NRC 1977).

The annual inhalation exposure time to the plume was 1 year for the MEI and general population (NRC 1977).

The exposed individual or population was assumed to have the characteristics and habits (e.g., inhalation and ingestion rates) of the adult human.

A semi-infinite/finite plume model was used for air immersion doses. Other pathways evaluated were ground exposure, inhalation, ingestion of food crops, and ingestion of contaminated animal products. Drinking water, aquatic food ingestion, and any other pathway that may involve liquid exposure were not examined because all releases were to the air.

Reported stack heights were used for atmospheric releases. The resultant doses were conservative as use of the actual stack height instead of the effective sack height negates plume rise.

The calculated doses are 50-year committed doses from 1 year of intake.

J.3.2 Facilities

The following sections present all viable radiological impact scenarios that could be associated with different combinations of incident-free facility operations at Pantex.

J.3.2.1 Pit Conversion Facility

J.3.2.1.1 Construction of Pit Conversion Facility

No radiological risk would be incurred by members of the public from the construction of a new pit conversion facility at Pantex. According to a recent radiation survey (DOE 1997) conducted in Zone 4, a construction worker would not be expected to receive any additional radiation exposure above natural background levels in the area. Nonetheless, construction workers may be monitored (badged) as a precautionary measure.

J.3.2.1.2 Operation of Pit Conversion Facility

Tables J–34 and J–35 present the incident-free radiological impacts of the operation of a new pit conversion facility at Pantex.

Table J–34. Potential Radiological Impacts on the Public of Operation of New Pit Conversion Facility at Pantex

Population within 80 km for year 2010	
Dose (person-rem)	0.58
Percent of natural background[a]	5.8×10^{-4}
10-year latent fatal cancers	2.9×10^{-3}
Maximally exposed individual	
Annual dose (mrem)	0.062
Percent of natural background[a]	0.019
10-year latent fatal cancer risk	3.1×10^{-7}
Average exposed individual within 80 km[b]	
Annual dose (mrem)	1.9×10^{-3}
10-year latent fatal cancer risk	9.5×10^{-9}

[a] The annual natural background radiation level at Pantex is 332 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 99,300 person-rem.
[b] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Pantex in 2010 (299,000).
Source: Model results.

Table J–35. Potential Radiological Impacts on Involved Workers of Operation of New Pit Conversion Facility at Pantex

Number of badged workers	383
Total dose (person-rem/yr)	192
10-year latent fatal cancers	0.77
Average worker dose (mrem/yr)	500
10-year latent fatal cancer risk	2.0×10^{-3}

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: UC 1998e.

J.3.2.2 MOX Facility

J.3.2.2.1 Construction of MOX Facility

No radiological risk would be incurred by members of the public from construction of a new MOX facility at Pantex. According to a recent radiation survey (DOE 1997) conducted in Zone 4, a construction worker would not be expected to receive any additional radiation exposure above natural background levels in the area. Nonetheless, construction workers may be monitored (badged) as a precautionary measure.

J.3.2.2.2 Operation of MOX Facility

Tables J–36 and J–37 present the incident-free radiological impacts of the operation of a new MOX facility at Pantex.

Table J–36. Potential Radiological Impacts on the Public of Operation of New MOX Facility at Pantex[a]

Population within 80 km for year 2010	
Dose (person-rem)	0.027
Percent of natural background[b]	2.7×10^{-5}
10-year latent fatal cancers	1.3×10^{-4}
Maximally exposed individual	
Annual dose (mrem)	0.015
Percent of natural background[b]	$4.5\text{x}10^{-3}$
10-year latent fatal cancer risk	7.5×10^{-8}
Average exposed individual within 80 km[c]	
Annual dose (mrem)	8.8×10^{-5}
10-year latent fatal cancer risk	4.5×10^{-10}

[a] As described in Section 4.26.3.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.
[b] The annual natural background radiation level at Pantex is 332 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 99,300 person-rem.
[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Pantex in 2010 (299,000).
Source: Model results.

Table J–37. Potential Radiological Impacts on Involved Workers of Operation of New MOX Facility at Pantex

Number of badged workers	331
Total dose (person-rem/yr)	22
10-year latent fatal cancers	0.088
Average worker dose (mrem/yr)	65
10-year latent fatal cancer risk	2.6×10^{-4}

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1999; UC 1998f.

J.3.2.3 Pit Conversion and MOX Facilities

J.3.2.3.1 Construction of Pit Conversion and MOX Facilities

No radiological risk would be incurred by members of the public from the construction of new pit conversion and MOX facilities at Pantex. According to a recent radiation survey (DOE 1997) conducted in Zone 4, a construction worker would not be expected to receive any additional radiation exposure above natural background levels in the area. Nonetheless, construction workers may be monitored (badged) as a precautionary measure.

J.3.2.3.2 Operation of Pit Conversion and MOX Facilities

Tables J–38 and J–39 present the incident-free radiological impacts of operation of the new pit conversion and MOX facilities at Pantex.

Table J–38. Potential Radiological Impacts on the Public of Operation of New Pit Conversion and MOX Facilities at Pantex

Impact	Pit Conversion	MOX[a]	Total[b]
Population within 80 km for year 2010			
Dose (person-rem)	0.58	0.027	0.61
Percent of natural background[c]	5.8×10^{-4}	2.7×10^{-5}	6.1×10^{-4}
10-year latent fatal cancers	2.9×10^{-3}	1.3×10^{-4}	3.0×10^{-3}
Maximally exposed individual			
Annual dose (mrem)	0.062	0.015	0.077
Percent of natural background[c]	0.019	4.5×10^{-3}	0.024
10-year latent fatal cancer risk	3.1×10^{-7}	7.5×10^{-8}	3.9×10^{-7}
Average exposed individual within 80 km[d]			
Annual dose (mrem)	1.9×10^{-3}	8.8×10^{-5}	2.0×10^{-3}
10-year latent fatal cancer risk	9.5×10^{-9}	4.4×10^{-10}	9.9×10^{-9}

[a] As described in Section 4.26.3.2.2, Water Resources, no component was attributed to liquid pathways because it is not expected that significant contamination could reach these pathways given the site's groundwater and surface-water characteristics.

[b] Totals are additive in all cases because the same groups or individuals would receive doses from both facilities.

[c] The annual natural background radiation level at Pantex is 332 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive 99,300 person-rem.

[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of Pantex in 2010 (299,000).

Source: Model results.

Table J–39. Potential Radiological Impacts on Involved Workers of Operation of New Pit Conversion and MOX Facilities at Pantex

Impact	Pit Conversion	MOX	Total
Number of badged workers	383	331	714
Total dose (person-rem/yr)	192	22	214
10-year latent fatal cancers	0.77	0.088	0.86
Average worker dose (mrem/yr)	500	65	300[a]
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	$1.2\text{x}10^{-3}$

[a] Represents an average of the doses for both facilities.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999; UC 1998e, 1998f.

J.4 SRS

J.4.1 Assessment Data

To perform the dose assessments for the SPD EIS, different types of data were collected and generated. In addition, calculational assumptions were made. Appendix F.10 provides a summary of the methods and tools (e.g., the GENII computer code) that were used for the assessments.

J.4.1.1 Meteorological Data

The meteorological data used for the SRS dose assessments was in the form of a JFD file. A JFD file is a table listing the percentages of time the wind blows in a certain direction, at a certain speed, and within a certain stability class. The JFD data file was based on measurements taken over a period of several years at a specific location (F-Area) and height. Average annual meteorological conditions, averaged over the measurement period, were used for normal operations. Table J–40 presents the JFD data used in the dose assessments for SRS.

J.4.1.2 Population Data

The SRS population distribution was based on the *1990 Census of Population and Housing Data* (DOC 1992). Projections were determined for the year 2010 (about midlife of operations) for areas within 80 km (50 mi) of the locations for the proposed surplus plutonium disposition facilities. The site population in 2010 was assumed to be representative of the population over the operational period evaluated. The population was spatially distributed on a circular grid with 16 directions and 10 radial distances out to an 80-km (50-mi) distance. The grids were centered at the Actinide Packaging and Storage Facility in F-Area, the locations from which radionuclides are assumed to be released during incident-free operations. Tables J–41 and J–42 present the population data used for the dose assessments at SRS.

J.4.1.3 Agricultural Data

The 1987 Census of Agriculture was the source used to generate site-specific data for food production. Food production was spatially distributed on a circular grid similar to that used for the population distributions described previously. This food grid (or wheel) was generated by combining the fraction of a county in each segment (e.g., south, southwest, north-northeast) and the county production of the eight food categories analyzed by GENII (leafy vegetables, root vegetables, fruits, grains, beef, poultry, milk, and eggs). Each county's food production was assumed to be distributed uniformly over the given county's land area. These categorized food wheels are then used in the assessment of doses to the SRS population from the ingestion pathway. The consumption rates used in the dose assessments were those for the MEI and average exposed individual. People living within the 80-km (50-mi) assessment area were assumed to consume only food grown in that area. SRS food production and consumption data used for the dose assessments in the SPD EIS were obtained from the *Health Risk Data for Storage and Disposition Final PEIS* (HNUS 1996).

Table J–40. SRS 1987–1991 Joint Frequency Distributions at 61-m Height

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
2.0	A	0.27	0.35	0.39	0.42	0.34	0.31	0.28	0.31	0.31	0.3	0.32	0.34	0.5	0.32	0.29	0.26
	B	0.04	0.05	0.06	0.08	0.05	0.05	0.04	0.05	0.05	0.04	0.06	0.07	0.06	0.06	0.06	0.04
	C	0.02	0.03	0.1	0.07	0.02	0.04	0.03	0.06	0.05	0.05	0.07	0.07	0.09	0.06	0.03	0.02
	D	0.01	0.03	0.07	0.02	0.02	0.03	0.05	0.05	0.04	0.04	0.05	0.05	0.03	0.02	0.04	0.03
	E	0	0	0.02	0	0	0.01	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02
	F	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0
4.0	A	0.64	0.63	0.7	0.77	0.76	0.63	0.54	0.66	0.58	0.64	0.73	1.15	1	0.69	0.52	0.44
	B	0.22	0.3	0.33	0.4	0.33	0.26	0.21	0.22	0.28	0.26	0.51	0.67	0.59	0.3	0.16	0.2
	C	0.08	0.52	0.57	0.77	0.51	0.37	0.33	0.39	0.44	0.45	0.7	0.77	0.69	0.33	0.28	0.15
	D	0.06	0.52	1.49	1.12	0.5	0.51	0.62	0.78	0.77	0.62	0.7	0.75	0.77	0.47	0.31	0.15
	E	0.04	0.2	0.8	0.35	0.18	0.28	0.42	0.55	0.57	0.43	0.51	0.42	0.49	0.33	0.25	0.15
	F	0.02	0.02	0.1	0.05	0.03	0.03	0.07	0.09	0.06	0.07	0.09	0.06	0.06	0.07	0.06	0.04
6.0	A	0.49	0.15	0.1	0.09	0.1	0.09	0.08	0.14	0.11	0.14	0.17	0.17	0.19	0.18	0.1	0.21
	B	0.12	0.22	0.17	0.22	0.19	0.09	0.08	0.15	0.17	0.2	0.3	0.42	0.37	0.28	0.11	0.08
	C	0.08	0.4	0.42	0.63	0.35	0.18	0.19	0.34	0.38	0.43	0.6	0.77	0.64	0.39	0.17	0.11
	D	0.06	0.8	2.28	1.39	0.62	0.44	0.67	1.31	1.21	0.75	0.94	0.87	1.01	0.66	0.29	0.18
	E	0.06	0.51	1.36	1.07	0.56	0.48	0.64	1.25	1.29	0.97	1.08	1.14	1.22	0.77	0.38	0.21
	F	0.02	0.04	0.18	0.28	0.23	0.21	0.2	0.23	0.23	0.26	0.25	0.26	0.21	0.19	0.1	0.08
8.0	A	0.11	0.03	0.01	0.01	0.01	0.01	0	0.02	0.01	0.04	0.02	0.02	0.03	0.03	0.02	0.03
	B	0	0.06	0.02	0.01	0	0	0	0.01	0.03	0.04	0.08	0.06	0.04	0.08	0.03	0.01
	C	0.01	0.11	0.11	0.13	0.06	0.04	0.05	0.07	0.13	0.17	0.27	0.28	0.33	0.29	0.06	0.01
	D	0.04	0.3	0.6	0.41	0.08	0.03	0.1	0.25	0.21	0.15	0.2	0.24	0.63	0.35	0.05	0.02
	E	0.02	0.29	0.25	0.16	0.06	0.02	0.02	0.06	0.08	0.05	0.16	0.12	0.15	0.06	0.02	0.02
	F	0	0.01	0.04	0.06	0.04	0.01	0.02	0.02	0.04	0.05	0.02	0.01	0.01	0	0	0
12.0	A	0.01	0	0	0	0	0	0	0	0	0	0.01	0.01	0	0.01	0	0.01
	B	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.02	0	0
	C	0	0.01	0	0	0	0	0	0.02	0.03	0.03	0.04	0.06	0.2	0.18	0.01	0
	D	0.01	0.06	0.08	0.08	0.01	0.01	0.01	0.03	0.05	0.03	0.06	0.03	0.39	0.2	0.01	0
	E	0	0.01	0.02	0.01	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14.1	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0.01	0	0
	D	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Simpkins 1997.

Table J–41. Projected SRS Population Surrounding APSF (Pit Conversion and MOX Facilities) for Year 2010

Direction	Distance (mi)										Total
	0–1	1–2	2–3	3–4	4–5	5–10	10–20	20–30	30–40	40–50	
S	0	0	0	0	0	0	600	2,109	3,312	3,447	**9,468**
SSW	0	0	0	0	0	36	935	1,853	4,732	2,501	**10,057**
SW	0	0	0	0	0	73	1,239	8,333	2,023	4,318	**15,986**
WSW	0	0	0	0	0	228	3,762	4,014	3,742	7,194	**18,940**
W	0	0	0	0	0	355	7,786	47,484	21,880	18,192	**95,697**
WNW	0	0	0	0	0	2,439	11,335	205,958	53,232	6,694	**279,658**
NW	0	0	0	0	0	1,455	18,694	38,351	2,884	3,123	**64,507**
NNW	0	0	0	0	0	3,279	40,843	20,468	9,466	5,766	**79,822**
N	0	0	0	0	0	1,012	7,787	6,010	5,928	20,994	**41,731**
NNE	0	0	0	0	0	145	1,934	2,959	6,794	20,775	**32,607**
NE	0	0	0	0	0	0	3,168	3,786	5,985	11,236	**24,175**
ENE	0	0	0	0	0	0	3,077	5,828	7,625	33,477	**50,007**
E	0	0	0	0	0	0	6,188	5,442	7,342	3,952	**22,924**
ESE	0	0	0	0	0	0	996	3,497	4,455	7,253	**16,201**
SE	0	0	0	0	0	0	572	2,555	4,695	7,667	**15,489**
SSE	0	0	0	0	0	0	390	648	4,122	2,975	**8,135**
Total	**0**	**0**	**0**	**0**	**0**	**9,022**	**109,306**	**359,295**	**148,217**	**159,564**	**785,404**

Key: APSF, Actinide Packaging and Storage Facility.
Source: DOC 1992.

Table J–42. Projected SRS Population Surrounding APSF (Immobilization Facility) for Year 2010

Direction	Distance (mi)										Total
	0–1	1–2	2–3	3–4	4–5	5–10	10–20	20–30	30–40	40–50	
S	0	0	0	0	0	0	576	2,124	3,368	3,437	**9,505**
SSW	0	0	0	0	0	33	914	1,849	4,750	2,508	**10,054**
SW	0	0	0	0	0	59	1,204	8,412	2,043	4,640	**16,358**
WSW	0	0	0	0	0	241	3,930	4,188	3,771	6,887	**19,017**
W	0	0	0	0	0	543	7,632	51,313	22,422	18,246	**100,156**
WNW	0	0	0	0	0	2,344	11,777	204,567	51,659	6,581	**276,928**
NW	0	0	0	0	0	1,479	19,053	36,367	2,990	3,123	**63,012**
NNW	0	0	0	0	0	3,394	43,236	17,846	9,567	5,783	**79,826**
N	0	0	0	0	0	961	7,818	5,691	6,005	21,037	**41,512**
NNE	0	0	0	0	0	171	1,936	3,000	6,811	21,327	**33,245**
NE	0	0	0	0	0	0	3,137	3,756	6,043	11,279	**24,215**
ENE	0	0	0	0	0	0	3,202	5,735	7,434	34,686	**51,057**
E	0	0	0	0	0	0	6,264	5,509	7,575	3,991	**23,339**
ESE	0	0	0	0	0	0	1,023	2,892	4,016	7,077	**15,008**
SE	0	0	0	0	0	0	569	3,116	5,213	7,848	**16,746**
SSE	0	0	0	0	0	0	380	636	3,953	3,002	**7,971**
Total	**0**	**0**	**0**	**0**	**0**	**9,225**	**112,651**	**357,001**	**147,620**	**161,452**	**787,949**

Key: APSF, Actinide Packaging and Storage Facility.
Source: DOC 1992.

J.4.1.4 Source Term Data

Estimated incident-free radiological releases associated with the new pit conversion, immobilization, and MOX facilities are presented in Tables J–43 through J–45. Stack heights and release locations are provided in the facility data reports (DOE 1999; UC 1998g, 1998h, 1999c, 1999d).

Table J–43. Estimated Incident-Free Annual Radiological Releases From the Pit Conversion Facility at SRS

Isotope	(μCi/yr)
Plutonium 236	9.3×10^{-11}
Plutonium 238	0.065
Plutonium 239	0.69
Plutonium 240	0.18
Plutonium 241	0.69
Plutonium 242	4.8×10^{-5}
Americium 241	0.37
Hydrogen 3	1.1×10^{9}

Source: UC 1998g.

Table J–44. Estimated Incident-Free Annual Radiological Releases From the New Immobilization Facility at SRS

Isotope	Ceramic (17 t) (μCi/yr)	Ceramic (50 t) (μCi/yr)	Glass (17 t) (μCi/yr)	Glass (50 t) (μCi/yr)
Plutonium 236	–	–	–	–
Plutonium 238	–	0.57	–	0.52
Plutonium 239	3.7	9.5	3.4	8.6
Plutonium 240	1.7	3.1	1.6	2.8
Plutonium 241	110	100	98	93
Plutonium 242	1.3×10^{-3}	1.6×10^{-3}	1.2×10^{-3}	1.5×10^{-3}
Americium 241	2.3	5.4	2.2	5.0
Uranium 234	–	–	–	–
Uranium 235	1.1×10^{-5}	4.5×10^{-5}	2.3×10^{-6}	2.3×10^{-6}
Uranium 238	8.8×10^{-5}	3.5×10^{-4}	1.9×10^{-5}	1.9×10^{-5}

Source: UC 1999c, 1999d.

Table J–45. Estimated Incident-Free Annual Radiological Releases From the New MOX Facility at SRS

Isotope	Airborne (μCi/yr)	Liquid (μCi/yr)
Plutonium 236	$1.3.\times10^{-8}$	9.3×10^{-8}
Plutonium 238	8.5	64
Plutonium 239	91	670
Plutonium 240	23	170
Plutonium 241	101	750
Plutonium 242	6.1×10^{-3}	0.046
Americium 241	48	350
Uranium 234	5.1×10^{-3}	0.037
Uranium 235	2.1×10^{-4}	1.6×10^{-3}
Uranium 238	0.012	0.089

Source: UC 1998h.

J.4.1.5 Other Calculational Assumptions

To estimate radiological impacts of incident-free operation of the facilities at SRS, the following additional assumptions and factors were considered, in accordance with the guidelines established in NRC Regulatory Guide 1.109 (NRC 1977).

Ground surfaces were assumed to have no previous deposition of radionuclides for the purposes of modeling the incremental radiological impacts associated with surplus plutonium disposition activities. However, doses associated with true instances of prior deposition are accounted for in the Affected Environment and Cumulative Impacts sections.

The annual external exposure time to the plume and to soil contamination was 0.7 year for the MEI (NRC 1977).

The annual external exposure time to the plume and to soil contamination was 0.5 year for the population (NRC 1977).

The annual inhalation exposure time to the plume was 1 year for the MEI and general population (NRC 1977).

The exposed individual or population was assumed to have the characteristics and habits (e.g., inhalation and ingestion rates) of the adult human.

A semi-infinite/finite plume model was used for air immersion doses. Other pathways evaluated were ground exposure, inhalation, ingestion of food crops, and ingestion of contaminated animal products. Drinking water, aquatic food ingestion, and any other pathway that may involve liquid exposure were also examined for the MOX facility because it is the only facility with expected liquid releases at SRS.

Reported stack heights were used for atmospheric releases. The resultant doses were conservative as use of the actual stack height instead of the effective stack height negates plume rise.

The calculated doses are 50-year committed doses from 1 year of intake.

J.4.2 Facilities

The following sections present all viable radiological impact scenarios that could be associated with different combinations of incident-free facility operations at SRS.

J.4.2.1 Pit Conversion Facility

J.4.2.1.1 Construction of Pit Conversion Facility

No radiological risk would be incurred by members of the public from the construction of a new pit conversion facility at SRS. Construction worker exposures to radiation that derives from other activities at the site, past and present, would also be kept as low as is reasonably achievable. Construction workers would be monitored (badged) as appropriate. Summaries of radiological impacts of these activities are presented in Table J–46 for workers at risk.

Table J–46. Potential Radiological Impacts on Construction Workers of New Pit Conversion Facility at SRS

Annual average number of workers	341
Total dose (person-rem/yr)	1.4
Annual latent fatal cancers[a]	5.6×10^{-4}
Average worker dose (mrem/yr)	4
Annual latent fatal cancer risk	1.6×10^{-6}

[a] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations.

Note: The radiological limit for a construction worker is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: ICRP 1991; NAS 1990; UC 1998g.

J.4.2.1.2 Operation of Pit Conversion Facility

Tables J–47 and J–48 present the incident-free radiological impacts of the operation of a new pit conversion facility at SRS.

Table J–47. Potential Radiological Impacts on the Public of Operation of New Pit Conversion Facility at SRS

Population within 80 km for year 2010	
Dose (person-rem)	1.6
Percent of natural background[a]	6.9×10^{-4}
10-year latent fatal cancers	8.0×10^{-3}
Maximally exposed individual	
Annual dose (mrem)	3.7×10^{-3}
Percent of natural background[a]	1.3×10^{-3}
10-year latent fatal cancer risk	1.9×10^{-8}
Average exposed individual within 80 km[b]	
Annual dose (mrem)	2.0×10^{-3}
10-year latent fatal cancer risk	1.0×10^{-8}

[a] The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive about 232,000 person-rem.
[b] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of SRS in 2010 (about 790,000).
Source: Model results.

Table J–48. Potential Radiological Impacts on Involved Workers of Operation of New Pit Conversion Facility at SRS

Number of badged workers	383
Total dose (person-rem/yr)	192
10-year latent fatal cancers	0.77
Average worker dose (mrem/yr)	500
10-year latent fatal cancer risk	2.0×10^{-3}

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: UC 1998g.

J.4.2.2 Immobilization Facility

J.4.2.2.1 Construction of Immobilization Facility

No radiological risk would be incurred by members of the public from the construction of a new immobilization facility at SRS. Construction worker exposures to radiation that derives from other activities at the site, past or present, would also be kept as low as is reasonably achievable. Construction workers would be monitored (badged) as appropriate. Summaries of radiological impacts of these activities are presented in Table J–49 for workers at risk.

Table J–49. Potential Radiological Impacts on Construction Workers of New Immobilization Facility at SRS[a]

Annual average number of workers	374
Total dose (person-rem/yr)	1.5
Annual latent fatal cancers[b]	6.0×10^{-4}
Average worker dose (mrem/yr)	4
Annual latent fatal cancer risk	1.6×10^{-6}

[a] The values would be the same for immobilization in either ceramic or glass.
[b] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations.
Note: The radiological limit for a construction worker is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: ICRP 1991; NAS 1990; UC 1999c, 1999d.

J.4.2.2.2 Operation of Immobilization Facility

Tables J–50 and J–51 present all possible incident-free radiological impact scenarios of the operation of a new immobilization facility at SRS.

Table J–50. Potential Radiological Impacts on the Public of Operation of New Immobilization Facility at SRS

	17 t		50 t	
Impact	**Ceramic**	**Glass**	**Ceramic**	**Glass**
Population within 80 km for year 2010				
Dose (person-rem)	2.8×10^{-3}	2.6×10^{-3}	5.8×10^{-3}	5.3×10^{-3}
Percent of natural background[a]	1.2×10^{-6}	1.1×10^{-6}	2.5×10^{-6}	2.3×10^{-6}
10-year latent fatal cancers	1.4×10^{-5}	1.3×10^{-5}	2.9×10^{-5}	2.7×10^{-5}
Maximally exposed individual				
Annual dose (mrem)	2.8×10^{-5}	2.6×10^{-5}	5.8×10^{-5}	5.3×10^{-5}
Percent of natural background[a]	9.5×10^{-6}	8.8×10^{-6}	2.0×10^{-5}	1.8×10^{-5}
10-year latent fatal cancer risk	1.4×10^{-10}	1.3×10^{-10}	2.9×10^{-10}	2.7×10^{-10}
Average exposed individual within 80 km[b]				
Annual dose (mrem)	3.6×10^{-6}	3.3×10^{-6}	7.4×10^{-6}	6.7×10^{-6}
10-year latent fatal cancer risk	1.8×10^{-11}	1.6×10^{-11}	3.7×10^{-11}	3.4×10^{-11}

[Text deleted.]
[a] The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive about 232,000 person-rem.
[b] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of the SRS facilities in 2010 (about 790,000).
Source: Model results.

Table J–51. Potential Radiological Impacts on Involved Workers of Operation of New Immobilization Facility at SRS[a]

Impact	17 t	50 t
Number of badged workers	323	339
Total dose (person-rem/yr)	242	254
10-year latent fatal cancers	0.97	1.0
Average worker dose (mrem/yr)	750	750
10-year latent fatal cancer risk	3.0×10^{-3}	3.0×10^{-3}

[a] The values would be the same for immobilization in either ceramic or glass.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: UC 1999c, 1999d.

J.4.2.3 MOX Facility

J.4.2.3.1 Construction of MOX Facility

No radiological risk would be incurred by members of the public from the construction of a new MOX facility at SRS. Construction worker exposures to radiation that derives from other activities at the site, past or present, would also be kept as low as is reasonably achievable. Construction workers would be monitored (badged) as appropriate. Summaries of radiological impacts of these activities are presented in Table J–52 for workers at risk.

Table J–52. Potential Radiological Impacts on Construction Workers of New MOX Facility at SRS

Annual average number of workers	292
Total dose (person-rem/yr)	1.2
Annual latent fatal cancers[a]	4.8×10^{-4}
Average worker dose (mrem/yr)	4
Annual latent fatal cancer risk	1.6×10^{-6}

[a] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations.

Note: The radiological limit for a construction worker is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: ICRP 1991; NAS 1990; UC 1998h.

J.4.2.3.2 Operation of MOX Facility

Tables J–53 and J–54 present the incident-free radiological impacts of the operation of a new MOX facility at SRS.

Table J–53. Potential Radiological Impacts on the Public of Operation of New MOX Facility at SRS[a]

Population within 80 km for year 2010	
Dose (person-rem)	0.18
Percent of natural background[b]	7.8×10^{-5}
10-year latent fatal cancers	9.1×10^{-4}
Maximally exposed individual	
Annual dose (mrem)	3.7×10^{-3}
Percent of natural background[b]	1.3×10^{-3}
10-year latent fatal cancer risk	1.9×10^{-8}
Average exposed individual within 80 km[c]	
Annual dose (mrem)	2.3×10^{-4}
10-year latent fatal cancer risk	1.2×10^{-9}

[a] Includes a dose component from liquid pathways because it is possible that liquid releases could reach these pathways at SRS.
[b] The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive about 232,000 person-rem.
[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of SRS in 2010 (about 790,000).
Source: Model results.

Table J–54. Potential Radiological Impacts on Involved Workers of Operation of New MOX Facility at SRS

Number of badged workers	331
Total dose (person-rem/yr)	22
10-year latent fatal cancers	0.088
Average worker dose (mrem/yr)	65
10-year latent fatal cancer risk	2.6×10^{-4}

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1999; UC 1998h.

J.4.2.4 Pit Conversion and Immobilization Facilities

J.4.2.4.1 Construction of Pit Conversion and Immobilization Facilities

No radiological risk would be incurred by members of the public from construction of new pit conversion and immobilization facilities at SRS. Construction worker exposures to radiation that derives from other activities at the site, past or present, would also be kept as low as is reasonably achievable. Construction workers would be monitored (badged) as appropriate. Summaries of radiological impacts of these activities are presented in Table J–55 for workers at risk.

Table J–55. Potential Radiological Impacts on Construction Workers of New Pit Conversion and Immobilization Facilities at SRS

Impact	Pit Conversion	Immobilization[a]	Total
Annual average number of workers	316	374	690
Total dose (person-rem/yr)	1.3	1.5	2.8
Annual latent fatal cancers[b]	5.2×10^{-4}	6.0×10^{-4}	1.1×10^{-3}
Average worker dose (mrem/yr)	4	4	4[c]
Annual latent fatal cancer risk	1.6×10^{-6}	1.6×10^{-6}	1.6×10^{-6}

[a] The values would be the same for immobilization in either ceramic or glass.
[b] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations.
[c] Represents an average of the doses for both facilities.
Note: The radiological limit for a construction worker is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: ICRP 1991; NAS 1990; UC 1998g, 1999c, 1999d.

J.4.2.4.2 Operation of Pit Conversion and Immobilization Facilities

Tables J–56 and J–57 present all possible incident-free radiological impact scenarios of operation of the new pit conversion and immobilization facilities at SRS.

Table J–56. Potential Radiological Impacts on the Public of Operation of New Pit Conversion and Immobilization Facilities at SRS

Impact	Pit Conversion	Immobilization (50 t)		Total[a]
		Ceramic	Glass	
Population within 80 km for year 2010				
Dose (person-rem)	1.6	5.8×10^{-3}	5.3×10^{-3}	1.6
Percent of natural background[b]	6.9×10^{-4}	2.5×10^{-6}	2.3×10^{-6}	6.9×10^{-4}
10-year latent fatal cancers	8.0×10^{-3}	2.9×10^{-5}	2.7×10^{-5}	8.0×10^{-3}
Maximally exposed individual				
Annual dose (mrem)	3.7×10^{-3}	5.8×10^{-5}	5.3×10^{-5}	3.8×10^{-3}
Percent of natural background[b]	1.3×10^{-3}	2.0×10^{-5}	1.8×10^{-5}	1.3×10^{-3}
10-year latent fatal cancer risk	1.9×10^{-8}	2.9×10^{-10}	2.7×10^{-10}	1.9×10^{-8}
Average exposed individual within 80 km[c]				
Annual dose (mrem)	2.0×10^{-3}	7.4×10^{-6}	6.7×10^{-6}	2.0×10^{-3}
10-year latent fatal cancer risk	1.0×10^{-8}	3.7×10^{-11}	3.4×10^{-11}	1.0×10^{-8}

[Text deleted.]
[a] Totals represent the largest possible sums for each public category. Totals are additive in all cases because the same groups or individuals would receive doses from both facilities.
[b] The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive about 232,000 person-rem.
[c] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of the SRS facilities in 2010 (about 790,000).
Source: Model results.

Table J–57. Radiological Impacts on Involved Workers of Operation of New Pit Conversion and Immobilization Facilities at SRS

Impact	Pit Conversion	Immobilization (50 t)[a]	Total
Number of badged workers	383	339	772
Total dose (person-rem/yr)	192	254	446
10-year latent fatal cancers	0.77	1.0	1.8
Average worker dose (mrem/yr)	500	750	618[b]
10-year latent fatal cancer risk	2.0×10^{-3}	3.0×10^{-3}	2.5×10^{-3}

[a] The values would be the same for immobilization in either ceramic or glass.
[b] Represents an average of the doses for both facilities.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved with operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: UC 1998g, 1999c, 1999d.

J.4.2.5 Pit Conversion and MOX Facilities

J.4.2.5.1 Construction of Pit Conversion and MOX Facilities

No radiological risk would be incurred by members of the public from the construction of new pit conversion and MOX facilities at SRS. Construction worker exposures to radiation that derives from other activities at the site, past or present, would also be kept as low as is reasonably achievable. Construction workers would be monitored (badged) as appropriate. Summaries of radiological impacts of these activities are presented in Table J–58 for workers at risk.

Table J–58. Potential Radiological Impacts on Construction Workers of New Pit Conversion and MOX Facilities at SRS

Impact	Pit Conversion	MOX	Total
Annual average number of workers	341	292	633
Total dose (person-rem/yr)	1.4	1.2	2.6
Annual latent fatal cancers[a]	5.6×10^{-4}	4.8×10^{-4}	1.0×10^{-3}
Average worker dose (mrem/yr)	4	4	4[b]
Annual latent fatal cancer risk	1.6×10^{-6}	1.6×10^{-6}	1.6×10^{-6}

[a] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations.
[b] Represents an average of the doses for both facilities.
Note: The radiological limit for a construction worker is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: ICRP 1991; NAS 1990; UC 1998g, 1998h.

J.4.2.5.2 Operation of Pit Conversion and MOX Facilities

Tables J–59 and J–60 present the incident-free radiological impacts of operation of the new pit conversion and MOX facilities at SRS.

Table J–59. Potential Radiological Impacts on the Public of Operation of New Pit Conversion and MOX Facilities at SRS

Impact	Pit Conversion	MOX[a]	Total[b]
Population within 80 km for year 2010			
Dose (person-rem)	1.6	0.18	1.8
Percent of natural background[c]	6.9×10^{-4}	7.8×10^{-5}	7.7×10^{-4}
10-year latent fatal cancers	8.0×10^{-3}	9.1×10^{-4}	8.9×10^{-3}
Maximally exposed individual			
Annual dose (mrem)	3.7×10^{-3}	3.7×10^{-3}	7.4×10^{-3}
Percent of natural background[c]	1.3×10^{-3}	1.3×10^{-3}	2.5×10^{-3}
10-year latent fatal cancer risk	1.9×10^{-8}	1.9×10^{-8}	3.7×10^{-8}
Average exposed individual within 80 km[d]			
Annual dose (mrem)	2.0×10^{-3}	2.3×10^{-4}	2.2×10^{-3}
10-year latent fatal cancer risk	1.0×10^{-8}	1.2×10^{-9}	1.1×10^{-8}

[a] Includes a dose component from liquid pathways because it is possible that liquid releases could reach these pathways at SRS.
[b] Totals are additive in all cases because the same groups or individuals would receive doses from both facilities.
[c] The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive about 232,000 person-rem.
[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of SRS in 2010 (about 790,000).
Source: Model results.

Table J–60. Potential Radiological Impacts on Involved Workers of Operation of New Pit Conversion and MOX Facilities at SRS

Impact	Pit Conversion	MOX	Total
Number of badged workers	383	331	714
Total dose (person-rem/yr)	192	22	214
10-year latent fatal cancers	0.77	0.088	0.86
Average worker dose (mrem/yr)	500	65	300[a]
10-year latent fatal cancer risk	2.0×10^{-3}	2.6×10^{-4}	1.2×10^{-3}

[a] Represents an average of the doses for both facilities.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1999; UC 1998g, 1998h.

J.4.2.6 Immobilization and MOX Facilities

J.4.2.6.1 Construction of Immobilization and MOX Facilities

No radiological risk would be incurred by members of the public from the construction of new immobilization and MOX facilities at SRS. Construction worker exposures to radiation deriving from other activities, past or present, at the site would also be kept as low as is reasonably achievable. Construction workers would be monitored (badged) as appropriate. Summaries of radiological impacts of these activities are presented in Table J–61 for workers at risk.

Table J–61. Potential Radiological Impacts on Construction Workers of New Immobilization and MOX Facilities at SRS

Impact	Immobilization[a]	MOX	Total
Annual average number of workers	374	292	666
Total dose (person-rem/yr)	1.5	1.2	2.7
Annual latent fatal cancers[b]	6.0×10^{-4}	4.8×10^{-4}	1.1×10^{-3}
Average worker dose (mrem/yr)	4	4	4[c]
Annual latent fatal cancer risk	1.6×10^{-6}	1.6×10^{-6}	1.6×10^{-6}

[a] The values would be the same for immobilization in either ceramic or glass.
[b] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations.
[c] Represents an average of the doses for both facilities.
Note: The radiological limit for a construction worker is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: ICRP 1991; NAS 1990; UC 1998h, 1999c, 1999d.

J.4.2.6.2 Operation of Immobilization and MOX Facilities

Tables J–62 and J–63 present the incident-free radiological impacts of operation of the new immobilization and MOX facilities at SRS.

Table J–62. Potential Radiological Impacts on the Public of Operation of New Immobilization and MOX Facilities at SRS

	Immobilization (17 t)			
Impact	Ceramic	Glass	MOX[a]	Total[b]
Population within 80 km for year 2010				
Dose (person-rem)	2.8×10^{-3}	2.6×10^{-3}	0.18	0.18
Percent of natural background[c]	1.2×10^{-6}	1.1×10^{-6}	7.8×10^{-5}	7.9×10^{-5}
10-year latent fatal cancers	1.4×10^{-5}	1.3×10^{-5}	9.1×10^{-4}	9.2×10^{-4}
Maximally exposed individual				
Annual dose (mrem)	2.8×10^{-5}	2.6×10^{-5}	3.7×10^{-3}	3.7×10^{-3}
Percent of natural background[c]	9.5×10^{-6}	8.8×10^{-6}	1.3×10^{-3}	1.3×10^{-3}
10-year latent fatal cancer risk	1.4×10^{-10}	1.3×10^{-10}	1.9×10^{-8}	1.9×10^{-8}
Average exposed individual within 80 km[d]				
Annual dose (mrem)	3.6×10^{-6}	3.3×10^{-6}	2.3×10^{-4}	2.3×10^{-4}
10-year latent fatal cancer risk	1.8×10^{-11}	1.6×10^{-11}	1.2×10^{-9}	1.2×10^{-9}

[Text deleted.]
[a] Includes a dose component from liquid pathways because it is possible that liquid releases could reach these pathways at SRS.
[b] Totals represent the largest possible sums for each public category. Totals are additive in all cases because the same groups or individuals would receive doses from both facilities.
[c] The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in 2010 would receive about 232,000 person-rem.
[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of the SRS facilities in 2010 (about 790,000).
Source: Model results.

Table J–63. Potential Radiological Impacts on Involved Workers of Operation of New Immobilization and MOX Facilities at SRS

Impact	Immobilization (17 t)[a]	MOX	Total
Number of badged workers	323	331	654
Total dose (person-rem/yr)	242	22	264
10-year latent fatal cancers	0.97	0.088	1.1
Average worker dose (mrem/yr)	750	65	404[b]
10-year latent fatal cancer risk	3.0×10^{-3}	2.6×10^{-4}	1.6×10^{-3}

[a] The values would be the same for immobilization in either ceramic or glass.
[b] Represents an average of the doses for both facilities.
Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: DOE 1999; UC 1998h, 1999c, 1999d.

J.4.2.7 Pit Conversion, Immobilization, and MOX Facilities

J.4.2.7.1 Construction of Pit Conversion, Immobilization, and MOX Facilities

No radiological risk would be incurred by members of the public from the construction of new pit conversion, immobilization, and MOX facilities at SRS. Construction worker exposures to radiation that derives from other activities at the site, past or present, would also be kept as low as is reasonably achievable. Construction workers would be monitored (badged) as appropriate. Summaries of radiological impacts of these activities are presented in Table J–64 for workers at risk.

Table J–64. Potential Radiological Impacts on Construction Workers of New Pit Conversion, Immobilization, and MOX Facilities at SRS

Impact	Pit Conversion	Immobilization[a]	MOX	Total
Annual average number of workers	341	374	292	1,007
Total dose (person-rem/yr)	1.4	1.5	1.2	4.1
Annual latent fatal cancers[b]	5.6×10^{-4}	6.0×10^{-4}	4.8×10^{-4}	1.6×10^{-3}
Average worker dose (mrem/yr)	4	4	4	4[c]
Annual latent fatal cancer risk	1.6×10^{-6}	1.6×10^{-6}	1.6×10^{-6}	1.6×10^{-6}

[a] The values would be the same for immobilization in either ceramic or glass.
[b] Values are based on a risk factor of 400 latent fatal cancers per million person-rem set by the National Research Council's Committee on the Biological Effects of Ionizing Radiations.
[c] Represents an average of the doses for all three facilities.
Note: The radiological limit for construction workers is 100 mrem/yr because they are categorized as members of the public (DOE 1993). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.
Source: ICRP 1991; NAS 1990; UC 1998g, 1998h, 1999c, 1999d.

J.4.2.7.2 Operation of Pit Conversion, Immobilization, and MOX Facilities

Tables J–65 and J–66 present all possible incident-free radiological impact scenarios of operation of all three new facilities at SRS.

Table J–65. Potential Radiological Impacts on the Public of Operation of New Pit Conversion, Immobilization, and MOX Facilities at SRS

Impact	Pit Conversion	Immobilization (17 t)		MOX[a]	Total[b]
		Ceramic	Glass		
Population within 80 km for year 2010					
Dose (person-rem)	1.6	2.8×10^{-3}	2.6×10^{-3}	0.18	1.8
Percent of natural background[c]	6.9×10^{-4}	1.2×10^{-6}	1.1×10^{-6}	7.8×10^{-5}	7.8×10^{-4}
10-year latent fatal cancers	8.0×10^{-3}	1.4×10^{-5}	1.3×10^{-5}	9.1×10^{-4}	9.0×10^{-3}
Maximally exposed individual					
Annual dose (mrem)	3.7×10^{-3}	2.8×10^{-5}	2.6×10^{-5}	3.7×10^{-3}	7.4×10^{-3}
Percent of natural background[c]	1.3×10^{-3}	9.5×10^{-6}	8.8×10^{-6}	1.3×10^{-3}	2.5×10^{-3}
10-year latent fatal cancer risk	1.9×10^{-8}	1.4×10^{-10}	1.3×10^{-10}	1.9×10^{-8}	3.7×10^{-8}
Average exposed individual within 80 km[d]					
Annual dose (mrem)	2.0×10^{-3}	3.6×10^{-6}	3.3×10^{-6}	2.3×10^{-4}	2.2×10^{-3}
10-year latent fatal cancer risk	1.0×10^{-8}	1.8×10^{-11}	1.6×10^{-11}	1.2×10^{-9}	1.1×10^{-8}

[Text deleted.]

[a] Includes a dose component from liquid pathways because it is possible that liquid releases could reach these pathways at SRS.

[b] Totals represent the largest possible sums for each public category. Totals are additive in all cases because the same groups or individuals would receive doses from all three facilities.

[c] The annual natural background radiation level at SRS is 295 mrem for the average individual; the population within 80 km (50 mi) in the year 2010 receives about 232,000 person-rem.

[d] Obtained by dividing the population dose by the number of people projected to live within 80 km (50 mi) of the SRS facilities in 2010 (about 790,000).

Source: Model results.

Table J–66. Potential Radiological Impacts on Involved Workers of Operation of New Pit Conversion, Immobilization, and MOX Facilities at SRS

Impact	Pit Conversion	Immobilization (17 t)[a]	MOX	Total
Number of badged workers	383	323	331	1,037
Total dose (person-rem/yr)	192	242	22	456
10-year latent fatal cancers	0.77	0.97	0.088	1.8
Average worker dose (mrem/yr)	500	750	65	440[b]
10-year latent fatal cancer risk	2.0×10^{-3}	3.0×10^{-3}	2.6×10^{-4}	1.8×10^{-3}

[a] The values would be the same for immobilization in either ceramic or glass.

[b] Represents an average of the doses for all three facilities.

Note: The radiological limit for an individual worker is 5,000 mrem/yr (DOE 1995). However, the maximum dose to a worker involved in operations would be kept below the DOE administrative control level of 2,000 mrem/yr (DOE 1994). An effective ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

Source: DOE 1999; UC 1998g, 1998h, 1999c, 1999d.

J.5 LEAD ASSEMBLY FABRICATION

J.5.1 ANL–W

J.5.1.1 Assessment Data

This section presents applicable data and assumptions used in the assessment of lead assembly human health risks at ANL–W at INEEL. Appendix F.10 provides a summary of the methods and tools (e.g., the GENII computer code) used for the assessment.

J.5.1.1.1 Meteorological Data

The meteorological data used for the ANL–W dose assessments was in the form of a JFD file. A JFD file is a table listing the percentages of time the wind blows in a certain direction, at a certain speed, and within a certain stability class. The JFD file was based on measurements taken over a period of several years at a specific location and height. Average annual meteorological conditions, averaged over the measurement period, were used for normal operations. Table J–20 presents the JFD used in the dose assessments for ANL–W.

J.5.1.1.2 Population Data

The INEEL population distribution was based on the *1990 Census of Population and Housing Data* (DOC 1992). Projections were determined for the year 2005 for areas within 80 km (50 mi) of the proposed facility location. The site population in 2005 was assumed to be representative of the population over the operational period evaluated. The population was spatially distributed on a circular grid with 16 directions and 10 radial distances out to an 80-km (50-mi) distance. The grid was centered at ANL–W, the location from which radionuclides are assumed to be released during incident-free operations. Table J–67 presents the population data used for the lead assembly dose assessments at ANL–W.

J.5.1.1.3 Agricultural Data

The 1987 Census of Agriculture was the source used to generate site-specific data for food production. Food production was spatially distributed on a circular grid similar to that used for the population distributions described previously. This food grid (or wheel) was generated by combining the fraction of a county in each segment (e.g., south, southwest, north-northeast) and the county production of the eight food categories analyzed by GENII—leafy vegetables, root vegetables, fruits, grains, beef, poultry, milk, and eggs. Each county's food production was assumed to be distributed uniformly over the given county's land area. These categorized food wheels were then used in the assessment of doses to the population from the ingestion pathway. The consumption rates used in the dose assessments were those for the MEI and average exposed individual. People living within the 80-km (50-mi) assessment area were assumed to consume only food grown in that area. ANL–W food production and consumption data used for the dose assessments in the SPD EIS were obtained from the *Health Risk Data for Storage and Disposition Final PEIS* (HNUS 1996).

J.5.1.1.4 Source Term Data

Estimated incident-free radiological releases associated with the MOX fuel lead assembly facility are presented in Table J–68. Stack height and release location are provided in the Oak Ridge National Laboratory (ORNL) *ANL-W MOX Fuel Lead Assemblies Data Report for the Surplus Plutonium Disposition Environmental Impact Statement* (O'Connor et al. 1998a).

Table J–67. Projected INEEL Population Surrounding ANL–W for Year 2005

Direction	Distance (mi)										Total
	0–1	1–2	2–3	3–4	4–5	5–10	10–20	20–30	30–40	40–50	
S	0	0	0	0	0	0	277	2,086	6,173	30,883	**39,419**
SSW	0	0	0	0	0	0	273	323	906	3,267	**4,769**
SW	0	0	0	0	0	0	246	247	224	334	**1,051**
WSW	0	0	0	0	0	0	0	238	177	181	**596**
W	0	0	0	0	0	0	0	179	224	528	**931**
WNW	0	0	0	0	0	0	35	474	824	467	**1,800**
NW	0	0	0	0	0	0	36	57	280	929	**1,302**
NNW	0	0	0	0	0	0	0	81	76	76	**233**
N	0	0	0	0	0	0	0	254	140	146	**540**
NNE	0	0	0	0	0	0	252	450	266	158	**1,126**
NE	0	0	0	0	0	0	252	443	515	98	**1,308**
ENE	0	0	0	0	0	0	253	706	1,411	5,196	**7,566**
E	0	0	0	0	0	0	367	1,405	18,570	32,506	**52,848**
ESE	0	0	0	0	0	103	509	4,197	90,875	756	**96,440**
SE	0	0	0	0	17	80	589	3,523	11,502	411	**16,122**
SSE	0	0	0	0	17	52	279	4,816	19,230	1,068	**25,462**
Total	**0**	**0**	**0**	**0**	**34**	**235**	**3,368**	**19,479**	**151,393**	**77,004**	**251,513**

Key: ANL–W, Argonne National Laboratory–West.
Source: DOC 1992.

Table J–68. Estimated Incident-Free Annual Radiological Releases From the MOX Lead Assembly Facility at ANL–W

Isotope	(μCi/yr)
Plutonium 236	–
Plutonium 238	0.85
Plutonium 239	23
Plutonium 240	5.3
Plutonium 241	58
Plutonium 242	9.3×10^{-4}
Americium 241	2.0
Uranium 234	1.3×10^{-3}
Uranium 235	5.4×10^{-5}
Uranium 238	3.1×10^{-3}

Source: O'Connor et al. 1998a.

J.5.1.1.5 Other Calculational Assumptions

To estimate radiological impacts of incident-free operation of the lead assembly facility at ANL–W, the following additional assumptions and factors were considered, in accordance with the guidelines established in NRC Regulatory Guide 1.109 (NRC 1977).

Ground surfaces were assumed to have no previous deposition of radionuclides for the purposes of modeling the incremental radiological impacts associated with surplus plutonium disposition activities.

However, doses associated with true instances of prior deposition are accounted for in the Affected Environment and Cumulative Impacts sections.

The annual external exposure time to the plume and to soil contamination was 0.7 year for the MEI (NRC 1977).

The annual external exposure time to the plume and to soil contamination was 0.5 year for the population (NRC 1977).

The annual inhalation exposure time to the plume was 1 year for the MEI and general population (NRC 1977).

The exposed individual or population was assumed to have the characteristics and habits (e.g., inhalation and ingestion rates) of the adult human.

A semi-infinite/finite plume model was used for air immersion doses. Other pathways evaluated were ground exposure, inhalation, ingestion of food crops, and ingestion of contaminated animal products. Drinking water, aquatic food ingestion, and any other pathway that may involve liquid exposure were not examined because all releases are to the air.

Reported stack heights were used for atmospheric releases and were assumed to be the effective stack height. The resultant doses were conservative because use of the actual stack height negates plume rise.

The calculated doses are 50-year committed doses from 1 year of intake.

J.5.1.2 Human Health Impacts

Potential radiological impacts on the public and workers resulting from normal lead assembly operations are presented in Section 4.27.1.4. Potential impacts on postirradiation examination facility workers are presented in Section 4.27.6.2.

J.5.2 Hanford

J.5.2.1 Assessment Data

This section presents applicable data and assumptions used in the assessment of lead assembly human health risks at Hanford. Appendix F.10 provides a summary of the methods and tools (e.g., the GENII computer code) used for the assessment.

J.5.2.1.1 Meteorological Data

The meteorological data used for the Hanford dose assessments was in the form of a JFD file. A JFD file is a table listing the percentages of time the wind blows in a certain direction, at a certain speed, and within a certain stability class. The JFD file was based on measurements taken over a period of several years at a specific location and height. Average annual meteorological conditions, averaged over the measurement period, were used for normal operations. Table J–1 presents the JFD used in the dose assessments for Hanford.

J.5.2.1.2 Population Data

The Hanford population distribution was based on the *1990 Census of Population and Housing Data* (DOC 1992). Projections were determined for the year 2005 for areas within 80 km (50 mi) of the proposed facility location. The site population in 2005 was assumed to be representative of the population over the operational period evaluated. The population was spatially distributed on a circular grid with 16 directions and 10 radial distances out to an 80-km (50-mi) distance. The grid was centered at FMEF in the 400 Area, the location from which radionuclides are assumed to be released during incident-free operations. Table J–69 presents the population data used for lead assembly dose assessments at Hanford.

Table J–69. Projected Hanford Population Surrounding FMEF for Year 2005

	Distance (mi)										
Direction	**0–1**	**1–2**	**2–3**	**3–4**	**4–5**	**5–10**	**10–20**	**20–30**	**30–40**	**40–50**	**Total**
S	0	0	0	0	0	3,886	40,763	1,039	7,050	19,641	**72,379**
SSW	0	0	0	0	2	1,380	2,513	399	2,888	3,828	**11,010**
SW	0	0	0	0	38	1,265	4,361	288	207	1,923	**8,082**
WSW	0	0	0	0	0	50	2,175	15,734	3,338	300	**21,597**
W	0	0	0	0	0	0	698	5,764	26,190	14,858	**47,510**
WNW	0	0	0	0	0	0	5	813	1,147	8,446	**10,411**
NW	0	0	0	0	0	0	0	592	377	163	**1,132**
NNW	0	0	0	0	0	0	0	1,034	1,317	1,362	**3,713**
N	0	0	0	0	0	0	0	1,224	3,458	2,520	**7,202**
NNE	0	0	0	0	0	16	425	5,074	1,388	23,720	**30,623**
NE	0	0	0	0	0	86	751	6,743	2,769	1,153	**11,502**
ENE	0	0	0	0	0	313	1,401	3,391	385	410	**5,900**
E	0	0	0	0	0	386	861	410	319	300	**2,276**
ESE	0	0	0	0	0	393	595	315	245	302	**1,850**
SE	0	0	0	0	0	381	1,191	1,604	366	1,364	**4,906**
SSE	0	0	0	0	0	6,366	79,333	30,715	565	979	**117,958**
Total	**0**	**0**	**0**	**0**	**40**	**14,522**	**135,072**	**75,139**	**52,009**	**81,269**	**358,051**

Key: FMEF, Fuels and Materials Examination Facility.
Source: DOC 1992.

J.5.2.1.3 Agricultural Data

The 1987 Census of Agriculture was the source used to generate site-specific data for food production. Food production was spatially distributed on a circular grid similar to that used for the population distributions described previously. This food grid (or wheel) was generated by combining the fraction of a county in each segment (e.g., south, southwest, north-northeast) and the county production of the eight food categories analyzed by GENII—leafy vegetables, root vegetables, fruits, grains, beef, poultry, milk, and eggs. Each county's food production was assumed to be distributed uniformly over the given county's land area. These categorized food wheels were then used in the assessment of doses to the population from the ingestion pathway. The consumption rates used in the dose assessments were those for the MEI and average exposed individual. People living within the 80-km (50-mi) assessment area were assumed to consume only food grown in that area. Hanford food production and consumption data used for the dose assessments in the SPD EIS were obtained from the *Health Risk Data for Storage and Disposition Final PEIS* (HNUS 1996).

J.5.2.1.4 Source Term Data

Estimated incident-free radiological releases associated with the MOX fuel lead assembly facility are presented in Table J–70. Stack height and release location are reported in the ORNL *Hanford MOX Fuel Lead*

Table J–70. Estimated Incident-Free Annual Radiological Releases From the MOX Lead Assembly Facility at Hanford

Isotope	(μCi/yr)
Plutonium 236	–
Plutonium 238	0.85
Plutonium 239	23
Plutonium 240	5.3
Plutonium 241	58
Plutonium 242	9.3×10^{-4}
Americium 241	2.0
Uranium 234	1.3×10^{-3}
Uranium 235	5.4×10^{-5}
Uranium 238	3.1×10^{-3}

Source: O'Connor et al. 1998b.

Assemblies Data Report for the Surplus Plutonium Disposition Environmental Impact Statement (O'Connor et al. 1998b).

J.5.2.1.5 Other Calculational Assumptions

To estimate radiological impacts of incident-free operation of the lead assembly facility at Hanford, the following additional assumptions and factors were considered, in accordance with the guidelines established in NRC Regulatory Guide 1.109 (NRC 1977).

Ground surfaces were assumed to have no previous deposition of radionuclides for the purposes of modeling the incremental radiological impacts associated with surplus plutonium disposition activities. However, doses associated with true instances of prior deposition are accounted for in the Affected Environment and Cumulative Impacts sections.

The annual external exposure time to the plume and to soil contamination was 0.7 year for the MEI (NRC 1977).

The annual external exposure time to the plume and to soil contamination was 0.5 year for the population (NRC 1977).

The annual inhalation exposure time to the plume was 1 year for the MEI and general population (NRC 1977).

The exposed individual or population was assumed to have the characteristics and habits (e.g., inhalation and ingestion rates) of the adult human.

A semi-infinite/finite plume model was used for air immersion doses. Other pathways evaluated were ground exposure, inhalation, ingestion of food crops, and ingestion of contaminated animal products. Drinking water, aquatic food ingestion, and any other pathway that may involve liquid exposure were not examined because all releases are to the air.

Reported stack heights were used for atmospheric releases and were assumed to be the effective stack height. The resultant doses were conservative because use of the actual stack height negates plume rise.

The calculated doses are 50-year committed doses from 1 year of intake.

J.5.2.2 Human Health Impacts

Potential radiological impacts on the public and workers resulting from normal lead assembly operations are presented in Section 4.27.2.4.

J.5.3 LLNL

J.5.3.1 Assessment Data

This section presents applicable data and assumptions used in the assessment of lead assembly human health risks at LLNL. Appendix F.10 provides a summary of the methods and tools (e.g., the GENII computer code) used for the assessment.

J.5.3.1.1 Meteorological Data

The meteorological data used for the LLNL dose assessments was in the form of a JFD file. A JFD file is a table listing the percentages of time the wind blows in a certain direction, at a certain speed, and within a certain stability class. The JFD file was based on measurements taken at a specific location and height. Annual meteorological conditions were used for normal operations. Table J–71 presents the JFD used in the dose assessments for LLNL.

J.5.3.1.2 Population Data

The LLNL population distribution was based on the *1990 Census of Population and Housing Data* (DOC 1992). Projections were determined for the year 2005 for areas within 80 km (50 mi) of the proposed facility location. The site population in 2005 was assumed to be representative of the population over the operational period evaluated. The population was spatially distributed on a circular grid with 16 directions and 10 radial distances out to an 80-km (50-mi) distance. The grid was centered at Building 332, the location from which radionuclides are assumed to be released during incident-free operations. Table J–72 presents the population data that were used for lead assembly dose assessments at LLNL.

J.5.3.1.3 Agricultural Data

The 1992 Census of Agriculture (DOC 1992) was the source used to generate site-specific data for food production. Food production was spatially distributed on a circular grid similar to that used for the population distributions described previously. This food grid (or wheel) was generated by combining the fraction of a county in each segment (e.g., south, southwest, north-northeast) and the county production of the eight food categories analyzed by GENII—leafy vegetables, root vegetables, fruits, grains, beef, poultry, milk, and eggs. Each county's food production was assumed to be distributed uniformly over the given county's land area. These categorized food wheels were then used in the assessment of doses to the population from the ingestion pathway. The consumption rates used in the dose assessments were those for the MEI and average exposed individual. People living within the 80-km (50-mi) assessment area were assumed to consume only food grown in that area. LLNL food production and consumption data used for the dose assessments in the SPD EIS were obtained from the 1992 census data for LLNL (DOC 1992).

Table J–71. LLNL 1993 Joint Frequency Distributions at 10-m Height

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
0.89	A	0.45	0.41	0.4	0.33	0.27	0.17	0.14	0.11	0.13	0.34	0.62	1.14	1.53	0.78	0.57	0.45
	B	0.22	0.11	0.1	0.11	0.1	0.03	0.03	0.01	0.07	0.05	0.27	0.41	0.17	0.17	0.14	0.09
	C	0.13	0.09	0.15	0.03	0.02	0.01	0	0.03	0.08	0.14	0.16	0.22	0.16	0.09	0.08	0.07
	D	0.17	0.33	0.45	0.53	0.65	0.67	0.23	0.34	1.05	1.86	1.21	0.7	0.27	0.13	0.05	0.03
	E	0.18	0.33	0.86	0.99	1.01	1.13	0.39	0.48	1.07	1.7	0.74	0.41	0.25	0.06	0.09	0.03
	F	0.11	0.16	0.61	0.93	0.8	0.63	0.55	0.31	0.35	0.38	0.39	0.14	0.1	0.08	0.11	0.07
	G	0.62	0.74	1.06	1.64	1.97	1.78	1.53	0.97	0.73	0.75	0.49	0.48	0.34	0.27	0.35	0.37
2.86	A	0.3	0.37	0.24	0.18	0.03	0.02	0.02	0.01	0	0.02	0.26	0.81	0.89	0.31	0.21	0.16
	B	0.4	0.39	0.77	0.16	0	0.03	0.02	0.01	0.02	0.08	0.39	1.26	1.15	0.22	0.07	0.21
	C	0.07	0.59	1.21	0	0	0	0	0.01	0.02	0.09	0.7	1.28	1.17	0.23	0.01	0.03
	D	0.03	0.82	1.04	0.03	0	0	0.03	0.09	0.25	1.14	4.88	2.71	1.81	0.21	0.02	0
	E	0.07	0.13	0.27	0.07	0	0	0.05	0.06	0.63	1.91	0.93	0.16	0.03	0	0	0.02
	F	0.03	0.03	0.16	0.1	0.01	0.02	0.01	0.02	0.03	0.02	0.06	0.02	0.01	0.02	0.01	0.01
	G	0.01	0.05	0.07	0.06	0.05	0.02	0.03	0.02	0.05	0.03	0.06	0	0	0	0.01	0.01
4.71	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0.34	0.71	0.23	0.02	0	0.02	0	0.05	0.01	0.03	0.3	1.22	1.62	0.16	0.01	0
	D	0.08	0.72	0.56	0	0	0	0	0.06	0.09	0.61	3.64	1.51	2.04	0.11	0.01	0.02
	E	0	0.02	0	0	0	0	0	0	0	0.15	0.17	0.01	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.69	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D	0.15	0.24	0.02	0	0	0	0	0	0.03	0.45	1.25	0.32	0.13	0.03	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8.68	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D	0.07	0.08	0	0	0	0	0	0	0.02	0.07	0.02	0	0.01	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table J–71. LLNL 1993 Joint Frequency Distributions at 10-m Height (Continued)

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
10.5	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Key: LLNL, Lawrence Livermore National Laboratory.
Source: Gouveia 1997.

Table J–72. Projected LLNL Population Surrounding Building 332 for Year 2005

Direction	Distance (mi)										Total
	0–1	1–2	2–3	3–4	4–5	5–10	10–20	20–30	30–40	40–50	
S	5	14	6	8	10	84	178	157	15,286	56,124	**71,872**
SSW	5	15	13	8	10	47	1,080	301,887	190,271	27,874	**521,210**
SW	31	538	25	18	16	91	42,723	589,979	350,562	52,017	**1,036,000**
WSW	228	1,283	660	982	1,885	644	146,903	239,224	184,580	4,845	**581,234**
W	302	1,316	3,338	6,379	9,931	24,309	112,488	123,480	333,290	64,111	**678,944**
WNW	311	1,316	4,567	6,337	8,349	20,051	92,859	476,610	570,787	545,627	**1,726,814**
NW	272	1,316	1,770	2,274	212	677	78,366	170,569	454,881	135,688	**846,025**
NNW	109	1,423	2,850	2,109	53	404	8,150	275,850	117,234	154,923	**563,105**
N	5	49	1,094	324	39	367	4,555	139,309	1,444	230,332	**377,518**
NNE	5	15	25	35	45	283	13,831	24,535	7,317	5,523	**51,614**
NE	5	15	16	25	21	127	8,403	12,091	128,594	36,124	**185,421**
ENE	5	11	6	8	10	111	2,218	130,249	211,561	11,360	**355,539**
E	5	14	8	8	10	249	54,523	86,577	30,047	47,622	**219,063**
ESE	5	15	17	8	10	103	1,898	7,484	230,939	242,714	**483,193**
SE	5	15	10	8	10	91	512	902	18,290	23,344	**43,187**
SSE	5	12	6	8	10	85	314	83	26	1,063	**1,612**
Total	**1,303**	**7,367**	**14,411**	**18,539**	**20,621**	**47,723**	**569,001**	**2,578,986**	**2,845,109**	**1,639,291**	**7,742,351**

Key: LLNL, Lawrence Livermore National Laboratory.
Source: DOC 1992.

J.5.3.1.4 Source Term Data

Estimated incident-free radiological releases associated with the MOX fuel lead assembly facility are presented in Table J–73. Stack height and release location are provided in the ORNL *LLNL MOX Fuel Lead Assemblies Data Report for the Surplus Plutonium Disposition Environmental Impact Statement* (O'Connor et al. 1998c).

Table J–73. Estimated Incident-Free Annual Radiological Releases From the MOX Lead Assembly Facility at LLNL

Isotope	(μCi/yr)
Plutonium 236	–
Plutonium 238	0.85
Plutonium 239	23
Plutonium 240	5.3
Plutonium 241	58
Plutonium 242	9.3×10^{-4}
Americium 241	2.0
Uranium 234	1.3×10^{-3}
Uranium 235	5.4×10^{-5}
Uranium 238	3.1×10^{-3}

Source: O'Connor et al. 1998c.

J.5.3.1.5 Other Calculational Assumptions

To estimate radiological impacts of incident-free operation of the lead assembly facility at LLNL, the following additional assumptions and factors were considered, in accordance with the guidelines established in NRC Regulatory Guide 1.109 (NRC 1977).

Ground surfaces were assumed to have no previous deposition of radionuclides for the purposes of modeling the incremental radiological impacts associated with surplus plutonium disposition activities. However, doses associated with true instances of prior deposition are accounted for in the Affected Environment and Cumulative Impacts sections.

The annual external exposure time to the plume and to soil contamination was 0.7 year for the MEI (NRC 1977).

The annual external exposure time to the plume and to soil contamination was 0.5 year for the population (NRC 1977).

The annual inhalation exposure time to the plume was 1 year for the MEI and general population (NRC 1977).

The exposed individual or population was assumed to have the characteristics and habits (e.g., inhalation and ingestion rates) of the adult human.

A semi-infinite/finite plume model was used for air immersion doses. Other pathways evaluated were ground exposure, inhalation, ingestion of food crops, and ingestion of contaminated animal products. Drinking water, aquatic food ingestion, and any other pathway that may involve liquid exposure were not examined because all releases are to the air.

Reported stack heights were used for atmospheric releases and were assumed to be the effective stack height. The resultant doses were conservative because use of the actual stack height negates plume rise.

The calculated doses are 50-year committed doses from 1 year of intake.

J.5.3.2 Human Health Impacts

Potential radiological impacts on the public and workers resulting from normal lead assembly operations are presented in Section 4.27.3.4.

J.5.4 LANL

J.5.4.1 Assessment Data

This section presents applicable data and assumptions used in the assessment of lead assembly human health risks at LANL. Appendix F.10 provides a summary of the methods and tools (e.g., the GENII computer code) used for the assessment.

J.5.4.1.1 Meteorological Data

The meteorological data used for the LANL dose assessments was in the form of a JFD file. A JFD file is a table listing the percentages of time the wind blows in a certain direction, at a certain speed, and within a certain stability class. The JFD file was based on measurements taken at a specific location and height. Annual meteorological conditions were used for normal operations. Table J–74 presents the JFD used in the dose assessments for LANL.

J.5.4.1.2 Population Data

The LANL population distribution was based on the *1990 Census of Population and Housing Data* (DOC 1992). Projections were determined for the year 2005 for areas within 80 km (50 mi) of the proposed facility location. The site population in 2005 was assumed to be representative of the population over the operational period evaluated. The population was spatially distributed on a circular grid with 16 directions and 10 radial distances out to an 80-km (50-mi) distance. The grid was centered at Technical Area 55 (TA–55), the location from which radionuclides are assumed to be released during incident-free operations. Table J–75 presents the population data used for lead assembly dose assessments at LANL.

J.5.4.1.3 Agricultural Data

The 1992 Census of Agriculture was the source used to generate site-specific data for food production. Food production was spatially distributed on a circular grid similar to that used for the population distributions described previously. This food grid (or wheel) was generated by combining the fraction of a county in each segment (e.g., south, southwest, north-northeast) and the county production of the eight food categories analyzed by GENII—leafy vegetables, root vegetables, fruits, grains, beef, poultry, milk, and eggs. Each county's food production was assumed to be distributed uniformly over the given county's land area. These categorized food wheels were then used in the assessment of doses to the population from the ingestion pathway. The consumption rates used in the dose assessments were those for the MEI and average exposed individual. People living within the 80-m (50-mi) assessment area were assumed to consume only food grown in that area. LANL food production and consumption data used for the dose assessments in the SPD EIS were obtained from the *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site* (DOE 1998).

Table J–74. LANL 1993–1996 Joint Frequency Distributions at 11-m Height

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
0.78	A	0.12	0.26	0.5	0.84	0.74	0.54	0.45	0.32	0.18	0.11	0.08	0.05	0.06	0.06	0.07	0.07
	B	0.03	0.05	0.12	0.19	0.16	0.09	0.08	0.07	0.04	0.01	0.02	0.01	0.02	0.02	0.01	0.02
	C	0.05	0.09	0.14	0.2	0.16	0.09	0.09	0.09	0.07	0.04	0.03	0.03	0.02	0.03	0.02	0.03
	D	0.86	0.69	0.57	0.45	0.47	0.34	0.33	0.33	0.38	0.35	0.33	0.31	0.35	0.4	0.57	0.72
	E	0.59	0.45	0.33	0.23	0.22	0.15	0.13	0.13	0.17	0.24	0.32	0.28	0.29	0.4	0.51	0.62
	F	0.26	0.28	0.27	0.19	0.18	0.17	0.2	0.25	0.3	0.32	0.22	0.17	0.15	0.2	0.24	0.25
2.5	A	0.03	0.07	0.17	0.45	0.56	0.43	0.33	0.22	0.18	0.08	0.06	0.05	0.04	0.03	0.03	0.03
	B	0.02	0.05	0.2	0.39	0.42	0.31	0.27	0.22	0.16	0.1	0.06	0.05	0.05	0.04	0.03	0.02
	C	0.05	0.15	0.46	0.68	0.65	0.45	0.46	0.59	0.59	0.26	0.16	0.12	0.16	0.12	0.07	0.05
	D	0.95	1.09	0.94	0.72	0.56	0.34	0.47	1.3	2.12	1.89	1.93	0.95	1.08	0.81	0.56	0.63
	E	0.87	0.59	0.34	0.19	0.11	0.1	0.13	0.24	0.67	1.82	2.41	1.72	1.84	1.41	0.8	0.8
	F	0.09	0.07	0.05	0.03	0.01	0.01	0.05	0.1	0.25	0.33	0.11	0.36	0.39	0.39	0.12	0.07
4.5	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0.01	0.01	0.01	0.02	0.01	0
	C	0.02	0.04	0.07	0.04	0.02	0.01	0.01	0.03	0.15	0.09	0.11	0.19	0.31	0.19	0.09	0.02
	D	0.81	0.8	0.42	0.16	0.07	0.04	0.11	0.99	3.24	3.52	2.59	1.61	1.86	1.05	0.54	0.44
	E	0.21	0.2	0.08	0.01	0	0	0.01	0.07	0.32	1.74	1.08	1.32	1.31	0.32	0.23	0.22
	F	0	0.01	0	0	0	0	0	0	0.02	0.04	0	0.05	0.05	0.01	0.01	0
6.9	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0.01	0.01	0.01	0	0
	D	0.19	0.2	0.05	0	0	0	0.01	0.31	0.96	1.42	0.87	0.93	0.62	0.48	0.31	0.15
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9.6	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D	0.01	0.01	0	0	0	0	0	0.05	0.03	0.08	0.09	0.19	0.08	0.05	0.04	0.02
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D	0	0	0	0	0	0	0	0.01	0	0	0.01	0.01	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Key: LANL, Los Alamos National Laboratory.
Source: LANL 1997.

Table J–75. Projected LANL Population Surrounding TA–55 for Year 2005

Direction	Distance (mi)										Total
	0–1	1–2	2–3	3–4	4–5	5–10	10–20	20–30	30–40	40–50	
S	0	0	25	26	44	221	701	1,606	1,125	2,962	**6,710**
SSW	0	0	26	20	56	21	1,373	4,464	4,949	43,596	**54,505**
SW	0	0	26	22	80	29	155	1,767	817	30,893	**33,789**
WSW	0	0	26	21	56	302	159	1,187	2,500	61	**4,312**
W	0	0	27	20	26	457	190	1,084	135	350	**2,289**
WNW	0	12	39	135	90	532	73	138	1,755	1,306	**4,080**
NW	0	152	1,287	2,379	1,500	720	102	195	248	274	**6,857**
NNW	0	427	844	224	126	421	169	211	174	220	**2,816**
N	500	585	264	107	137	560	609	688	659	289	**4,398**
NNE	0	480	61	57	56	463	958	919	658	143	**3,795**
NE	0	101	12	17	22	378	12,856	2,950	1,954	3,236	**21,526**
ENE	0	10	12	17	22	618	13,270	3,439	2,869	1,938	**22,195**
E	0	10	12	17	22	684	3,598	590	719	1,161	**6,813**
ESE	0	10	12	17	33	220	1,602	3,608	316	834	**6,652**
SE	0	0	0	0	4,488	952	6,143	76,455	4,503	742	**93,283**
SSE	0	0	0	117	85	224	5,021	10,633	2,091	483	**18,654**
Total	**500**	**1,787**	**2,673**	**3,196**	**6,843**	**6,802**	**46,979**	**109,934**	**25,472**	**88,488**	**292,674**

Key: LANL, Los Alamos National Laboratory; TA–55, Technical Area 55.
Source: DOC 1992.

J.5.4.1.4 Source Term Data

Estimated incident-free radiological releases associated with the MOX fuel lead assembly facility are presented in Table J–76. Stack height and release location are provided in the ORNL *LANL MOX Fuel Lead Assemblies Data Report for the Surplus Plutonium Disposition Environmental Impact Statement* (O'Connor et al. 1998d).

Table J–76. Estimated Incident-Free Annual Radiological Releases From the MOX Lead Assembly Facility at LANL

Isotope	(μCi/yr)
Plutonium 236	–
Plutonium 238	0.85
Plutonium 239	23
Plutonium 240	5.3
Plutonium 241	58
Plutonium 242	9.3×10^{-4}
Americium 241	2.0
Uranium 234	1.3×10^{-3}
Uranium 235	5.4×10^{-5}
Uranium 238	3.1×10^{-3}

Source: O'Connor et al. 1998d.

J.5.4.1.5 Other Calculational Assumptions

To estimate radiological impacts of incident-free operation of the lead assembly facility at LANL, the following additional assumptions and factors were considered, in accordance with the guidelines established in NRC Regulatory Guide 1.109 (NRC 1977).

Ground surfaces were assumed to have no previous deposition of radionuclides for the purposes of modeling the incremental radiological impacts associated with surplus plutonium disposition activities. However, doses associated with true instances of prior deposition are accounted for in the Affected Environment and Cumulative Impacts sections.

The annual external exposure time to the plume and to soil contamination was 0.7 year for the MEI (NRC 1977).

The annual external exposure time to the plume and to soil contamination was 0.5 year for the population (NRC 1977).

The annual inhalation exposure time to the plume was 1 year for the MEI and general population (NRC 1977).

The exposed individual or population was assumed to have the characteristics and habits (e.g., inhalation and ingestion rates) of the adult human.

A semi-infinite/finite plume model was used for air immersion doses. Other pathways evaluated were ground exposure, inhalation, ingestion of food crops, and ingestion of contaminated animal products. Drinking water, aquatic food ingestion, and any other pathway that may involve liquid exposure were not examined because all releases are to the air.

Reported stack heights were used for atmospheric releases and were assumed to be the effective stack height. The resultant doses were conservative, because use of the actual stack height negates plume rise.

The calculated doses are 50-year committed doses from 1 year of intake.

J.5.4.2 Human Health Impacts

Potential radiological impacts on the public and workers resulting from normal lead assembly operations are presented in Section 4.27.4.4.

J.5.5 SRS

J.5.5.1 Assessment Data

This section presents applicable data and assumptions used in the assessment of lead assembly human health risks at SRS. Appendix F.10 provides a summary of the methods and tools (e.g., the GENII computer code) used for the assessment.

J.5.5.1.1 Meteorological Data

The meteorological data used for the SRS dose assessments was in the form of a JFD file. A JFD file is a table listing the percentages of time the wind blows in a certain direction, at a certain speed, and within a certain

stability class. The JFD file was based on measurements taken over a period of several years at a specific location (H-Area) and height. Average annual meteorological conditions, averaged over the measurement period, were used for normal operations. Table J–77 presents the JFD used in the dose assessments for SRS.

J.5.5.1.2 Population Data

The SRS population distribution was based on the *1990 Census of Population and Housing Data* (DOC 1992). Projections were determined for the year 2005 for areas within 80 km (50 mi) of the proposed facility location. The site population in 2005 was assumed to be representative of the population over the operational period evaluated. The population was spatially distributed on a circular grid with 16 directions and 10 radial distances out to an 80-km (50-mi) distance. The grid was centered within H-Area, the location from which radionuclides are assumed to be released during incident-free operations. Table J–78 presents the population data used for the lead assembly dose assessments at SRS.

J.5.5.1.3 Agricultural Data

The 1987 Census of Agriculture was the source used to generate site-specific data for food production. Food production was spatially distributed on a circular grid similar to that used for the population distributions described previously. This food grid (or wheel) was generated by combining the fraction of a county in each segment (e.g., south, southwest, north-northeast) and the county production of the eight food categories analyzed by GENII—leafy vegetables, root vegetables, fruits, grains, beef, poultry, milk, and eggs. Each county's food production was assumed to be distributed uniformly over the given county's land area. These categorized food wheels were then used in the assessment of doses to the population from the ingestion pathway. The consumption rates used in the dose assessments were those for the MEI and average exposed individual. People living within the 80-km (50-mi) assessment area were assumed to consume only food grown in that area. SRS food production and consumption data used for the dose assessments in the SPD EIS were obtained from the *Health Risk Data for Storage and Disposition of Final PEIS* (HNUS 1996).

Table J–77. SRS 1987–1991 Joint Frequency Distributions at 61-m Height

Wind Speed (m/s)	Stability Class	Wind Blows Toward															
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
2.0	A	0.37	0.41	0.37	0.42	0.4	0.37	0.4	0.36	0.36	0.35	0.45	0.39	0.45	0.43	0.37	0.41
	B	0.08	0.08	0.09	0.1	0.05	0.06	0.06	0.05	0.08	0.07	0.05	0.05	0.05	0.08	0.05	0.07
	C	0.03	0.06	0.09	0.07	0.06	0.05	0.06	0.05	0.07	0.05	0.06	0.05	0.08	0.05	0.05	0.05
	D	0.02	0.05	0.06	0.04	0.06	0.03	0.06	0.07	0.06	0.03	0.07	0.05	0.04	0.03	0.05	0.04
	E	0.01	0.02	0.04	0.01	0.01	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.02	0.01	0.02	0.02
	F	0	0.01	0.01	0.01	0.01	0.01	0	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
4.0	A	0.87	0.74	0.88	1	0.94	0.94	0.65	0.62	0.74	0.72	1	1.28	1.29	0.94	0.53	0.6
	B	0.27	0.41	0.58	0.62	0.43	0.34	0.24	0.22	0.32	0.33	0.48	0.67	0.56	0.37	0.25	0.21
	C	0.17	0.57	1.13	1.03	0.6	0.41	0.41	0.37	0.48	0.52	0.59	0.79	0.53	0.45	0.3	0.24
	D	0.1	0.44	1.07	0.89	0.55	0.5	0.71	0.69	0.92	0.91	0.8	0.81	0.72	0.57	0.43	0.27
	E	0.06	0.27	0.69	0.48	0.3	0.33	0.46	0.7	0.67	0.57	0.54	0.47	0.43	0.43	0.33	0.3
	F	0.02	0.05	0.09	0.04	0.02	0.08	0.09	0.09	0.11	0.08	0.12	0.09	0.03	0.05	0.05	0.07
6.0	A	0.57	0.26	0.16	0.19	0.15	0.07	0.07	0.09	0.14	0.14	0.21	0.24	0.27	0.24	0.14	0.24
	B	0.14	0.39	0.38	0.31	0.16	0.11	0.07	0.08	0.19	0.21	0.32	0.51	0.51	0.36	0.13	0.09
	C	0.12	0.54	1.3	0.74	0.35	0.19	0.22	0.25	0.47	0.46	0.56	0.69	0.64	0.56	0.21	0.12
	D	0.12	0.43	0.85	0.58	0.4	0.44	0.65	1.16	1.45	0.78	0.9	0.77	0.78	0.65	0.32	0.09
	E	0.07	0.53	0.69	0.71	0.6	0.45	0.65	1.01	1.18	0.94	0.91	0.89	0.48	0.4	0.19	0.14
	F	0.01	0.26	0.21	0.14	0.14	0.19	0.13	0.16	0.22	0.21	0.24	0.23	0.07	0.04	0.02	0.04
8.0	A	0.09	0.05	0.01	0.01	0.01	0	0.01	0.01	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.06
	B	0.01	0.08	0.03	0.01	0.01	0.01	0	0.01	0.05	0.04	0.05	0.1	0.17	0.21	0.06	0.01
	C	0.01	0.1	0.2	0.08	0.02	0.03	0.03	0.06	0.16	0.16	0.21	0.26	0.45	0.43	0.1	0.02
	D	0.01	0.05	0.1	0.02	0.01	0.01	0.05	0.18	0.22	0.15	0.1	0.09	0.03	0.05	0.03	0
	E	0	0.05	0.03	0.04	0.01	0.01	0	0.03	0.04	0.02	0.04	0.01	0.01	0	0	0
	F	0	0.03	0.02	0.02	0	0.01	0	0.01	0.02	0.01	0.02	0.01	0	0	0	0
12.0	A	0.01	0	0	0	0	0	0	0	0	0.01	0.01	0.01	0	0.01	0	0.01
	B	0	0.01	0	0	0	0	0	0	0	0	0.01	0.01	0.06	0.06	0.01	0
	C	0	0.01	0	0	0	0.01	0	0.03	0.04	0.04	0.05	0.06	0.16	0.17	0.02	0.01
	D	0	0.02	0.02	0	0	0	0	0.01	0.02	0.04	0	0	0.01	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14.1	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Simpkins 1997.

Table J–78. Projected SRS Population Surrounding H-Area for Year 2005

Direction	Distance (mi)										Total
	0–1	1–2	2–3	3–4	4–5	5–10	10–20	20–30	30–40	40–50	
S	0	0	0	0	0	0	485	1,807	5,207	3,545	**11,044**
SSW	0	0	0	0	0	0	629	1,906	5,070	2,361	**9,966**
SW	0	0	0	0	0	25	895	7,586	1,939	2,953	**13,398**
WSW	0	0	0	0	0	71	2,428	4,529	3,330	8,327	**18,685**
W	0	0	0	0	0	683	4,586	54,394	22,338	13,086	**95,087**
WNW	0	0	0	0	0	1,384	7,849	172,996	76,767	6,917	**265,913**
NW	0	0	0	0	0	1,026	14,508	34,759	4,044	3,629	**57,966**
NNW	0	0	0	0	0	2,691	30,598	23,544	8,243	6,184	**71,260**
N	0	0	0	0	0	363	4,049	3,790	4,887	20,832	**33,921**
NNE	0	0	0	0	0	89	1,790	3,016	6,535	21,457	**32,887**
NE	0	0	0	0	0	15	3,754	3,684	6,147	9,896	**23,496**
ENE	0	0	0	0	0	9	3,723	6,246	6,956	43,139	**60,073**
E	0	0	0	0	0	113	7,647	3,844	6,830	4,084	**22,518**
ESE	0	0	0	0	0	3	1,329	2,551	3,551	5,933	**13,367**
SE	0	0	0	0	0	0	552	4,950	4,962	8,342	**18,806**
SSE	0	0	0	0	0	0	374	597	1,940	2,703	**5,614**
Total	**0**	**0**	**0**	**0**	**0**	**6,472**	**85,196**	**330,199**	**168,746**	**163,388**	**754,001**

Source: DOC 1992.

J.5.5.1.4 Source Term Data

Estimated incident-free radiological releases associated with the MOX fuel lead assembly facility are presented in Table J–79. Stack height and release location are provided in the ORNL *SRS MOX Fuel Lead Assemblies Data Report for the Surplus Plutonium Disposition Environmental Impact Statement* (O'Connor et al. 1998e).

Table J–79. Estimated Incident-Free Annual Radiological Releases From the MOX Lead Assembly Facility at SRS

Isotope	(μCi/yr)
Plutonium 236	–
Plutonium 238	0.85
Plutonium 239	23
Plutonium 240	5.3
Plutonium 241	58
Plutonium 242	9.3×10^{-4}
Americium 241	2.0
Uranium 234	1.3×10^{-3}
Uranium 235	5.4×10^{-5}
Uranium 238	3.1×10^{-3}

Source: O'Connor et al. 1998e.

J.5.5.1.5 Other Calculational Assumptions

To estimate radiological impacts of incident-free operation of the facilities at SRS, the following additional assumptions and factors were considered, in accordance with the guidelines established in NRC Regulatory Guide 1.109 (NRC 1977).

Ground surfaces were assumed to have no previous deposition of radionuclides for the purposes of modeling the incremental radiological impacts associated with surplus plutonium disposition activities. However, doses associated with true instances of prior deposition are accounted for in the Affected Environment and Cumulative Impacts sections.

The annual external exposure time to the plume and to soil contamination was 0.7 year for the MEI (NRC 1977).

The annual external exposure time to the plume and to soil contamination was 0.5 year for the population (NRC 1977).

The annual inhalation exposure time to the plume was 1 year for the MEI and general population (NRC 1977).

The exposed individual or population was assumed to have the characteristics and habits (e.g., inhalation and ingestion rates) of the adult human.

A semi-infinite/finite plume model was used for air immersion doses. Other pathways evaluated were ground exposure, inhalation, ingestion of food crops, and ingestion of contaminated animal products. Drinking water, aquatic food ingestion, and any other pathway that may involve liquid exposure were not examined because all releases are to the air.

Reported stack heights were used for atmospheric releases and were assumed to be the effective stack height. The resultant doses were conservative because use of the actual stack height negates plume rise.

The calculated doses are 50-year committed doses from 1 year of intake.

J.5.5.2 Human Health Impacts

Potential radiological impacts on the public and workers resulting from normal lead assembly operations are presented in Section 4.27.5.4.

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Appendix K
Facility Accidents

K.1 IMPACT ASSESSMENT METHODS FOR FACILITY ACCIDENTS

K.1.1 Introduction

The potential for facility accidents and the magnitude of their consequences are important factors for making reasonable choices among the various surplus plutonium disposition alternatives analyzed in the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS). Guidance on the implementation of 40 CFR 1502.22, as amended (EPA 1992), requires the evaluation of impacts that have a low frequency of occurrence but high consequences. Further, public comments received during the scoping process have clearly indicated the public's concern with facility safety and health risks and the need to address these concerns in the decisionmaking process.

For the No Action Alternative, potential accidents are defined in existing facility documentation, such as safety analysis reports (SARs), hazards assessment documents, National Environmental Policy Act (NEPA) documents, and probabilistic risk assessments (PRAs). The accidents include radiological and chemical accidents that have a low frequency of occurrence but high consequences, and a spectrum of other accidents that have a higher frequency of occurrence and lesser consequences. The data in these documents include accident scenarios, materials at risk, source terms (quantities of hazardous materials released to the environment), and consequences.

For each facility, a hazards analysis document identifying and estimating the effects of all major hazards that could affect the environment, workers, and the public would be issued in conjunction with the conceptual design package. Additional accident analyses for identified major hazards would be provided in a preliminary SAR issued during the period of definitive design (Title II) review. A final SAR would be prepared during the construction period and issued before testing began as final documented evidence that the new facility could be operated in a manner that did not pose any undue risk to the health and safety of workers and the public.

In determining the potential for facility accidents and the magnitude of their consequences, the SPD EIS considers two important concepts in the presentation of results: (1) risk and (2) uncertainties and conservatism.

K.1.1.1 Risk

One type of metric that can be obtained from the accident analysis results presented in the SPD EIS is accident risk. Risk is usually defined as the product of the consequences and estimated frequency of a given accident. Accident consequences may be presented in terms of dose (e.g., person-rem) or health effects (e.g., latent cancer fatalities [LCFs]). The accident frequency is the number of times the accident is expected to occur over a given period of time (e.g., per year). In general, the frequency of design basis and beyond-design-basis accidents is much lower than 1 per year, and therefore is approximately equal to the probability of the accident during 1 year. If an accident is expected to occur once every 1,000 years (i.e., a frequency of 1.0×10^{-3} per year) and the consequences of the accident is five LCFs, then the risk is $1.0\times10^{-3}\times5 = 5.0\times10^{-3}$ LCF per year.

A number of specific types of risk can be directly calculated from the Melcor Accident Consequence Code System (MACCS2) results reported in the SPD EIS (SNL 1997). One type of risk, average individual risk, is the product of the total consequences experienced by the population and the accident frequency, divided by the population.[1] For example, if an accident has a frequency of 1.0×10^{-3} per year, the consequence thereof is 5 LCFs, and the

[1] Population data for each facility considered in the SPD EIS can be found in Appendix J.

population in which the fatalities are experienced is 100,000, then the average individual risk is $1.0\times10^{-3} \times 5/100{,}000 = 5.0\times10^{-8}$ LCF per year. This metric is meaningful only when the mean value for consequence is used because risk itself is not a random parameter, even though it involves underlying randomness. It is noteworthy that the value of the average individual risk depends on the size of the area for which the population is defined. In general, the larger the area considered, the smaller the average individual risk for a given accident. The choice of an 80-km (50-mi) radius is common practice.

The average individual risk is a measure of the risk that an average individual (in this case within 80 km [50 mi] of the accident) experiences from specified accidents at the facility. This risk can be compared with other average individual risks, such as the risk of dying from a motor vehicle accident (about 1 in 80), the risk of death from fires (about 1 in 500), or the risk of accidental poisoning (about 1 in 1,000). These comparisons are not meant to imply that risks of an LCF caused by U.S. Department of Energy (DOE) operations are trivial, but only to show how they compare with other, more common risks. Radiological risks to the general public from DOE operations are considered to be involuntary risks as opposed to voluntary risks, such as operating a motor vehicle.

It is also possible to calculate population risk, which is the product of the total consequences experienced by the population and accident frequency. For example, if an accident has a frequency of 1.0×10^{-3} per year and the consequences of the accident is 5 LCFs, then the population risk is $1.0\times10^{-3}\times5 = 5.0\times10^{-3}$ LCF per year. Population risk is a measure of the expected number of consequences experienced by the population as a whole over the course of a year.

It would be inappropriate, however, to simply take the LCFs given the dose at 1,000 m (3,281 ft) or the LCFs given the dose at the site boundary and multiply them by the corresponding accident frequencies in an attempt to obtain the maximum individual risk to the noninvolved worker or the maximally exposed individual (MEI) member of the public. The reasons for this are discussed in the following paragraphs.

The distribution of centerline consequences from which the reported doses are obtained is constructed by modeling the accidental release many times using different weather conditions (i.e., windspeed, wind direction, stability class, and rainfall) each time. For each weather condition, the centerline consequences at 1,000 m (3,281 ft) and at the site boundary are calculated, and those values contribute to their respective distributions. Thus, given the accidental release, there is a 95 percent chance that the centerline consequences at 1,000 m (3,281 ft) and at the site boundary will fall below the reported 95th percentile consequences, and the expected consequences would be equal to the reported mean consequences. It is noteworthy, however, that the actual locations of the centerline consequences vary with wind direction, so the reported consequences are not associated with a specific point at 1,000 m (3,281 ft) or the site boundary. It is known only that the centerline consequences, wherever they might be, are characterized by the reported values.

A problem arises when these consequences are used to characterize individual risk. Although there is always some location that is exposed to the centerline consequences, no location is associated with the risk obtained by multiplying the centerline consequences by the accident frequency, because the direction of the plume centerline changes for each set of weather conditions. As a result, the risk to an individual at the location of maximum risk is likely to be much lower than the risk calculated by multiplying the centerline consequences by the accident frequency. In fact, because there are 16 sectors, and because doses decrease with lateral movement away from the centerline even within a sector, risk values generated in this way would tend to overstate the risk by a factor of as much as 100, and possibly more. The values are bounding, but have a potentially misleading degree of conservatism. Ultimately, MACCS2 is capable of calculating individual consequences at the point of maximum consequence (as reported in the SPD EIS), but it is not configured to calculate individual risk at the point of maximum risk.

K.1.1.2 Uncertainties and Conservatism

The analyses of accidents are based on calculations relevant to hypothetical sequences of events and models of their effects. The models provide estimates of the frequencies, source terms, pathways for dispersion, exposures, and the effects on human health and the environment that are as realistic as possible within the scope of the analysis. In many cases, a paucity of experience with the accidents postulated leads to uncertainty in the calculation of their consequences and frequencies. This fact has prompted the use of models or input values that yield conservative estimates of consequence and frequency. All alternatives have been evaluated using uniform methods and data, allowing for a fair comparison of all alternatives.

Although average individual and population risks can be calculated from the information in the SPD EIS, the equations for such calculations involve accident frequency, a parameter whose calculation is subject to considerable uncertainty. The uncertainty in estimates of the frequency of highly unlikely events can be several orders of magnitude. This is the reason accident frequencies are reported in the SPD EIS qualitatively, in terms of broad frequency bins, as opposed to numerically. Similarly, any metric that includes frequency as a factor will have at least as much, and generally more, uncertainty associated with it. Therefore, the consequence metrics have been preserved as the primary accident analysis results, and accident frequencies identified qualitatively, to provide a perspective on risk that does not imply an unjustified level of precision.

K.1.2 Safety Design Process

The proposed surplus plutonium disposition facilities would be designed to comply with current Federal, State, and local laws, DOE orders, and industrial codes and standards. This would result in a plant that is highly resistant to the effects of natural phenomena, including earthquake, flood, tornado, and high wind, as well as credible events as appropriate to the site, such as fire, explosions, and man-made threats.

The design process for the proposed facilities would comply with the requirements for safety analysis and evaluation in DOE Orders 430.1 and 5480.23. These orders require that the safety assessment be an integral part of the design process to ensure compliance with all DOE construction and operation safety criteria by the time the facilities are constructed and in operation.

The safety analysis process begins early in conceptual design with the identification of hazards that could produce unintended adverse safety consequences to workers or the public. As the design develops, failure modes and effects analyses (FMEAs) are performed to identify events capable of releasing hazardous material. The kinds of events considered include equipment failures, spills, human errors, fires, explosions, criticality, earthquakes, electrical storms, tornadoes, floods, and aircraft crashes. These postulated events become focal points for design changes or improvements to prevent unacceptable accidents. The analyses continue as the design progresses, the object being to assess the need for safety equipment and the performance of such equipment. Eventually, the safety analyses are formally documented in a SAR and, if appropriate, a PRA. The PRA documents the estimated frequency and consequences of a complete spectrum of accidents and helps to identify where design improvements could make meaningful safety improvements.

The first SAR, completed at the conclusion of conceptual design, includes identification of hazards and some limited assessment of a few enveloping design basis accidents. It includes deterministic safety analysis and FMEA of major systems. A comprehensive preliminary SAR, completed by the end of the preliminary design, provides a broad assessment of the range of design basis accident scenarios and the performance of equipment provided in the facility specifically for accident consequence mitigation. A limited PRA may be included in that analysis.

The SAR continues to be developed during detailed design. The safety review of the report and any supporting PRA are completed and safety issues resolved before the initiation of facility construction. Also, a final SAR is produced that includes documentation of safety-related design changes made during construction and the impact of those changes on the safety assessment. It also includes the results of any safety-related research and development that was performed to support the safety assessment of the facility. Approval of the final SAR is required before the facility is allowed to commence operation.

K.1.3 DOE Facility Accident Identification and Quantification

K.1.3.1 Background

Identification of accident scenarios for the proposed facilities is fairly straightforward. The proposed facilities are simple, and their processes have been used in other facilities for other purposes. From an accident identification and quantification perspective, therefore, these processes are well known and understood. Very few of the proposed activities would differ from activities at other facilities.

New facilities would likely be designed, constructed, and operated to provide an even lower accident risk than other facilities that have used these types of processes. The new facilities would benefit from lessons learned in the operation of similar processes. They would be designed to surpass existing plutonium facilities in the ability to reduce the frequency of accidents and to mitigate the consequences thereof.

A large experience base exists for the design of the proposed facilities and processes. Because the principal hazard to workers and the public from plutonium is the inhalation of very small particles, the safety management approach that has evolved is centered on control of those particles. The control approach is to perform all operations that could release airborne plutonium particles in a glovebox. The glovebox protects workers from inhalation of the particles and provides a convenient means for the collection of any particle that becomes airborne on filters. Air from the gloveboxes, operating areas, and buildings is exhausted through multiple stages of high-efficiency particulate air (HEPA) filters and monitored for radioactivity prior to release from the building. These exhaust systems are designed for effective performance even under the severe conditions of design basis accidents, such as major fires involving an entire process line.

While the new processes and facilities would be designed to reduce the risks of a wide range of possible accidents to a level deemed acceptable, some such risks would remain. As with all engineered structures—e.g., houses, bridges, dams—there is some level of earthquake or high wind the structure could not survive. While new plutonium facilities must be designed to very high standards—for instance, they must survive, with little plutonium release, a 1-in-10,000-year earthquake—an accident more severe than the design basis can always be postulated. Current DOE standards require that new facilities be designed to prevent to the extent possible, and then withstand, control, and mitigate, all credible process-related accidents. For safety analysis purposes, credible accidents are generally defined as accidents with frequencies greater than 1 in 1 million per year, including such natural-phenomena-induced accidents as earthquakes, high winds, and flooding. The accidents considered in the design, construction, and operation of these facilities are generally called design basis accidents.

In addition to the accident risks from the design basis accidents, the new facilities would face risks from beyond-design-basis accidents. For most plutonium facilities, the design basis includes all types of process-related accidents that have occurred in past operations: major spills, leaks, transfer errors, process-related fires, explosions, and nuclear criticalities. Certain natural-phenomena-initiated accidents also meet the DOE design basis criteria. While extremely unlikely, all new plutonium facilities, as essentially all manmade structures, could collapse under the influence of an earthquake. For most new plutonium facilities, the worst possible accident is a beyond-design-basis earthquake that results in partial or total collapse of the structure, spills, possibly fires, and loss of confinement of the plutonium powder. Also conceivable are such external events

as the crash of a large aircraft onto the structure with an ensuing fuel-fed fire. At most locations away from major airports, however, the likelihood is less than 1 in 10 million per year. For some locations, such as Pantex, the frequency is higher, so aircraft crash–initiated accidents are a basic consideration.

The accident analysis reported in the SPD EIS is less detailed than a formal PRA or facility safety analysis because it addresses bounding accidents (accidents with low frequency of occurrence and high consequence) and a representative spectrum of possible operational accidents (accidents with high frequency of occurrence and low consequence). The technical approach for the selection of accidents is consistent with the DOE Office of NEPA Oversight's *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements* (DOE 1993), which recommends consideration of two major categories of accidents: design basis accidents and beyond-design-basis accidents.[2]

K.1.3.2 Identification of Accident Scenarios and Frequencies

A range of design basis and beyond-design-basis accident scenarios have been identified for each of the surplus plutonium disposition technologies (UC 1998a–h, 1999a–d). For each technology, the wide range of process-related accidents possible during construction and operation of the facility have been evaluated to ensure that their consequences are low or the frequency of occurrence, extremely low.

All of the analyzed accidents would involve a release of small, respirable plutonium particles or direct gamma and neutron radiation, and to a lesser extent, fission products from a nuclear criticality. Analyses of each proposed operation for accidents involving hazardous chemicals are reflected in the data reports supporting the SPD EIS. However, as the quantities of hazardous chemicals to be handled are small relative to those of many industrial facilities, no major chemical accidents were identified. The general categories of process-related accidents considered include:

- Drops or spills of materials within and outside the gloveboxes
- Fires involving process equipment or materials, and room or building fires
- Explosions initiated by the process equipment or materials or by conditions or events external to the process
- Nuclear criticalities

The analyses considered synergistic effects and determined that the only significant source of such effects would be a seismic event (i.e., a design basis seismic event or a seismically induced total collapse). The synergy would be due to the common-cause initiator (i.e., seismic ground motion). This was accounted for by summing population doses and LCFs for alternatives in which facilities would be located at the same site. MEI doses were not summed because an individual would only receive a summed dose if he or she were located along the line connecting the release points from two facilities and the wind were blowing along the same line at the time of the accident.

For each of these accident categories, a conservative preliminary assessment of consequence was made, and where consequences were significant, one or more bounding accident scenarios were postulated. The building confinement and fire suppression systems would be adequate to reduce the risks of most spills and minor fires. The systems would be designed to prevent, to the extent practicable, larger fires and explosions. Great efforts have always been made to prevent nuclear criticalities, which have the potential to kill workers in their immediate

[2] Some of the data reports supporting the SPD EIS use the terms "evaluation basis" and "beyond-evaluation-basis" to denote the two major categories of accidents. For clarity, the SPD EIS uses the terms "design basis" and "beyond-design-basis" throughout.

vicinity. In all cases, standard practice is expected to keep the frequency of accidental nuclear criticalities as low as possible.

The proposed surplus plutonium disposition facilities would be expected to meet or exceed the requirements of DOE Order 420.1, *Facility Safety*, and *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities* (DOE-STD-1020-94) (DOE 1994a), or the requirements of 10 CFR 70, *Domestic Licensing of Special Nuclear Material*, if the proposed facility were to be licensed by the U.S. Nuclear Regulatory Commission (NRC). Because the DOE and, if applicable, NRC design criteria require that new plutonium-processing buildings be of very robust, reinforced-concrete construction, very few events outside the building would have sufficient energy to threaten the building confinement. The principal concern would be the crash of a large commercial or military aircraft into the facility. Such an event, however, is highly unlikely. Only those crashes with a frequency greater than 10^{-7} per year are addressed in the SPD EIS.

Design basis and beyond-design-basis natural-phenomena-initiated accidents are also considered. Because of the robust nature of construction of new plutonium facilities, the only design basis natural-phenomena-initiated accidents with the potential to impact the facility interior are seismic events. Similarly, seismic events also bound the consequences and risks posed by beyond-design-basis natural phenomena.

The suite of generic accidents in the *Storage and Disposition PEIS* (DOE 1996a) was considered in the analysis of accidents for the SPD EIS. However, the more detailed design information in the surplus plutonium disposition data reports was the primary basis for the identification of accidents because it most accurately represents the expected facility configuration. The fire on the loading dock and the oxyacetylene explosion in a process cell were unsupported by this information, so were not included in the SPD EIS.

Accident frequencies are generally grouped into the bins of “anticipated,” “unlikely,” and “extremely unlikely,” with estimated frequencies of greater than 10^{-2}, 10^{-2} to 10^{-4}, and 10^{-4} to 10^{-6} per year, respectively. The accidents evaluated represent a spectrum of accident frequencies and consequences ranging from low-frequency/high-consequence to high-frequency/low-consequence events. However, given the preliminary nature of the designs under consideration, it was not possible to assess quantitatively the frequency of occurrence of all the events addressed. The evaluation does not indicate the total risk of operating the facility, but does provide information on high-risk events that could be used to develop an accident risk ranking of the various alternatives.

K.1.3.3 Identification of Material at Risk

For each accident scenario, the material at risk—generally plutonium—was identified. Plutonium to be disposed of has a wide range of chemical and isotopic forms. The sources of plutonium vary among the various candidate facilities, and for specific facilities among various alternatives. Table K–1 presents the isotopic compositions that were used in the development of accident consequences in the SPD EIS. The vulnerability of material generally depends on the form of that material, the degree and robustness of containment, and the energetics of the potential accident scenario (UC 1998a:table 6-6; 1998c:tables 9-2 and A-7; 1998d:table B-1). For example, plutonium stored in strong, tight storage containers is not generally vulnerable to simple drops or spills, but may be vulnerable in a total collapse earthquake scenario.

Table K–1. Isotopic Composition of Plutonium Used in Accident Analysis (wt %)

Isotope	Pit Disassembly and MOX	Immobilization: Plutonium Conversion	Immobilization: First Stage, Hybrid Case	Immobilization: First Stage, 50-t Case
Plutonium 238	3.00×10^{-2}	0.0	0.0	2.0×10^{-2}
Plutonium 239	92.2	86.9	86.9	91.0
Plutonium 240	6.46	11.1	11.1	8.2
Plutonium 241	5.00×10^{-2}	1.5	1.5	5.80×10^{-1}
Plutonium 242	1.00×10^{-1}	5.0×10^{-1}	5.0×10^{-1}	2.50×10^{-1}
Americium 241	9.00×10^{-1}	1.0	1.0	9.4×10^{-1}

On an industrial scale, the quantities of hazardous chemicals are generally small. The occupational risks are generally limited to material handling and are managed under the required industrial hygiene program. No substantial hazardous chemical releases are expected.

K.1.3.4 Identification of Material Potentially Released to the Environment

The amount and particle size distribution of material aerosolized in an accident generally depends on the form of that material, the degree and robustness of containment, and the energetics of the potential accident scenario. Once the material is aerosolized, it must still travel through building confinement and filtration systems or bypass the systems before being released to the environment.

A standard DOE formula was used to estimate the source term for each accident at each of the proposed surplus plutonium facilities:

$$\text{Source Term} = \text{MAR} \times \text{DR} \times \text{ARF} \times \text{RF} \times \text{LPF}$$

where:

MAR = material at risk (curies or grams)
DR = damage ratio
ARF = airborne release fraction
RF = respirable fraction[3]
LPF = leak path factor

The value of each of these factors depends on the details of the specific accident scenario postulated. ARF and RF were estimated according to reference material in *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities* (DOE-HDBK-3010-94) (DOE 1994b). Conservative HEPA filter efficiencies of 0.999 and 0.99 were assumed, based on two stages of filtration, for a total LPF of 1.0×10^{-5}; however, actual efficiencies would likely be 0.999 and 0.998 or better. [Text deleted.]

No accident scenarios were identified that would result in a substantial release of plutonium or other radionuclides via liquid pathways.

[3] Respirable fractions are not applied in the assessment of doses based on noninhalation pathways, such as criticality.

K.1.4 Evaluation of Consequences of Accidents

K.1.4.1 Potential Receptors

For each potential accident, information is provided on accident consequences and frequencies to three types of receptors: (1) a noninvolved worker, (2) the maximally exposed member of the public, and (3) the offsite population. The first receptor, a noninvolved worker, is a hypothetical individual working on the site but not involved in the proposed activity. The worker is assumed to be downwind at a point 1,000 m (3,281 ft) from the accident. Although other distances closer to the accident could have been assumed, the calculations break down at distances of about 200 m (656 ft) or less due to limitations in modeling the effects of building wake and local terrain on dispersion of the released radioactive substances. A worker closer than 1,000 m (3,281 ft) to the accident would generally receive a higher dose; a worker farther away, a lower dose. At some sites where the distance from the accident to the nearest site boundary is less than 1,000 m (3,281 ft), the worker is assumed to be at the site boundary. The second receptor, a maximally exposed member of the public, is a hypothetical individual assumed to be downwind at the site boundary. Exposures received by this individual are intended to represent the highest doses to a member of the public. The third receptor, the offsite population, is all members of the public within 80 km (50 mi) of the accident location.

Consequences to workers directly involved in the processes under consideration are addressed generically, without attempt at a scenario-specific quantification of consequences. This approach to in-facility consequences was selected for two reasons. First, the uncertainties involved in quantifying accident consequences become overwhelming for most radiological accidents due to the high sensitivity of dose values to assumptions about the details of the release and the location and behavior of the impacted worker. Also, the dominant accident risks to the worker of facility operations are from standard industrial accidents, as opposed to bounding radiological accidents. The accident fatality risk for DOE has been reported as 2.7×10^{-5} per person per year (DOE 1999a). According to historical data on standard industrial accidents, the national average fatality risk from manufacturing operations is 3.5×10^{-5} per person per year (DOL 1997).

Consequences for potential receptors as a result of plume passage were determined without regard for emergency response measures, and thus are more conservative than would be expected if evacuation and sheltering were explicitly modeled. Instead, it is assumed that potential receptors are fully exposed in fixed positions for the duration of plume passage, thereby maximizing their exposure to the plume. As discussed in Appendix K.1.4.2, a conservative estimate of total risk was obtained by assuming that all released radionuclides contributed to the inhalation dose rather than being removed from the plume by surface deposition, which is a less significant contributor to overall risk and is controllable through interdiction.

K.1.4.2 Modeling of Dispersion of Releases to the Environment

The MACCS2 computer code (version 1.12) was used to estimate the consequences of accidents for the proposed facilities. A detailed description of the MACCS2 model is available in NUREG/CR-4691 (NRC 1990). Originally developed to model the radiological consequences of nuclear reactor accidents, this code has been used for the analysis of accidents for many EISs and other safety documentation, and is considered applicable to the analysis of accidents associated with the disposition of plutonium.

MACCS2 models the offsite consequences of an accident that releases a plume of radioactive materials into the atmosphere, specifically, the degree of dispersion versus distance as a function of historical wind direction, speed, and atmospheric conditions. Were such an accidental release to occur, the radioactive gases and aerosols in the plume would be transported by the prevailing wind and dispersed in the atmosphere, and the population would be exposed to radiation. MACCS2 generates the distribution of downwind doses at specified distances, as well as the distribution of population doses out to 80 km (50 mi).

As implemented, the MACCS2 model evaluates doses due to inhalation of aerosols, such as respirable plutonium, as well as exposure to the passing plume. This represents the major portion of the dose that a noninvolved worker or member of the public would receive as a result of a plutonium disposition facility accident. The longer-term effects of plutonium deposited on the ground and surface waters after the accident, including the resuspension and inhalation of plutonium and the ingestion of contaminated crops, were not modeled for the SPD EIS. These pathways have been studied and been found not to contribute as significantly to dosage as inhalation, and they are controllable through interdiction. Instead, the deposition velocity of the radioactive material was set to zero, so that material that might otherwise be deposited on surfaces remained airborne and available for inhalation. This adds a conservatism to inhalation doses that can become considerable at large distances (as much as two orders of magnitude at the 80-km [50-mi] limit). Thus, the method used in the SPD EIS is conservative compared with dose results that would be obtained if deposition and resuspension were taken into account.

Longer-term effects of fission products released in a nuclear criticality accident have been extensively studied. The principal concern is ingestion of iodine 131 via milk that becomes contaminated due to the ingestion of contaminated grains by milk cows. This pathway can be controlled if necessary. In terms of the effects of an accidental criticality, doses from this pathway are small.

The potential for tritium contamination of the Ogallala aquifer as a consequence of an accident at Pantex involving tritium was identified as a specific concern during the development of the SPD EIS. The assessment of consequences of accidental tritium releases in the SPD EIS is consistent with the method used in the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE 1995a). Unlike plutonium, oxidized tritium (i.e., water vapor) is not significantly deposited on the ground for subsequent percolation into the local groundwater except under conditions of rain or dew. Pantex has a rather arid climate, so the chance of these weather conditions at the time of an accident is slight. Moreover, even if it were to happen as indicated in Section 4.6.1.2 of the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE 1996b), actual movement of contaminated groundwater off the site would require about 10 to 20 years. In fact, current test data show that it could take as long as 50 or more years for a contaminant plume to move off the site. The half-life of tritium is 12 years; therefore, any hypothetical contamination deposited on the ground surface and carried into the groundwater regime would be reduced by a factor of roughly 2 to 16 by the time it moved off the site. Because of these considerations, health consequences of contamination of the Ogallala aquifer were not considered to be a significant contributor to health risks from a tritium release accident.

The region around the facility is divided by a polar-coordinate grid centered on the facility itself. The user specifies the number of radial divisions and their endpoint distances. The angular divisions used to define the spatial grid correspond to the 16 directions of the compass.

MACCS2 was applied in a probabilistic manner using a weather bin–sampling technique. Centerline doses, as a function of distance, were calculated for each of 1,460 meteorological sequence samples, resulting in a distribution of doses reflecting variations in weather conditions at the time of the postulated accidental release. The code outputs the conditional probability of exceeding a dose as a function of distance. The mean and 95th percentile consequences are reported in the SPD EIS. Doses higher than the 95th percentile values would be expected only 5 percent of the time.

MACCS2 cannot be used to calculate directly the distribution of maximum doses (resulting from meteorological variations) around irregular contours, such as a site boundary. As a result, analyses that use MACCS2 to calculate site boundary doses usually default to calculating doses at the distance corresponding to the shortest distance to the site boundary. In effect, the site boundary is treated as if it were circular, with a radius equal to the shortest distance from the facility to the actual site boundary. While this approximation is conservative with respect to dose (with the possible exception of doses from elevated plumes), it eliminates the use of some

site-specific information, namely the site boundary location (other than the nearest point), wind direction, and any correlation between wind direction and other meteorological parameters. Because the primary purpose of the SPD EIS is to aid in decisions about facility locations, and because differences in dose values among the various options are largely a function of site-specific variations, a different approach was taken to more accurately characterize the potential for maximum doses at the site boundary.

For the SPD EIS, MACCS2 was used to generate intermediate results that could be further processed to obtain the distribution of doses around the site boundary, accounting for variations in site boundary distance as a function of direction. The specific instrument was the Type B result option of MACCS2, which renders the distribution of doses at a specified radial distance within a specified compass sector, given a release. Type B results were requested for the site boundary distance for each of the 16 compass sectors over which the meteorological data is defined. This resulted in 16 separate dose distributions; one for each specific location around the site boundary. The distribution of maximum doses around the site boundary was constructed by first summing the values of the Type B distributions for each dose value. The resulting distribution was then truncated for low dose values to the point where the remainder of the distribution was normalized. This produced the distribution of maximum doses around the site boundary, which is the distribution from which the mean and 95th percentile doses are reported.

Radiological consequences may vary somewhat as a result of variations in the duration of release. For longer releases, there is a greater chance of plume meander (i.e., variations in wind direction over the duration of release). MACCS2 models plume meander by increasing the lateral dispersion coefficient of the plume for longer release durations, thus lowering the dose. For perspective, doses from an homogenous, 1-hr release would be 30 percent lower than those of a 10-min release as a result of plume meander; doses from a 2-hr release, 46 percent lower. The other effect of longer release durations is involvement of a greater variety of meteorological conditions in a given release, which reduces the variance of the resulting dose distributions. This would tend to lower high-percentile doses, raise low-percentile doses, and have no effect on the mean dose.

For the SPD EIS accident analysis, a duration of 10 min was assumed for all releases. This is consistent with the accident phenomenology expected for all scenarios, with the possible exception of fire. Depending on the circumstances, the time between fire ignition and extinction may be considerably longer, particularly for the larger, beyond-design-basis fires. However, even in a fire of long duration, it is possible to release substantial fractions of the total radiological source term in fairly short periods, as the fire consumes areas of high MAR concentrations. The assumption of a 10-min release duration for fire is intended to generically account for this circumstance.

K.1.4.3 Modeling of Consequences of Releases to the Environment

The mean and 95th percentile consequences of accidental radiological releases, given variations in meteorological conditions at the time of the accident, are calculated as radiological doses in terms of rem. The mean consequences, or the expected consequences of the accident, are an appropriate statistic for use in risk estimates. The 95th percentile consequences represent bounding consequences of the accident; that is, if the accident were to occur and release the stated source term, there would be a 95 percent probability of lower than the stated consequences. This statistic is thus useful for characterizing the bounding consequence potential of the proposed activity under the stated accident condition. The consequences are also expressed as the additional potential or likelihood of death from cancer for the noninvolved worker and the maximally exposed member of the public, and the expected number of incremental LCFs among the exposed population.

The probability coefficients for determining the likelihood of fatal cancer, given a dose, are taken from the *1990 Recommendations of the International Commission on Radiological Protection* (ICRP 1991). For low doses or low dose rates, respective probability coefficients of 4.0×10^{-4} and 5.0×10^{-4} fatal cancers per rem are applied

for workers and the general public.[4] For high doses received at a high rate, respective probability coefficients of 8.0×10^{-4} and 1.0×10^{-3} fatal cancers per rem are applied for noninvolved workers and the public. These higher probability coefficients apply where doses are above 20 rem and dose rates above 10 rem/hr.

K.1.5 Accident Scenarios for Surplus Plutonium Disposition Facilities

Bounding design basis and beyond-design-basis accident scenarios have been developed from accident scenarios presented in each of the surplus plutonium disposition data reports (UC 1998a–h, 1999a–d). These scenarios are discussed in detail, along with specific assumptions for each facility and site, in these documents.

K.1.5.1 Accident Scenario Consistency

In preparing the accident analysis for the SPD EIS, the primary objective was to ensure consistency between the data reports so that results of the analyses for the proposed surplus plutonium disposition alternatives could be compared on as equal a footing as possible. In spite of efforts by all parties, some inconsistencies exist between the data reports. This does not imply technical inaccuracy in any analysis; it merely reflects the uncertainties and reliance on convention that are inherent in accident analyses in general. In order to provide a consistent analytical basis, information in the data reports has been modified or augmented as described below.

Aircraft Crash. It was decided early in the process of developing accident scenarios that aircraft crash scenarios would not be provided in the data reports, but would be developed, as appropriate, directly for the SPD EIS.

Frequencies of an aircraft crash into each facility for each alternative were developed in accordance with DOE-STD-3014 (DOE 1996c). The frequency of crashes involving aircraft capable of penetrating the subject facility (assumed to be all aircraft except those in general aviation) would be below 1.0×10^{-7} per year for all facilities except those at Pantex. For facilities at Pantex, the frequency of impact would be 1.7×10^{-6} per year.

Of the variety of impact conditions accounted for in the above frequency values (e.g., impact angle, direction, lateral distance from building center, speed) only a fraction would have the potential to produce consequences comparable to those reported in the SPD EIS, while other impacts (grazing impacts, impacts into office areas, etc.) would not result in significant radiological impacts. [Text deleted.] Aircraft crashes at Pantex with the potential for significant consequences could occur more frequently than 1.0×10^{-7} per year, so these scenarios were analyzed further.

For the facilities at Pantex, the potential for an aircraft crash into vaults containing large quantities of plutonium powder was examined in relation to the potential for a crash into the facility as a whole. For the pit conversion and mixed oxide (MOX) facilities, the footprint of the vault would be considerably less than one-tenth that of the facility as a whole, indicating that vault impact frequencies would be on the order of, and perhaps less than, one-tenth the facility impact frequencies. Moreover, fewer types of aircraft would have the potential to penetrate the vault due to the robustness of the reinforced-concrete vault structures and their location in the basements of the facilities. Inside the vault, the storage containers would provide additional protection against the release of material. The protection provided by the vault structure and the storage containers can be regarded as conducive to a further reduction in the frequency of aircraft crashes into vault areas.

In response to public concern over the risk of an aircraft crash at Pantex, and consistent with a Memorandum of Understanding between the DOE Amarillo Area Office and the Federal Aviation Administration (FAA), an

[4] Probability coefficients for the likelihood of nonfatal cancer are 8.0×10^{-5} for adult workers and 1.0×10^{-4} for the public. The probability coefficients for severe hereditary effects are 8.0×10^{-5} for adult workers and 1.3×10^{-4} for the public.

Overflight Working Group was established. This working group provided a number of recommendations for reducing the risk of an aircraft crash into any facility at Pantex. DOE supplemented the Memorandum of Understanding with an Interagency Agreement with the FAA. These actions resulted in the following recommendations:

- Modifying the vectoring of approaching aircraft to preclude extended flying over plant boundaries and reducing the number of aircraft turning on final approach over the plant
- Modifying holding patterns so that they are away from the plant
- Developing a new global positioning satellite (GPS), nonprecision approach to runway 22
- Replacing the backcourse localizer approach to runway 22 with an offset localizer approach
- Upgrading the lighting system for the approach to runway 4
- Establishing a hotline between the FAA and DOE
- Establishing new very high frequency omnidirection radio tactical (VORTAC) air navigation device locations
- Installing a GPS ground differential station, and commissioning a new GPS precision approach to runway 22

As of this date, all the recommendations except the last two have been implemented. The recommendation to install a precision approach is on hold until the FAA develops the standards for the augmentation system. While these changes cannot be quantitatively reflected in the frequency of aircraft crash as calculated by DOE-STD-3014, the improvements have been acknowledged as representing a reduction in the exposure of Pantex to aircraft, which translates to a reduction in the aircraft crash frequency at that site.

As a result of these considerations, it was qualitatively estimated that the overall scenario frequency of an aircraft crash into a plutonium powder vault associated with either the pit conversion or MOX facility was below the threshold frequency of 1.0×10^{-7} per year. Additionally, it was qualitatively estimated that in light of these considerations, the overall frequency of aircraft impact into the pit conversion or MOX facility at Pantex was below 1×10^{-6} per year, or "beyond extremely unlikely." The development of consequences of an aircraft crash was therefore refocused on the MAR that could be in process areas at the time of the crash. To develop representative consequences, it was assumed that the aircraft impact would involve the process area containing the largest amount of material in the most dispersable form. For the MOX facility, the impact was assumed to involve the unloading vessel and hopper storage, powder-blending process, and MOX powder storage areas. These processes would contain the bulk of process plutonium in powder form. The total quantity of plutonium in powder form would be 1.8×10^{5} g (6.3×10^{3} oz) (UC 1998d:table B-13), assuming that one-third of the plutonium in MOX powder storage was in powder form, one-third in green pellet form, and one-third in the form of sintered pellets. However, given the potentially high-energy densities associated with an aircraft crash, it was assumed that the green pellets would be equally vulnerable to release as powder, for a total effective powder quantity of 3.5×10^{5} g (1.2×10^{4} oz). For the pit conversion facility, the impact was assumed to involve the bisector, blending, canning, nondestructive analysis, and temporary storage areas, for a total of 6.0×10^{4} g (2.1×10^{3} oz) (UC 1998a:table 7-3) of plutonium in powder form.

The initial effect of the impact would be to disperse the material in a manner consistent with DOE-HDBK-3010-94 values for debris impact in powder. For this phenomenon, DOE-HDBK-3010-94

recommends bounding ARF and RF values of 1.0×10^{-2} and 0.2 (DOE 1994a:4-10), respectively, resulting in an initial source term of 117 g (4.1 oz) for the pit conversion facility and 690 g (24 oz) for the MOX facility. An aircraft crash could also induce a fire capable of entraining additional material in a lofted plume. The ARF and RF values for thermal stress, 6.0×10^{-3} and 1.0×10^{-2} (DOE 1994a:4-7), respectively, would result in a 3 percent increase in the source term. This additional source term should not contribute significantly to the noninvolved worker dose or the MEI dose, given the trajectory of the plume. However, it would contribute to the population dose. For simplicity, the source term was included in the ground-level release, yielding a total plutonium release of 124 g (4.4 oz) for the pit conversion facility and 710 g (25 oz) for the MOX facility.

The same source terms would result from postulated aircraft crashes into the pit conversion and MOX facilities regardless of their location. As discussed above, inclusion of the consequence analysis for Pantex, but not for other sites such as SRS, was solely due to differences in accident frequency.

Criticality. All of the data reports provide technically defensible information on criticality, but the analytical assumptions vary among the reports. To assess the significance of the variations, MACCS2 runs were performed for each criticality source term. The resulting doses varied by a factor of about 15 for all criticalities except the natural phenomena hazard (NPH) vault criticality in the immobilization data report. Doses from this criticality were roughly 100 times larger than any other doses and were dominated by aerosolized plutonium from the vault.

For the SPD EIS, it was decided to discard the NPH vault criticality on the grounds that it is, at most, an improbable event that is conditional on the occurrence of a beyond-design-basis earthquake and does not represent the potential consequences of an isolated criticality. Beyond-design-basis earthquakes have been addressed via a total collapse scenario in all data reports, and the additional assumption of a criticality occurring in addition to the total collapse does not significantly increase doses beyond those resulting from the collapse itself.

Of the remaining criticalities, the criticality in the rotary splitter tumbler in the glass immobilization data report produced the highest doses, dominated by fission products as opposed to plutonium. The source term for this criticality is based on a fission yield from 1.0×10^{19} fissions in an oxide powder.

For the SPD EIS, it was decided to use this source term for criticality for all facilities, because all facilities would handle oxide powder in quantities sufficient for criticality. For the aqueous plutonium-polishing process at the MOX facility, a solution criticality of 10^{19} fissions was also postulated, which bounds the powder criticality due to the greater release potential of fission products from solution. The estimated frequency of extremely unlikely (i.e., 10^{-6} to 10^{-4} per year) reported in the immobilization data report was also used because it is the bounding estimate.

The criticality source term provided in the immobilization data report neglects some very short-lived isotopes that would be expected in a criticality, namely bromine 85, iodine 136, krypton 89 and 90, and xenon 137. Since the half-lives of these isotopes are all less than 4 min, they do not have a significant direct impact on radiological consequences. However, the daughters of some of the isotopes are themselves radioactive; in particular, krypton 89 decays to rubidium 89, which has a half-life of 15 min. The significance of the daughters for overall consequences has been assessed for Pantex, which is considered bounding because Pantex has the highest windspeeds and tends to carry the daughters the farthest for a given level of decay. As expected, the increase in dose is greatest for the noninvolved worker; approximately 25 percent higher for both the mean and 95th percentile. The dose increase decreases to 3 and 13 percent, respectively, for the mean and 95th percentile doses to the population within 80 km (50 mi). Dose increases at other sites are expected to be lower than corresponding increases at Pantex. Because these increases are small considering the great uncertainty inherent in the estimate of the total number of fissions, the source term in the immobilization data report remains a conservative estimate of the potential release from a criticality accident, and no modification of the source term has been made.

Design Basis Earthquake. Each data report presents an analysis of the design basis earthquake. The immobilization and MOX data reports provide source terms for that earthquake, while the pit conversion data reports indicate no release as a result of a design basis earthquake because the facility would be designed to withstand the event.

For the SPD EIS, a nonzero source term for pit conversion was generated by applying a building ventilation LPF of 1.0×10^{-5}, accounting for a HEPA filtered release, to the beyond-design-basis earthquake source term. It is recognized that this is a conservative procedure, in that the beyond-design-basis earthquake would release more material into the air within the building than a design basis earthquake. The combined ARF×RF for powder under beyond-design-basis earthquake conditions has been assessed as three times that for design basis earthquake conditions, and the total amount of vulnerable material may be somewhat greater. (For perspective, it resulted in a ratio of design basis earthquake to beyond-design-basis earthquake source term values that is somewhat higher than the corresponding ratio for MOX fuel fabrication, but lower than for plutonium conversion and immobilization.)

Beyond-Design-Basis Earthquake. All of the proposed operations would be in either existing or new facilities that would be expected to meet or exceed the requirements of DOE O 420.1 (DOE 1995b) and DOE-STD-1020-94 for reducing the risks associated with natural phenomena hazards. The proposed facilities would be characterized as Performance Category 3 facilities. Such facilities would have to be designed or evaluated for a design basis earthquake with a mean annual exceedance probability of 5×10^{-4}, corresponding to a return period of 2,000 years. For sites such as Lawrence Livermore National Laboratory (LLNL), which are near tectonic plate boundaries, the requirements would include a mean annual seismic hazard exceedance probability of 1.0×10^{-3}, or a return period of 1,000 years.

The numerical seismic design requirements detailed in DOE-STD-1020-94 are structured such that there is assurance that specific performance goals are met. For plutonium facilities (Performance Category 3), the performance goal is that occupant safety, continued operation, and hazard confinement would be ensured for earthquakes with an annual probability exceeding approximately 1×10^{-4}. There is sufficient conservatism in the design of buildings and the structures, systems, and components important to safety that these goals should be met given that they are designed against earthquakes with an estimated mean annual probability of 5×10^{-4}.

[Text deleted.]

By contrast, nonnuclear structures at these sites and the surrounding community would be constructed to the standards of the Uniform Building Code for that region. These peak acceleration values are 50 to 82 percent of the peak acceleration design requirements for plutonium facilities in the same area and correspond approximately to DOE Performance Category 1 facilities with 500-year return intervals. During major earthquakes, structures built to these Uniform Building Code requirements would be expected to suffer significantly more damage than reinforced-concrete structures designed for plutonium operations.

At sites far from tectonic plate boundaries, deterministic techniques such as those used by NRC in evaluating safe-shutdown earthquakes for the siting of nuclear reactors have also been used to determine the maximum seismic ground motion requirements for facility designs. These techniques involve estimating the ground acceleration at the proposed facility either by assuming the largest historical earthquake within the tectonic province or by assessing the maximum earthquake potential of the appropriate tectonic structure or capable fault closest to the facility. For NRC-licensed reactors, this technique resulted in safe-shutdown earthquakes with estimated return periods in the 1,000- to 100,000-year range (DOE 1994a:C-17).

All the existing facilities under consideration in the SPD EIS have had seismic evaluations demonstrating that they meet the seismic evaluation requirements for the design basis earthquake. Some facilities, such as

Building 332 at LLNL under consideration for preparation of the lead test assemblies, have had extensive evaluations of the ability of the structures, systems, and components important to safety to survive a range of seismic loadings. Evaluations reported in the *Final Environmental Impact Statement and Environmental Impact Report for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore* (DOE 1992) indicate that Building 332 would survive a postulated 0.8g earthquake and retain those features essential for the safe containment of radioactive materials. The estimated return interval for this level of ground accelerations is about 10,000 years. The facility was also examined for damage due to a 0.9g earthquake and found to be survivable (DOE 1992:app. D.5.2.1), albeit with some potential for loss of confinement due to equipment damage in safety systems (DOE 1992:table I-14).

The magnitude of potential earthquakes with return periods greater than 10,000 years is highly uncertain. For purposes of the SPD EIS, it was assumed that at all the candidate sites, earthquakes with return periods in the 100,000- to 10-million-year range might result in sufficient ground motion to cause major damage to even a modern, well-engineered and well-constructed plutonium facility. Therefore, in the absence of convincing evidence otherwise, a total collapse of the plutonium facilities was assumed to be scientifically credible and within the rule of reason for return intervals in this range.

Each data report presents an analysis of total collapse. The immobilization and MOX data reports are fairly consistent in their use of damage estimates and release fractions. They assume that material in storage containers in vault storage would be adequately protected from the scenario energetics, for a damage ratio of zero in the vault. They also assume powder ARF and RF values of 1.0×10^{-3} and 0.3 (UC 1998c:tables 8-14 and 8-15; 1998d:169), respectively. The pit conversion data reports assume a damage ratio of 50 percent for material held in storage containers, applies cumulative ARF and RF values of 2.7×10^{-3} to powder subject to seismic vibration, free-fall spill, and turbulent air currents; and also presents a resuspension source term (UC 1998a:79–81).

For the SPD EIS, the pit conversion source term was modified by adjusting the damage ratio in the vault from 0.5 to 0 based on the corresponding analyses in the immobilization and MOX data reports, and adjusting the ARF and RF values for powder to 1.0×10^{-3} and 0.3, respectively. The assumption of vault survival in the beyond-design-basis earthquake was based on the fact that the vaults would be designed with significantly more robustness than the balance of the proposed facilities. The requirements for the additional robustness of the vault derive from the desire for increased protection of vault contents against external events such as aircraft crash or proliferation concerns, as well as increased earthquake survivability. It is expected that the vaults would survive the most likely seismic events of sufficient magnitude to collapse the processing areas of the proposed facilities. While there may be even more intense seismic events capable of compromising the protection afforded by the vaults, such events are expected to be beyond extremely unlikely.

The value of 2.7×10^{-3}, used in the pit conversion data report, is based on seismic-induced collapse of large structures into loose bulk powder; this assumption is considered unnecessarily conservative given the expectation of containered storage for the majority of the powder inventory at any given time. The resuspension source term was kept (and was not applied to either immobilization or MOX). Although worth noting, this difference between the data reports is not considered particularly significant, for the resuspension source term constitutes only 30 percent of the total.

The frequency for all beyond-design-basis earthquakes for all facilities is reported in the SPD EIS as extremely unlikely to beyond extremely unlikely (the pit conversion facility data report estimated a frequency of less than 1×10^{-6} per year.) They are reported as such because the uncertainties inherent in associating damage levels with earthquake frequencies become overwhelming below frequencies of about 1.0×10^{-5} per year.

Filtration Efficiency. The immobilization and MOX data reports use a building filtration efficiency of 1.0×10^{-5} for particulate releases (UC 1998c:8-3; 1998d:tables B-18–B-20). The pit conversion data report uses a building

filtration efficiency of 2.0×10^{-6} (UC 1998a:73). For consistency, the pit conversion source terms have been adjusted to reflect an LPF of 1.0×10^{-5}. This is reasonable because it is expected that the ventilation efficiencies of all HEPA-filtered buildings would be essentially the same.

Beyond-Design-Basis Fire. The MOX data report presents an analysis of a beyond-design-basis fire whose basis in terms of scenario definition was from the *Data Report for Plutonium Conversion Facility* (Smith, Wilkey, and Siebe 1996), which was produced for the *Storage and Disposition PEIS* (DOE 1996a). Neither the pit conversion nor the immobilization data reports contain analyses of a beyond-design-basis fire.

For the SPD EIS, beyond-design-basis fires were developed for pit conversion and immobilization by replacing the building filtration LPF with an LPF of 1.4 percent, in accordance with the beyond-design-basis scenario definition presented in the *Data Report for Plutonium Conversion Facility* (Smith, Wilkey, and Siebe 1996) and adapted for the MOX fuel fabrication analysis. (For perspective, it resulted in a ratio of design basis fire to beyond-design-basis fire source term values that are within a factor of 2 of the corresponding ratio for MOX fuel fabrication.)

It is understood that the LPF of 1.4 percent is based on a facility-specific analysis of the Plutonium Finishing Building (PF–4) in Technical Area 55 at LANL, and that an analysis of other facilities using the same phenomenological assumptions might yield somewhat different results. However, for the purpose of this analysis, and considering the degree of similarity expected between facilities as a result of required plutonium-handling practices, this value was used generically in the assessment of beyond-design-basis fire.

K.1.5.2 Facility Accident Scenarios

K.1.5.2.1 Pit Conversion Facility

A wide range of potential accident scenarios were considered for the pit conversion facility. These scenarios are considered in detail in the pit conversion facility data reports (UC 1998a, 1998c, 1998e, 1998f). The analysis assumes that the pit conversion facility is located in a new or upgraded existing building designed to withstand design basis natural phenomena hazards such as earthquakes, winds, tornadoes, and floods such that no unfiltered releases would be expected. Also, no site-specific accidents conducive to releases are identified. Therefore, the potential accident scenarios apply to all four candidate sites.

Analysis of the proposed process operations for the pit conversion facility identified the following broad categories of accidents: aircraft crash, criticality, design basis earthquake, beyond-design-basis earthquake, explosion, fire, leaks or spills, and tritium release. Basic characteristics of each of these postulated accidents are described below. Additional discussion of scenario development based on consistency concerns can be found in Appendix K.1.5.1.

Aircraft Crash. A crash of a large, heavy commercial or military aircraft directly into a reinforced-concrete facility could damage the structure sufficient to breach confinement and disperse material into the environment. A subsequent fuel-fed fire could provide energy to further damage structures and equipment, aerosolize material, and drive materials into the environment. Source terms are highly speculative but would be expected to exceed those from the beyond-design-basis earthquake. At all sites except Pantex, the frequency of such a crash is below 10^{-7} per year.

Criticality. Engineered and administrative controls should be available to ensure that the double-contingency principles are in place for all portions of the process. It is assumed that human error results in multiple failures leading to an inadvertent nuclear criticality. The estimated frequency of this accident is in the range of 10^{-4} to 10^{-6} per year. A bounding source term resulting from 10^{19} fissions is assumed.

Design Basis Earthquake. The principal design basis natural phenomena event that could release material to the environment is the design basis earthquake. While the major safety systems, including building confinement and the building HEPA filtration system should continue to function, the vibratory motion would be expected to resuspend loose plutonium powder within gloveboxes and cause some minor spills. These would be picked up by the ventilation system and filtered by the HEPA filters before release from the building. Although highly uncertain, the source term should be much lower than that postulated for the beyond-design-basis earthquake. Based on an LPF of 1.0×10^{-5} for two HEPA filters, a stack release of 3.9×10^{-4} g (1.4×10^{-5} oz) is postulated. The estimated frequency of this accident is in the range of 10^{-4} to 10^{-2} per year.

Beyond-Design-Basis Earthquake. The postulated beyond-design-basis earthquake is assumed to be of sufficient magnitude to cause total collapse of the process equipment, building walls, roof, and floors, and loss of the containment function of the building. The material in the building is assumed to be driven airborne by the seismic vibrations, free-fall during the collapse, and impact. Molten metal in furnaces is also assumed to burn in the aftermath of the collapse. An instantaneous plus-resuspension ground-level release of 39 g (1.4 oz) of respirable plutonium is estimated for the process area. While the release of an additional 2,529 g (89 oz) from the vault would be possible, it would be unlikely given the expected packaging of materials in the vault. The estimated frequency of this accident is in the range of 10^{-5} to 10^{-7} per year.

Explosion. The bounding explosion is a deflagration of a hydrogen gas mixture inside the hydride oxidation (HYDOX) furnace. The deflagration is assumed to result from multiple equipment failures and operator errors that lead to a buildup of hydrogen and a flow of oxygen into the inert-atmosphere glovebox used in the HYDOX process. Also assumed is an MAR of 4.5 kg (9.9 lb) of plutonium powder, and given the venting of pressurized gas through the powder, bounding ARF and RF of 0.1 and 0.7, respectively. The explosive energy would be sufficient to damage glovebox windows but insufficient to threaten the building HEPA filter system. Based on an LPF of 1.0×10^{-5} for two HEPA filters, a stack release of 3.2×10^{-3} g (1.1×10^{-4} oz) is postulated. The estimated frequency of this accident is in the range of 10^{-2} to 10^{-4} per year.

Fire. According to the several safety analyses of the plutonium facility at LANL, the bounding fire within the pit conversion facility is a fire involving all of the gloves in a glovebox used for blending plutonium powder. A flammable cleaning liquid is assumed to be brought into the glovebox, in violation of procedure, then to spill and ignite. The gloves are assumed to be stowed outside the glovebox but to be ignited by the fire and completely consumed. An MAR of 2 g (0.07 oz) of plutonium dust is assumed for each of 12 gloves, with all of the 24 g (0.85 oz) assumed to be aerosolized. The sprinkler system is assumed to function and protect the room and remainder of the building. Also assumed are an ARF of 0.05 and an RF of 1.0, resulting in a 1.2-g (0.04-oz) release to the building ventilation system. Based on an LPF of 1.0×10^{-5} for two HEPA filters, a stack release of 1.2×10^{-5} g (4.2×10^{-7} oz) is postulated. The estimated frequency of this accident is in the range of 10^{-2} to 10^{-4} per year.

Leaks or Spills of Nuclear Material. The most catastrophic leak or spill postulated would result from a forklift or other large vehicle running over a package of nuclear material and breaching the storage container. If a 4-kg (8.8-lb) package of plutonium oxide were breached, a total airborne release of 0.44 g (0.016 oz) to the room would occur, and after HEPA filtration of the facility exhaust, a total release of 4.4×10^{-6}. This accident has an estimated frequency in the range of 10^{-4} to 10^{-6} per year.

Tritium Release. A major glovebox fire is assumed to heat multiple parts contaminated with up to 20 g (0.71 oz) of tritium and convert all of it into tritiated water vapor. Very conservatively, the ARF, RF, and LPF are all assumed to be 1.0, resulting in a release of 20 g (0.71 oz) (1.9×10^{-5} Ci) through the stack to the atmosphere. The estimated frequency of this accident is in the range of 10^{-4} to 10^{-6} per year.

K.1.5.2.2 Immobilization Facility

A wide range of potential accident scenarios are reflected in the immobilization facility data reports (UC 1999a–d). The analysis assumes that the immobilization facility is located in a new or upgraded existing building designed to withstand design basis natural phenomena hazards such as earthquakes, winds, tornadoes, and floods such that no unfiltered releases would be expected. Also, no site-specific accidents conducive to releases are identified. Therefore, the potential accident scenarios apply to all four candidate sites. Additional discussion of scenario development based on consistency concerns can be found in Appendix K.1.5.1.

Analysis of the proposed process operations identified specific scenarios for the conversion process, each of the immobilization options (ceramic and glass), and the canister-handling portion of the process. Design basis and beyond-design-basis earthquakes were identified for the overall facility. Identified as accidents specific to the plutonium conversion processes were a criticality, an explosion in HYDOX furnace, a calcining furnace–glovebox fire, and a hydrogen explosion in the plutonium conversion room. For the ceramic immobilization option, moreover, a sintering furnace–glovebox fire was identified; for the glass immobilization option, a melter eruption and a melter spill. All of the scenarios identified with the canister-handling phase were negligible compared with the conversion and immobilization scenarios.

PLUTONIUM CONVERSION OPERATIONS

Criticality. Review of the possibility of accidents attributable to plutonium conversion operations indicated that the principal processes of concern include the halide wash operations, the HYDOX furnace, and the sorting/unpacking glovebox. Engineered and administrative controls should be available to ensure that the double-contingency principles are in place for all portions of the process. It is assumed that human error could result in multiple failures leading to an inadvertent nuclear criticality. The estimated frequency of this accident is in the range of 10^{-4} to 10^{-6} per year. A bounding source term resulting from 10^{19} fissions is assumed.

Explosion in HYDOX Furnace. The bounding explosion is a deflagration of a hydrogen gas mixture inside the HYDOX furnace. The deflagration is assumed to result from multiple equipment failures and operator errors that lead to a buildup of hydrogen and a flow of oxygen into the inert-atmosphere glovebox used in the HYDOX process. Also assumed is an MAR of 4.8 kg (11 lb) of plutonium powder, and given the venting pressurized gas through the powder, bounding ARF and RF of 0.1 and 0.7, respectively. The explosive energy would be sufficient to damage glovebox windows but insufficient to threaten the building HEPA filter system. Based on an LPF of 1.0×10^{-5} for two HEPA filters, a stack release of 3.4×10^{-3} g (1.2×10^{-4} oz) is postulated. The estimated frequency of this accident is approximately 10^{-3} per year or in the unlikely range.

Hydrogen Explosion in Plutonium Conversion Room. A supply pipe leak in the plutonium conversion room could result in a hydrogen explosion. Conversion of plutonium metal is accomplished using the HYDOX process, which entails the introduction of hydrogen gas. Were the hydrogen supply piping to leak into the operating/maintenance room, the gas could be ignited by an electrical short or operating mechanical equipment, causing an explosion. Depending on the volume of the leak, the structural integrity of the glovebox glove ports could fail and disperse the plutonium oxide. It is assumed that the building ventilation does not fail, and that the two HEPA filters provide filtration prior to discharge of the powder to the stack. An entire day's inventory of 25 kg (55 lb) of plutonium oxide powder is assumed present in the plutonium conversion gloveboxes. Based on an ARF of 5×10^{-3}, an RF of 0.3, and an LPF of 1.0×10^{-5} for two HEPA filters, a stack release of 3.8×10^{-4}g (1.3×10^{-5} oz) of plutonium is postulated. The estimated frequency of this accident is approximately 10^{-3} per year or in the unlikely range.

Furnace-Initiated Glovebox Fire (Calcining Furnace). It is assumed that a fault in the calcining furnace results in the ignition of any combustibles (e.g., bags) left inside the glovebox. The fire would be self-limiting, but would cause suspension of the radioactive material. It is also assumed that the glovebox (including the window) maintains its structural integrity, but that the internal glovebox HEPA filter fails. All of the loose

surface contamination within the glovebox, assumed to be 10 percent of the daily inventory (4.5 kg [9.9 lb] of plutonium) of the calcining furnace, is assumed to be involved. Based on an ARF of 6×10^{-3}, an RF of 0.01, and an LPF of 1.0×10^{-5} for two HEPA filters, a stack release of 2.7×10^{-7} g (9.5×10^{-9} oz) of plutonium is postulated. The estimated frequency of this accident is in the range of 10^{-4} to 10^{-6} per year.

CERAMIC IMMOBILIZATION OPTION

Criticality. Review of the possibility of accidents attributable to the ceramic immobilization operations indicated that the principal operation of concern is the rotary splitter tumbler. Engineered and administrative controls should be available to ensure that the double-contingency principles are in place for all portions of the process. It is assumed that human error results in multiple failures leading to an inadvertent nuclear criticality. The estimated frequency of this accident is in the range of 10^{-4} to 10^{-6} per year. A bounding source term resulting from 10^{19} fissions is assumed.

Design Basis Earthquake. The principal design basis natural phenomena event that could release material to the environment is the design basis earthquake. While the major safety systems, including building confinement and the building HEPA filtration system should continue to function, the vibratory motion would be expected to suspend loose plutonium powder within gloveboxes and cause some minor spills. These would be picked up by the ventilation system and filtered by the HEPA filters before release from the building. Most material storage containers are assumed to be engineered to withstand design basis earthquakes without failing. For plutonium conversion, it is assumed that at the time of the event the entire day's inventory (25 kg [55 lb] of plutonium) is present in the form of oxide powder. For the ceramic immobilization portion, this includes the oxide inventories from the rotary splitter, oxide grinding, blend and granulate feed storage, drying and storage, pressing, inspection, and load trays and weigh areas. Although the source term is highly uncertain, an assessment of the MAR, ARF, and RF for each of the process areas indicated a potential for the release of 38 g (1.3 oz) of plutonium to the still-functioning building ventilation system and 3.8×10^{-4} g (1.3×10^{-5} oz) from the stack. The nominal frequency estimate for a design basis earthquake affecting new DOE plutonium facilities is 5×10^{-4} per year, or in the unlikely range.

Beyond-Design-Basis Earthquake. The postulated beyond-design-basis earthquake is assumed to be of sufficient magnitude to cause total collapse of the process equipment, building walls, roof, and floors, and loss of the containment function of the building. The material in the building is assumed to be driven airborne by the seismic vibrations, free-fall during the collapse, and impact. Material in storage containers in vaults would be adequately protected from the scenario energetics. Although the source term is highly uncertain, an assessment of the MAR, ARF, and RF for each of the process areas indicated a potential for the release of 19 g (0.67 oz) of plutonium at ground level. The estimated frequency of this accident is in the range of 10^{-5} to 10^{-7} per year.

Furnace-Initiated Glovebox Fire (Sintering Furnace). It is assumed that the sintering gas supplied to the furnace gloveboxes is a safe gas mixture—hydrogen and argon. Human errors are at issue—either a vendor/supplier that causes a supply of air or noninerting gas to be supplied to the furnace glovebox, or a piping error at the facility itself, in which oxygen is inadvertently substituted for the inert gas. Any combustibles (e.g., bags) left inside the glovebox could ignite, causing a glovebox fire. It is assumed that the fire is self-limiting, but causes suspension of the radioactive material. It is also assumed that the glovebox (including the window) maintains its structural integrity, but that the internal glovebox HEPA filter fails. All of the loose surface contamination within the glovebox, assumed to be 10 percent of the daily inventory (25 kg [55 lb] of plutonium) of the calcining furnace, is assumed to be involved. Based on an ARF of 6×10^{-3}, an RF of 0.01, and an LPF of 1.0×10^{-5} for two HEPA filters, a stack release of 1.5×10^{-6} g (5.3×10^{-8} oz) of plutonium is postulated. The estimated frequency of this accident is in the range of 10^{-4} to 10^{-6} per year.

GLASS IMMOBILIZATION OPTION

Design Basis Earthquake. The principal design basis natural phenomena event that could release material to the environment is the design basis earthquake. While the major safety systems, including building confinement and the building HEPA filtration system should continue to function, the vibratory motion would be expected to suspend loose plutonium powder within gloveboxes and cause some minor spills. These would be picked up by the ventilation system and filtered by the HEPA filters before release from the building. Most material storage containers are assumed to be engineered to withstand design basis earthquakes without failing. For plutonium conversion, it is assumed that at the time of the event the entire day's inventory (25 kg [55 lb] of plutonium) is present in the form of oxide powder. For the glass immobilization portion, this includes oxide inventories from the rotary splitter, oxide grinding, blend melter, and feed storage. Although the source term is highly uncertain, an assessment of the MAR, ARF, and RF for each of the process areas indicated a potential for the release of 33 g (1.2 oz) of plutonium to the still-functioning building ventilation system and 3.3×10^{-4} g (1.2×10^{-5} oz) from the stack. The nominal frequency estimate for a design basis earthquake affecting new DOE plutonium facilities is 5×10^{-4} per year, or in the unlikely range.

Beyond-Design-Basis Earthquake. The postulated beyond-design-basis earthquake is assumed to be of sufficient magnitude to cause total collapse of the process equipment, building walls, roof, and floors, and loss of the containment function of the building. The material in the building is assumed to be driven airborne by the seismic vibrations, free-fall during the collapse, and impact. Material in storage containers in vaults storage would be adequately protected from the scenario energetics. Although the source term is highly uncertain, an assessment of the MAR, ARF, and RF for each of the process areas indicated a potential for the release of 17 g (0.60 oz) of plutonium released at ground level. The estimated frequency of this accident is in the range of 10^{-5} to 10^{-7} per year.

Melter Eruption. A melter eruption could result from the buildup of impurities in, or addition of impurities to, the glass frit or melt. Impurities range from water, which could cause a steam eruption, to chemical contaminants, which could react at elevated temperatures and produce a highly exothermic reaction (eruption or deflagration). The resulting sudden pressure increase could eject the fissile material bearing melt liquid into the processing glovebox structure. However the energy release would likely be insufficient to challenge the glovebox structure. It is assumed that the entire contents of the melter, about 1.4 kg (3.1 lb) of plutonium, are ejected into the glovebox. Based on an ARF of 4×10^{-4}, an RF of 1, and an LPF of 1.0×10^{-5} for two HEPAs, a stack release of 1.4×10^{-6} g (4.9×10^{-8} oz) of plutonium is postulated. The estimated frequency of this accident is approximately 2.5×10^{-3} per year, or in the unlikely range.

Melter Spill. A melter spill into the glovebox could occur due to improper alignment of the product glass cans during pouring operations. The melter glovebox enclosure and the off-gas exhaust ventilation system would confine radioactive material released in the spill. The glovebox structure and its associated filtered exhaust ventilation system would not be impacted by this event. It is assumed that the entire contents of the melter, about 1.4 kg (3.1 lb) of plutonium, are spilled into the glovebox. On the basis of an ARF of 2.4×10^{-5}, a RF of 1, and an LPF of 1.0×10^{-5} for two HEPAs, a stack release of 3.3×10^{-7} g (1.2×10^{-8} oz) of plutonium is postulated. The estimated frequency of this accident is approximately 3×10^{-4} per year, or in the unlikely range.

CAN-IN-CANISTER OPERATIONS

Can-Handling Accident (Before Shipment to Vitrification Facility). A can-handling accident would involve a can containing either ceramic pellets or a vitrified glass log of plutonium material. Studies supporting the Defense Waste Processing Facility (DWPF) SAR (UC 1999a–d) indicate that the source term resulting from dropping or tipping a log of vitrified waste, even without credit for the steel canister, would be negligible. Both surplus plutonium immobilization technologies (ceramic and glass) result in a form with a durability that is comparable to that of the DWPF vitrified waste form. Consequently, no postulated can-handling event would result in a radioactive release to the environment.

Melter Spill (Melt Pour at Vitrification Facility). Analysis of a spill of melt material was included in studies performed in support of the DWPF SAR. According to that analysis, the source term resulting from the dropping or tipping a log of vitrified waste, even without credit for the steel canister, would be negligible. Both surplus plutonium immobilization technologies (ceramic and glass) result in a form with a durability that is comparable to the DWPF vitrified waste form. Consequently, it is postulated that no melter spill event results in a radioactive release to the environment.

Canister-Handling Accident (After Melt Pour at DWPF). Analysis of events involving the handling and storage of vitrified waste canisters was included in studies performed in support of the DWPF SAR. Results of that analysis indicate that the source term resulting from the dropping or tipping of a log of vitrified waste, even without credit for the steel canister, would be negligible. Both surplus plutonium immobilization technologies (ceramic and glass) result in a form with a durability that is comparable to the DWPF vitrified waste form. Consequently, it is postulated that no canister-handling event results in a radioactive release to the environment.

K.1.5.2.3 MOX Facility Accident Scenarios

A wide range of potential accident scenarios were considered in the analysis reflected in the MOX facility data reports (UC 1998b, 1998d, 1998g, 1998h). The analysis assumes that the MOX facility is located in a new or upgraded existing building designed to withstand design basis natural phenomena hazards such as earthquakes, winds, tornadoes, and floods such that no unfiltered releases would be expected. The MOX facility includes an aqueous plutonium-polishing process by which impurities, in particular gallium, are removed from the plutonium feed for MOX fuel fabrication. Bounding accidents for this process were developed separately from the accidents reflected in the MOX facility data reports and are documented in a stand-alone, process-specific data report (ORNL 1998).

Analysis of the proposed process operations for the MOX facility identified the following broad categories of accidents: aircraft crash (Pantex only), criticality, design basis earthquake, beyond-design-basis earthquake, explosion in sintering furnace, fire, and beyond-design-basis fire. Basic characteristics of each of these postulated accidents are described below. Additional discussion of scenario development based on consistency concerns can be found in Appendix K.1.5.1.

Aircraft Crash. A crash of a large, heavy commercial or military aircraft directly into a reinforced-concrete facility could damage the structure sufficiently to breach confinement and disperse material into the environment. A subsequent fuel-fed fire could provide energy to further damage structures and equipment, aerosolize material, and drive materials into the environment. Source terms are highly speculative but would be expected to exceed those from the beyond-design-basis earthquake. At all sites except Pantex, the frequency of such a crash is below 10^{-7} per year.

Criticality. Review of the possibility of accidents for the MOX facility indicated no undue criticality risk associated with the proposed operations. Engineered and administrative controls should be available to ensure that the double-contingency principles are in place for all portions of the process. It is assumed that human error could result in multiple failures leading to an inadvertent nuclear criticality. The estimated frequency of this accident is in the range of 10^{-4} to 10^{-6} per year. A bounding source term resulting from 10^{19} fissions in solution is assumed.

Design Basis Earthquake. The principal design basis natural phenomena event that could release material to the environment is the design basis earthquake. While the major safety systems, including building confinement and the building HEPA filtration system should continue to function, the vibratory motion would be expected to resuspend loose plutonium powder within gloveboxes and cause some minor spills. These would be picked up by the ventilation system and filtered by the HEPA filters before to release from the building. Material storage

containers including cans, hoppers, and bulk storage vessels are assumed to be engineered to withstand design basis earthquakes without failing. Although the source term is highly uncertain, an assessment of the MAR, ARF, and RF for each of the process areas indicated a potential for the release of 4 g (0.14 oz) of plutonium (in the form of MOX powder) to the still-functioning building ventilation system and 4.0×10^{-5} g (3.5×10^{-7} oz) from the stack. The nominal frequency estimate for a design basis earthquake for new DOE plutonium facilities is 5×10^{-4} per year, or in the unlikely range.

Beyond-Design-Basis Earthquake. The postulated beyond-design-basis earthquake is assumed to be of sufficient magnitude to cause total collapse of the process equipment, building walls, roof, and floors, and loss of the containment function of the building. The material in the building is assumed to be driven airborne by the seismic vibrations, free-fall during the collapse, and impact. Although the source term is highly uncertain, an assessment of the MAR, ARF, and RF for each of the process areas indicated a potential for the release of 124 g (4.4 oz) of plutonium (in the form of MOX powder) at ground level. The estimated frequency of this accident is in the range of 10^{-5} to 10^{-7} per year.

Explosion in Sintering Furnace. The several furnaces proposed for the MOX fuel fabrication process all use nonexplosive mixtures of 6 percent hydrogen and 94 percent argon. Given the physical controls on the piping for nonexplosive and explosive gas mixtures, operating procedures, and other engineered safety controls, accidental use of an explosive gas is extremely unlikely, though not impossible. A bounding explosion or deflagration is postulated to occur in one of the three sintering furnaces in the MOX facility building. Multiple equipment failures and operator errors would be required to lead to a buildup of hydrogen and an inflow of oxygen into the inert furnace atmosphere. As much as 5.6 kg (12.3 lb) of plutonium in the form of MOX powder would be at risk, and a bounding ARF of 0.01 and RF of 1.0 is assumed. Based on an LPF of 1.0×10^{-5} for two HEPA filters, a stack release of 5.6×10^{-4} g (2.0×10^{-5} oz) of plutonium (in the form of MOX powder) is postulated. It is estimated that the frequency of this accident is in the range of 10^{-4} to 10^{-6} per year.

Ion Exchange Column Exotherm. A thermal excursion within an ion exchange column is postulated to result from offnormal operations, degraded resin, or a glovebox fire. It is also assumed that the column venting/pressure relief valve fails to vent the overpressure, causing the column to rupture violently. The overpressure releases plutonium nitrate solution as an aerosol within the affected glovebox, which in turn is processed through the ventilation system. If the overpressure also breaches the glovebox, a fraction of the aerosol is released within the room as well. The combined ARF and RF values for this scenario are 9.0×10^{-3} for burning resin and 6.0×10^{-3} for liquid behaving as a flashing spray on depressurization. Additionally, 10 percent of the resin is assumed to burn, yielding a combined ARF and RF value of 9.0×10^{-3} for loaded plutonium. The LPF for the ventilation system is 1.0×10^{-5}.

With regard to probability, process controls are used to ensure that nitrated anion exchange resins are maintained in a wet condition, that the maximum nitric acid concentration and the operating temperature are limited to safe values, and that the time for absorption of plutonium in the resin is minimized. With these controls in place, the frequency of this accident is estimated to be in the unlikely range.

Fire. It is assumed that the liquid organic solvent containing the maximum plutonium concentration leaks as a spray into the glovebox, builds to a flammable concentration, and is contacted by an ignition source. The combined ARF and RF value for this scenario is 1.0×10^{-2} for quiescent burning to self-extinguishment. The LPF for the ventilation system is 1.0×10^{-5}. Scenario frequency is assessed as unlikely.

Spill. Leakage of liquids from process equipment must be considered as an anticipated event. However, with multiple containment barriers, a release from the process room would be extremely unlikely. A bounding scenario involved a liquid spill of concentrated aqueous plutonium solution, with 50 l (13.2 gal) accumulating before the

leak is stopped. The ARF and RF values used for this scenario are 2.0×10^{-4} and 0.5, respectively. The LPF for the building ventilation system is 1.0×10^{-5}.

Beyond-Design-Basis Fire. The MOX facility would be built and operated such that there would be insufficient combustible materials to support a large fire. To bound the possible consequences of a major fire, a large quantity of combustible materials are assumed to be introduced into the process area near the blending area, which contains a fairly large amount of plutonium. A major fire is assumed to occur that causes the building ventilation and filtration systems to fail, possibly due to clogged HEPA filters. A total of 11 kg (24 lb) of plutonium in the form of MOX powder is assumed at risk. Based on an ARF of 6×10^{-3}, a RF of 0.01, and an LPF of 1.4×10^{-2} for two damaged, clogged HEPA filters, a stack release of 9.4×10^{-3} g (3.3×10^{-4} oz) of plutonium (in the form of MOX powder) is postulated. It is estimated that the frequency of this accident is less than 10^{-6} per year.

K.1.5.2.4 Lead Assembly Accident Scenarios

Design basis and beyond-design-basis accident scenarios have been developed for the fabrication of MOX fuel lead assemblies. These scenarios are discussed in detail, with specific assumptions for each facility and site, in the site data reports (O'Connor et al. 1998a–e). In spite of efforts by all parties, however, some inconsistencies exist between the data reports. This does not imply technical inaccuracy in any analysis; it merely reflects the uncertainties and reliance on convention inherent in accident analyses in general. In preparing the accident analysis for the SPD EIS, therefore, information in the data reports was modified or augmented to ensure the consistency, as appropriate, that is necessary for a reliable comparison of lead assembly fabrication accidents and the other accidents analyzed herein. Modifications were made to ensure that, to the extent practical, differences in analytical results were based on actual differences in facility conditions, as opposed to arbitrary differences in analytical methods or assumptions. One change, reflected in Table K–2, involved the assumption for all accidents of an isotopic composition of plutonium identical to that assumed in the analyses of pit disassembly and conversion and MOX fuel fabrication.

Table K–2. Isotopic Composition of Plutonium Used in Lead Assembly Accident Analysis

Isotope	Weight Percent
Plutonium 238	3.0×10^{-2}
Plutonium 239	92.2
Plutonium 240	6.46
Plutonium 241	5.0×10^{-2}
Plutonium 242	1.0×10^{-1}
Americium 241	9.0×10^{-1}

Criticality. Criticalities could be postulated in several areas (e.g., powder storage, the gloveboxes involved in mixing, the furnace, the fuel rod storage area). The estimated frequencies associated with these events would vary depending on the controls in place, the number of operator movements, and the amount of fissile material present. A generic approach was taken with respect to the selection of the specifics of this event, rather than selection of a criticality scenario associated with a specific operation in the lead assembly fabrication.

The criticality source term stipulated in the data reports was modified to make it identical to the corresponding source term used in the assessment of criticality in the pit conversion, immobilization, and MOX facilities. That source term is based on a fission yield from 1.0×10^{19} fissions in an oxide powder. The discussion provided in Appendix K.1.5 on criticality is also applicable here.

Design Basis Earthquake. An earthquake appropriate with the facility's design basis was selected. For this event, major portions of the process line gloveboxes are assumed to be breached, making the contents available for release. The storage vault and receiving area are assumed to have suitable storage containers for plutonium oxide that would survive the earthquake (storage containers with double containment). In-process material in gloveboxes is, however, more vulnerable, as are powder storage areas that may exist. Of particular concerns are the dispersable powders at the powder-blending stations. Finished pellets and fuel rods are thought to be generally nondispersable, even though they could escape the gloveboxes. In this earthquake, some non-seismically qualified process equipment could fail, and some process material spill. It is also conservatively assumed that glovebox filtration would fail.

The lead assembly data reports use ARF and RF values of 1.0×10^{-2} and 0.2, respectively, for plutonium oxide in cans involved in a design basis earthquake. These values are based on DOE-HDBK-3010-94 recommendations for the suspension of bulk powder by debris impact and air turbulence from falling objects. For consistency with the design basis accident analyses for the other facilities, these values were changed to 1.0×10^{-3} and 0.1, values based on DOE-HDBK-3010-94 recommendations for the suspension of bulk powder due to vibration of substrate from shock-impact to powder confinement (e.g., gloveboxes, cans) due to external energy (e.g., seismic vibrations). Such values are appropriate for earthquakes in which structural integrity is largely maintained and there is not a significant amount of debris or falling objects.

Beyond-Design-Basis Earthquake. For this analysis an event much more severe in consequences than would be expected from the design basis earthquake was examined. For some existing DOE facilities, the estimated seismic frequencies of beyond-design-basis events can be greater than 1.0×10^{-6} per year. The design basis for every building in the complex varies considerably depending on site specifics, including the type of construction used in the building. A damage assessment of the facility is further complicated by the fact that seismic considerations could also be incorporated in the glovebox design of the facility. In reality, such a catastrophic event may or may not demolish the building and the gloveboxes. However, for the purposes of illustrating a high-consequence accident, total demolition of the building is assumed. In this event, no credit is taken for the building, filters, or gloveboxes.

In the data report, an estimated frequency of 1.0×10^{-6} per year is cited as appropriate. To acknowledge the high degree of uncertainty in assessing a frequency of this scenario, a range of extremely unlikely to beyond extremely unlikely has been assigned to this event.

The source term for the beyond-design-basis earthquake includes a contribution from the plutonium storage vault, the assumed DR being 5 percent. The values used for the ARF, RF and vault DR—1.0×10^{-3}, 0.3, and 0, respectively—derive from adjustments consistent with the analysis of the corresponding scenario in the MOX facility data report. This results in a reduction of the source term for this accident by a factor of 2, to 11 g (0.39 oz) plutonium.

Extensive analyses have been performed on the seismic hazard at LLNL and the response of the plutonium facility, Building 332, to that hazard. According to the geology and seismology studies characterizing the nature and magnitude of the seismic threat, there is no physiographic basis for postulating earthquake magnitudes and ground accelerations higher than Richter magnitude 6.9 and 1.1g, respectively. Building 332, Increment III, has been evaluated for resistance to earthquakes and ground accelerations of these magnitudes and found to be adequate. Events of significantly higher magnitude and ground acceleration would be required to collapse Increment III. The frequency of these larger events would most likely be extremely low (1.0×10^{-6} per year or less), as the physiography of the dominant fault systems is such that they are thought incapable of producing the required magnitudes of ground accelerations (Coats 1998). Results of a number of reviews of Increment III indicate that the actual ground motion needed to cause collapse of the structure is above 1.5g. Based on the current LLNL hazard curve and various estimates of the fragility curves for collapse of Increment III, the

frequency of collapse is estimated at 1.0×10^{-7} per year or less (Murray 1998). The frequency of a total collapse of Building 332 at LLNL is thus considered sufficiently low that additional examination is unnecessary.

Explosion. An explosion event was postulated in the sintering furnace in the lead assembly fabrication facility. A nonexplosive mixture of 6 percent hydrogen and 94 percent argon is used in the furnace. Multiple equipment and operator errors would have to occur to enable the buildup of an explosive mixture of hydrogen and air in the box. It is assumed that green pellets are subjected to the direct force of the shock waves resulting from such an explosion. It is further assumed that the gloveboxes involved in powder blending are damaged indirectly by the explosion. It is not expected that the shock wave impacting this area would be severe enough to significantly damage all of the storage inventory because interim storage containers would provide some mitigation.

Fire. A moderate-size room fire is assumed. Combustible material such as hydraulic fluid, alcohol, or contaminated combustibles is assumed to be present in the room. Adjoining facilities such as offices conceivably add to the risk of fires in the building. The gloveboxes are assumed to fail in the fire. The MOX powder in interim storage is assumed to be at risk and subjected to the thermal stress of the fire, given failure of the gloveboxes. Because of the limited combustible material and mitigation features such as fire protection systems and a firefighting unit, the event is assumed to be terminated. This fire is not severe enough to jeopardize the overall confinement characteristics of the building.

The source term for the design basis fire analyzed in the lead assembly data reports is dominated by the explosive release of high pressure from two plutonium oxide cans as they are heated to the point of failure. The ARF and RF values for this phenomenon are 0.1 and 0.7, respectively, and reflect burst pressures on the order of 25 to 500 psig. The potential for this kind of release is highly uncertain, and a valid design basis fire may be defined without including it, as is the case with the data reports for the other facilities. Therefore, for greater consistency between the design basis fire for the lead assembly and those for the other facilities, it is assumed that the two plutonium oxide cans are already open and vulnerable to the same phenomena as the rest of the analyzed powder. This results in a reduction of the data report source term by a factor of 38.

It is noteworthy that the lead assembly data report assumes a room fire, and the other data reports, a process fire. This is not considered inconsistent: the lead assembly processes are expected to be closer to one another other than the MOX processes, so the potential for propagation of fire may be somewhat greater.

Beyond-Design-Basis Fire. Fuel-manufacturing operations do not involve the use of significant amounts of combustible material. For the purpose of analysis, the lead assembly data reports define a beyond-design-basis fire that results in building collapse, the breach of material in the plutonium storage vault, and a lofted plume. These assumptions, however, are inconsistent with the beyond-design-basis fires analyzed for the other facilities. The beyond-design-basis fire has therefore been modified to reflect a room fire or building fire that clogs the building HEPA filters, resulting in a ground-level, unfiltered release. The assumed LPF is 1.4×10^{-2} (Smith, Wilkey, and Siebe 1996), consistent with the other analyses. Additionally, it is assumed that the fire does not involve the vault or that the storage canisters in the vault provide adequate protection for the duration of the fire.

K.2 FACILITY ACCIDENT IMPACTS AT HANFORD

The potential source terms and consequences of postulated bounding facility accidents for each facility option at Hanford are presented in Tables K–3 through K–9. Accident scenarios and source terms were developed from data reports prepared for each technology. Consequences were estimated using the MACCS2 computer code and local population and meteorology data. The consequences are presented for mean and 95th percentile meteorological conditions.

Meteorological data are based on 10-m (33-ft) weather readings at Hanford for the 1996 calendar year.[5] In accordance with the MACCS2 format requirements, the data set consists of 8,760 consecutive hourly readings of windspeed, wind direction, Pasquill-Gifford stability class, and accumulated rainfall.

Population estimates for Hanford are for the year 2010, are based on the *Census of Population and Housing, 1990* (DOC 1992), and are identical to the estimates used for the analysis of normal operations in the SPD EIS. Population values are formatted into 16 sectors centered around the 16 standard compass directions, which are further subdivided into 10 radial distance intervals out to 80 km (50 mi).

[5] The choice of calendar year was based primarily on data quality. For some combinations of site and calendar year, the data set contains significant gaps, making that data undesirable for use in dispersion modeling. As a result, not all sites were analyzed using meteorological data for the same calendar year.

Table K–3. Accident Impacts of Pit Conversion Facility in FMEF at Hanford

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Fire	1.2×10^{-5}	Unlikely	Mean	2.8×10^{-6}	1.1×10^{-9}	5.2×10^{-7}	2.6×10^{-10}	8.7×10^{-4}	4.3×10^{-7}
			95th percentile	1.1×10^{-5}	4.3×10^{-9}	1.6×10^{-6}	8.1×10^{-10}	5.3×10^{-3}	2.6×10^{-6}
Explosion	3.2×10^{-3}	Unlikely	Mean	7.3×10^{-4}	2.9×10^{-7}	1.4×10^{-4}	6.8×10^{-8}	2.3×10^{-1}	1.1×10^{-4}
			95th percentile	2.8×10^{-3}	1.1×10^{-6}	4.2×10^{-4}	2.1×10^{-7}	1.4	6.8×10^{-4}
Leaks/spills of nuclear material	4.4×10^{-6}	Extremely unlikely	Mean	1.0×10^{-6}	4.1×10^{-10}	1.9×10^{-7}	9.6×10^{-11}	3.2×10^{-4}	1.6×10^{-7}
			95th percentile	3.9×10^{-6}	1.6×10^{-9}	5.9×10^{-7}	3.0×10^{-10}	1.9×10^{-3}	9.5×10^{-7}
Tritium release	2.0×10^{1}	Extremely unlikely	Mean	1.2×10^{-1}	4.7×10^{-5}	2.2×10^{-2}	1.1×10^{-5}	3.7×10^{1}	1.8×10^{-2}
			95th percentile	4.5×10^{-1}	1.8×10^{-4}	6.8×10^{-2}	3.4×10^{-5}	2.2×10^{2}	1.1×10^{-1}
Criticality	1.0×10^{19} Fissions	Extremely unlikely	Mean	1.1×10^{-2}	4.4×10^{-6}	1.2×10^{-3}	6.0×10^{-7}	8.5×10^{-1}	4.3×10^{-4}
			95th percentile	3.3×10^{-2}	1.3×10^{-5}	3.4×10^{-3}	1.7×10^{-6}	5.4	2.7×10^{-3}
Design basis earthquake	3.9×10^{-4}	Unlikely	Mean	9.0×10^{-5}	3.6×10^{-8}	1.7×10^{-5}	8.4×10^{-9}	2.8×10^{-2}	1.4×10^{-5}
			95th percentile	3.5×10^{-4}	1.4×10^{-7}	5.2×10^{-5}	2.6×10^{-8}	1.7×10^{-1}	8.4×10^{-5}
Beyond-design-basis fire	1.7×10^{-2}	Beyond extremely unlikely	Mean	2.9×10^{-2}	1.1×10^{-5}	1.1×10^{-3}	5.6×10^{-7}	1.5	7.7×10^{-4}
			95th percentile	1.1×10^{-1}	4.3×10^{-5}	4.1×10^{-3}	2.0×10^{-6}	9.9	4.9×10^{-3}
Beyond-design-basis earthquake	3.9×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	6.6×10^{1}	2.6×10^{-2}	2.6	1.3×10^{-3}	3.6×10^{3}	1.8
			95th percentile	2.5×10^{2}	9.9×10^{-2}	9.4	4.7×10^{-3}	2.3×10^{4}	11

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility.

Note: Calculated using the source terms in the pit conversion data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1998a.

Table K–4. Accident Impacts of Ceramic Immobilization Facility in FMEF and HLWVF at Hanford (Hybrid Case)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts of Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	1.1×10^{-2}	4.4×10^{-6}	1.2×10^{-3}	6.0×10^{-7}	8.5×10^{-1}	4.3×10^{-4}
			95th percentile	3.3×10^{-2}	1.3×10^{-5}	3.4×10^{-3}	1.7×10^{-6}	5.4	2.7×10^{-3}
Explosion in HYDOX furnace	3.4×10^{-3}	Unlikely	Mean	1.0×10^{-3}	4.0×10^{-7}	1.9×10^{-4}	9.4×10^{-8}	3.1×10^{-1}	1.6×10^{-4}
			95th percentile	3.8×10^{-3}	1.5×10^{-6}	5.8×10^{-4}	2.9×10^{-7}	1.9	9.4×10^{-4}
Glovebox fire (calcining furnace)	2.7×10^{-7}	Extremely unlikely	Mean	8.0×10^{-8}	3.2×10^{-11}	1.5×10^{-8}	7.4×10^{-12}	2.5×10^{-5}	1.2×10^{-8}
			95th percentile	3.0×10^{-7}	1.2×10^{-10}	4.6×10^{-8}	2.3×10^{-11}	1.5×10^{-4}	7.4×10^{-8}
Hydrogen explosion	3.8×10^{-4}	Unlikely	Mean	1.1×10^{-4}	4.4×10^{-8}	2.1×10^{-5}	1.0×10^{-8}	3.4×10^{-2}	1.7×10^{-5}
			95th percentile	4.2×10^{-4}	1.7×10^{-7}	6.4×10^{-5}	3.2×10^{-8}	2.1×10^{-1}	1.0×10^{-4}
Glovebox fire (sintering furnace)	1.5×10^{-6}	Extremely unlikely	Mean	4.4×10^{-7}	1.8×10^{-10}	8.3×10^{-8}	4.1×10^{-11}	1.4×10^{-4}	6.9×10^{-8}
			95th percentile	1.7×10^{-6}	6.8×10^{-10}	2.6×10^{-7}	1.3×10^{-10}	8.3×10^{-4}	4.1×10^{-7}
Design basis earthquake	3.8×10^{-4}	Unlikely	Mean	1.1×10^{-4}	4.5×10^{-8}	2.1×10^{-5}	1.0×10^{-8}	3.5×10^{-2}	1.7×10^{-5}
			95th percentile	4.3×10^{-4}	1.7×10^{-7}	6.4×10^{-5}	3.2×10^{-8}	2.1×10^{-1}	1.0×10^{-4}
Beyond-design-basis fire	2.1×10^{-3}	Beyond extremely unlikely	Mean	4.5×10^{-3}	1.8×10^{-6}	1.8×10^{-4}	8.9×10^{-8}	2.4×10^{-1}	1.2×10^{-4}
			95th percentile	1.7×10^{-2}	6.8×10^{-6}	6.5×10^{-4}	3.2×10^{-7}	1.6	7.8×10^{-4}
Beyond-design-basis earthquake	1.9×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	4.1×10^{1}	1.6×10^{-2}	1.6	8.1×10^{-4}	2.2×10^{3}	1.1
			95th percentile	1.5×10^{2}	1.6×10^{-2}	5.8	2.9×10^{-3}	1.4×10^{4}	7.1

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility, HYDOX, hydride oxidation.

Note: Calculated using the source terms in the immobilization data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1999a.

Table K–5. Accident Impacts of Glass Immobilization Facility in FMEF and HLWVF at Hanford (Hybrid Case)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	1.1×10^{-2}	4.4×10^{-6}	1.2×10^{-3}	6.0×10^{-7}	8.5×10^{-1}	4.3×10^{-4}
			95th percentile	3.3×10^{-2}	1.3×10^{-5}	3.4×10^{-3}	1.7×10^{-6}	5.4	2.7×10^{-3}
Explosion in HYDOX furnace	3.4×10^{-3}	Unlikely	Mean	1.0×10^{-3}	4.0×10^{-7}	1.9×10^{-4}	9.4×10^{-8}	3.1×10^{-1}	1.6×10^{-4}
			95th percentile	3.8×10^{-3}	1.5×10^{-6}	5.8×10^{-4}	2.9×10^{-7}	1.9	9.4×10^{-4}
Glovebox fire (calcining furnace)	2.7×10^{-7}	Extremely unlikely	Mean	8.0×10^{-8}	3.2×10^{-11}	1.5×10^{-8}	7.4×10^{-12}	2.5×10^{-5}	1.2×10^{-8}
			95th percentile	3.0×10^{-7}	1.2×10^{-10}	4.6×10^{-8}	2.3×10^{-11}	1.5×10^{-4}	7.4×10^{-8}
Hydrogen explosion	3.8×10^{-4}	Unlikely	Mean	1.1×10^{-4}	4.4×10^{-8}	2.1×10^{-5}	1.0×10^{-8}	3.4×10^{-2}	1.7×10^{-5}
			95th percentile	4.2×10^{-4}	1.7×10^{-7}	6.4×10^{-5}	3.2×10^{-8}	2.1×10^{-1}	1.0×10^{-4}
Melter eruption	1.4×10^{-6}	Unlikely	Mean	4.1×10^{-7}	1.6×10^{-10}	7.6×10^{-8}	3.8×10^{-11}	1.3×10^{-4}	6.4×10^{-8}
			95th percentile	1.6×10^{-6}	6.3×10^{-10}	2.4×10^{-7}	1.2×10^{-10}	7.7×10^{-4}	3.8×10^{-7}
Melter spill	3.3×10^{-7}	Unlikely	Mean	9.6×10^{-8}	3.9×10^{-11}	1.8×10^{-8}	9.0×10^{-12}	3.0×10^{-5}	1.5×10^{-8}
			95th percentile	3.7×10^{-7}	1.5×10^{-10}	5.6×10^{-8}	2.8×10^{-11}	1.8×10^{-4}	9.0×10^{-8}
Design basis earthquake	3.3×10^{-4}	Unlikely	Mean	9.7×10^{-5}	3.9×10^{-8}	1.8×10^{-5}	9.1×10^{-9}	3.0×10^{-2}	1.5×10^{-5}
			95th percentile	3.7×10^{-4}	1.5×10^{-7}	5.6×10^{-5}	2.8×10^{-8}	1.8×10^{-1}	9.1×10^{-5}
Beyond-design-basis fire	3.8×10^{-4}	Beyond extremely unlikely	Mean	8.1×10^{-4}	3.3×10^{-7}	3.2×10^{-5}	1.6×10^{-8}	4.4×10^{-2}	2.2×10^{-5}
			95th percentile	3.1×10^{-3}	1.2×10^{-6}	1.2×10^{-4}	5.8×10^{-8}	2.8×10^{-1}	1.4×10^{-4}
Beyond-design-basis earthquake	1.7×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	3.6×10^{1}	1.4×10^{-2}	1.4	7.1×10^{-4}	1.9×10^{3}	9.7×10^{-1}
			95th percentile	1.4×10^{2}	5.4×10^{-2}	5.1	2.6×10^{-3}	1.2×10^{4}	6.2

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; HYDOX, hydride oxidation.

Note: Calculated using the source terms in the immobilization data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1999b.

Table K–6. Accident Impacts of Ceramic Immobilization Facility in FMEF and HLWVF at Hanford (50-t Case)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	1.1×10^{-2}	4.4×10^{-6}	1.2×10^{-3}	6.0×10^{-7}	8.5×10^{-1}	4.3×10^{-4}
			95th percentile	3.3×10^{-2}	1.3×10^{-5}	3.4×10^{-3}	1.7×10^{-6}	5.4	2.7×10^{-3}
Explosion in HYDOX furnace	3.4×10^{-3}	Unlikely	Mean	1.0×10^{-3}	4.0×10^{-7}	1.9×10^{-4}	9.4×10^{-8}	3.1×10^{-1}	1.6×10^{-4}
			95th percentile	3.8×10^{-3}	1.5×10^{-6}	5.8×10^{-4}	2.9×10^{-7}	1.9	9.4×10^{-4}
Glovebox fire (calcining furnace)	2.7×10^{-7}	Extremely unlikely	Mean	8.0×10^{-8}	3.2×10^{-11}	1.5×10^{-8}	7.4×10^{-12}	2.5×10^{-5}	1.2×10^{-8}
			95th percentile	3.0×10^{-7}	1.2×10^{-10}	4.6×10^{-8}	2.3×10^{-11}	1.5×10^{-4}	7.4×10^{-8}
Hydrogen explosion	3.8×10^{-4}	Unlikely	Mean	1.1×10^{-4}	4.4×10^{-8}	2.1×10^{-5}	1.0×10^{-8}	3.4×10^{-2}	1.7×10^{-5}
			95th percentile	4.2×10^{-4}	1.7×10^{-7}	6.4×10^{-5}	3.2×10^{-8}	2.1×10^{-1}	1.0×10^{-4}
Glovebox fire (sintering furnace)	1.5×10^{-6}	Extremely unlikely	Mean	4.4×10^{-7}	1.8×10^{-10}	8.3×10^{-8}	4.1×10^{-11}	1.4×10^{-4}	6.9×10^{-8}
			95th percentile	1.7×10^{-6}	6.8×10^{-10}	2.6×10^{-7}	1.3×10^{-10}	8.3×10^{-4}	4.1×10^{-7}
Design basis earthquake	3.8×10^{-4}	Unlikely	Mean	1.0×10^{-4}	4.1×10^{-8}	1.9×10^{-5}	9.6×10^{-9}	3.2×10^{-2}	1.6×10^{-5}
			95th percentile	3.9×10^{-4}	1.6×10^{-7}	5.9×10^{-5}	3.0×10^{-8}	1.9×10^{-1}	9.6×10^{-5}
Beyond-design-basis fire	2.1×10^{-3}	Beyond extremely unlikely	Mean	4.5×10^{-3}	1.8×10^{-6}	1.8×10^{-4}	8.9×10^{-8}	2.4×10^{-1}	1.2×10^{-4}
			95th percentile	1.7×10^{-2}	6.8×10^{-6}	6.5×10^{-4}	3.2×10^{-7}	1.6	7.8×10^{-4}
Beyond-design-basis earthquake	1.9×10^{1}	Unlikely to beyond extremely unlikely	Mean	3.8×10^{1}	1.5×10^{-2}	1.5	7.4×10^{-4}	2.0×10^{3}	1.0
			95th percentile	1.4×10^{2}	5.7×10^{-2}	5.4	2.7×10^{-3}	1.3×10^{4}	6.5

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility, HYDOX, hydride oxidation.

Note: Calculated using the source terms in the immobilization data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1999a.

Table K–7. Accident Impacts of Glass Immobilization Facility in FMEF and HLWVF at Hanford (50-t Case)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	1.1×10^{-2}	4.4×10^{-6}	1.2×10^{-3}	6.0×10^{-7}	8.5×10^{-1}	4.3×10^{-4}
			95th percentile	3.3×10^{-2}	1.3×10^{-5}	3.4×10^{-3}	1.7×10^{-6}	5.4	2.7×10^{-3}
Explosion in HYDOX furnace	3.4×10^{-3}	Unlikely	Mean	1.0×10^{-3}	4.0×10^{-7}	1.9×10^{-4}	9.4×10^{-8}	3.1×10^{-1}	1.6×10^{-4}
			95th percentile	3.8×10^{-3}	1.5×10^{-6}	5.8×10^{-4}	2.9×10^{-7}	1.9	9.4×10^{-4}
Glovebox fire (calcining furnace)	2.7×10^{-7}	Extremely unlikely	Mean	8.0×10^{-8}	3.2×10^{-11}	1.5×10^{-8}	7.4×10^{-12}	2.5×10^{-5}	1.2×10^{-8}
			95th percentile	3.0×10^{-7}	1.2×10^{-10}	4.6×10^{-8}	2.3×10^{-11}	1.5×10^{-4}	7.4×10^{-8}
Hydrogen explosion	3.8×10^{-4}	Unlikely	Mean	1.1×10^{-4}	4.4×10^{-8}	2.1×10^{-5}	1.0×10^{-8}	3.4×10^{-2}	1.7×10^{-5}
			95th percentile	4.2×10^{-4}	1.7×10^{-7}	6.4×10^{-5}	3.2×10^{-8}	2.1×10^{-1}	1.0×10^{-4}
Melter eruption	1.4×10^{-6}	Unlikely	Mean	4.1×10^{-7}	1.6×10^{-10}	7.6×10^{-8}	3.8×10^{-11}	1.3×10^{-4}	6.4×10^{-8}
			95th percentile	1.6×10^{-6}	6.3×10^{-10}	2.4×10^{-7}	1.2×10^{-10}	7.7×10^{-4}	3.8×10^{-7}
Melter spill	3.3×10^{-7}	Unlikely	Mean	9.6×10^{-8}	3.9×10^{-11}	1.8×10^{-8}	9.0×10^{-12}	3.0×10^{-5}	1.5×10^{-8}
			95th percentile	3.7×10^{-7}	1.5×10^{-10}	5.6×10^{-8}	2.8×10^{-11}	1.8×10^{-4}	9.0×10^{-8}
Design basis earthquake	3.3×10^{-4}	Unlikely	Mean	9.0×10^{-5}	3.6×10^{-8}	1.7×10^{-5}	8.4×10^{-9}	2.8×10^{-2}	1.4×10^{-5}
			95th percentile	3.5×10^{-4}	1.4×10^{-7}	5.2×10^{-5}	2.6×10^{-8}	1.7×10^{-1}	8.4×10^{-5}
Beyond-design-basis fire	3.8×10^{-4}	Beyond extremely unlikely	Mean	8.1×10^{-4}	3.3×10^{-7}	3.2×10^{-5}	1.6×10^{-8}	4.4×10^{-2}	2.2×10^{-5}
			95th percentile	3.1×10^{-3}	1.2×10^{-6}	1.2×10^{-4}	5.8×10^{-8}	2.8×10^{-1}	1.4×10^{-4}
Beyond-design-basis earthquake	1.7×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	3.3×10^{1}	1.3×10^{-2}	1.3	6.6×10^{-4}	1.8×10^{3}	9.0×10^{-1}
			95th percentile	1.3×10^{2}	5.0×10^{-2}	4.8	2.4×10^{-3}	1.2×10^{4}	5.8

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility; HLWVF, high-level-waste vitrification facility; HYDOX, hydride oxidation.

Note: Calculated using the source terms in the immobilization data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1999b.

Table K–8. Accident Impacts of MOX Facility in FMEF at Hanford

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	5.1×10^{-2}	2.0×10^{-5}	6.5×10^{-3}	3.3×10^{-6}	6.2	3.1×10^{-3}
			95th percentile	1.5×10^{-1}	6.0×10^{-5}	1.9×10^{-2}	9.4×10^{-6}	3.9×10^{1}	1.9×10^{-2}
Explosion in sintering furnace	5.5×10^{-4}	Extremely unlikely	Mean	1.3×10^{-4}	5.1×10^{-8}	2.4×10^{-5}	1.2×10^{-8}	4.0×10^{-2}	2.0×10^{-5}
			95th percentile	4.9×10^{-4}	2.0×10^{-7}	7.4×10^{-5}	3.7×10^{-8}	2.4×10^{-1}	1.2×10^{-4}
Ion exchange exotherm	2.4×10^{-5}	Unlikely	Mean	5.6×10^{-6}	2.2×10^{-9}	1.0×10^{-6}	5.2×10^{-10}	1.7×10^{-3}	8.7×10^{-7}
			95th percentile	2.1×10^{-5}	8.6×10^{-9}	3.2×10^{-6}	1.6×10^{-9}	1.1×10^{-2}	5.2×10^{-6}
Fire	4.0×10^{-6}	Unlikely	Mean	9.3×10^{-7}	3.7×10^{-10}	1.7×10^{-7}	8.7×10^{-11}	2.9×10^{-4}	1.4×10^{-7}
			95th percentile	3.6×10^{-6}	1.4×10^{-9}	5.4×10^{-7}	2.7×10^{-10}	1.8×10^{-3}	8.7×10^{-7}
Spill	5.0×10^{-6}	Extremely unlikely	Mean	1.2×10^{-6}	4.7×10^{-10}	2.2×10^{-7}	1.1×10^{-10}	3.6×10^{-4}	1.8×10^{-7}
			95th percentile	4.5×10^{-6}	1.8×10^{-9}	6.7×10^{-7}	3.4×10^{-10}	2.2×10^{-3}	1.1×10^{-6}
Design basis earthquake	7.9×10^{-5}	Unlikely	Mean	1.8×10^{-5}	7.3×10^{-9}	3.4×10^{-6}	1.7×10^{-9}	5.7×10^{-3}	2.8×10^{-6}
			95th percentile	7.0×10^{-5}	2.8×10^{-8}	1.1×10^{-5}	5.3×10^{-9}	3.4×10^{-2}	1.7×10^{-5}
Beyond-design-basis fire	6.0×10^{-2}	Beyond extremely unlikely	Mean	1.0×10^{-1}	4.1×10^{-5}	4.0×10^{-3}	2.0×10^{-6}	5.5	2.8×10^{-3}
			95th percentile	3.8×10^{-1}	1.5×10^{-4}	1.5×10^{-2}	7.3×10^{-6}	3.5×10^{1}	1.8×10^{-2}
Beyond-design-basis earthquake	9.5×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.6×10^{2}	6.5×10^{-2}	6.4	3.2×10^{-3}	8.7×10^{3}	4.4
			95th percentile	6.1×10^{2}	2.4×10^{-1}	2.3×10^{1}	1.2×10^{-2}	5.6×10^{4}	2.8×10^{1}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: FMEF, Fuels and Materials Examination Facility.

Note: Calculated using the source terms in the MOX data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1998b.

Table K–9. Accident Impacts of New MOX Facility at Hanford

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	1.8×10^{-1}	7.2×10^{-5}	9.9×10^{-3}	4.9×10^{-6}	8.2	4.1×10^{-3}
			95th percentile	6.1×10^{-1}	2.5×10^{-4}	3.5×10^{-2}	1.7×10^{-5}	5.5×10^{1}	2.8×10^{-2}
Explosion in sintering furnace	5.5×10^{-4}	Extremely unlikely	Mean	8.0×10^{-4}	3.2×10^{-7}	3.5×10^{-5}	1.8×10^{-8}	5.0×10^{-2}	2.5×10^{-5}
			95th percentile	2.9×10^{-3}	1.2×10^{-6}	1.1×10^{-4}	5.7×10^{-8}	3.2×10^{-1}	1.6×10^{-4}
Ion exchange exotherm	2.4×10^{-5}	Unlikely	Mean	3.5×10^{-5}	1.4×10^{-8}	1.5×10^{-6}	7.7×10^{-10}	2.2×10^{-3}	1.1×10^{-6}
			95th percentile	1.3×10^{-4}	5.1×10^{-8}	5.0×10^{-6}	2.5×10^{-9}	1.4×10^{-2}	7.0×10^{-6}
Fire	4.0×10^{-6}	Unlikely	Mean	5.8×10^{-6}	2.3×10^{-9}	2.6×10^{-7}	1.3×10^{-10}	3.6×10^{-4}	1.8×10^{-7}
			95th percentile	2.1×10^{-5}	8.4×10^{-9}	8.3×10^{-7}	4.2×10^{-10}	2.3×10^{-3}	1.2×10^{-6}
Spill	5.0×10^{-6}	Extremely unlikely	Mean	7.3×10^{-6}	2.9×10^{-9}	3.2×10^{-7}	1.6×10^{-10}	4.5×10^{-4}	2.3×10^{-7}
			95th percentile	2.6×10^{-5}	1.1×10^{-8}	1.0×10^{-6}	5.2×10^{-10}	2.9×10^{-3}	1.5×10^{-6}
Design basis earthquake	7.9×10^{-5}	Unlikely	Mean	1.1×10^{-4}	4.6×10^{-8}	5.0×10^{-6}	2.5×10^{-9}	7.1×10^{-3}	3.6×10^{-6}
			95th percentile	4.1×10^{-4}	1.7×10^{-7}	1.6×10^{-5}	8.2×10^{-9}	4.6×10^{-2}	2.3×10^{-5}
Beyond-design-basis fire	6.0×10^{-2}	Beyond extremely unlikely	Mean	1.0×10^{-1}	4.1×10^{-5}	4.0×10^{-3}	2.0×10^{-6}	5.5	2.8×10^{-3}
			95th percentile	3.8×10^{-1}	1.5×10^{-4}	1.5×10^{-2}	7.3×10^{-6}	3.5×10^{1}	1.8×10^{-2}
Beyond-design-basis earthquake	9.5×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.6×10^{2}	6.5×10^{-2}	6.4	3.2×10^{-3}	8.7×10^{3}	4.4
			95th percentile	6.1×10^{2}	2.4×10^{-1}	2.3×10^{1}	1.2×10^{-2}	5.6×10^{4}	2.8×10^{1}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Note: Calculated using the source terms in the MOX data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1998b.

K.3 FACILITY ACCIDENT IMPACTS AT INEEL

The potential source terms and consequences of postulated bounding facility accidents for each facility option for INEEL are presented in Tables K–10 and K–11. Accident scenarios and source terms were developed from data reports prepared for each technology. Consequences were estimated using the MACCS2 computer code and local population and meteorology data. The consequences are presented for mean and 95th percentile meteorological conditions.

Meteorological data are based on 10-m (33-ft) weather readings at INEEL for the 1993 calendar year.[6] In accordance with MACCS2 format requirements, the data set consists of 8,760 consecutive hourly readings of windspeed, wind direction, Pasquill-Gifford stability class, and accumulated rainfall.

Population estimates for INEEL are for the year 2010, are based on the *Census of Population and Housing, 1990* (DOC 1992), and are identical to the estimates used for the analysis of normal operations in the SPD EIS. Population values are formatted into 16 sectors centered around the 16 standard compass directions, which are further subdivided into 10 radial distance intervals out to 80 km (50 mi).

[6] The choice of calendar year was based primarily on data quality. For some combinations of site and calendar year, the data set contains significant gaps, making that data undesirable for use in dispersion modeling. As a result, not all sites were analyzed using meteorological data for the same calendar year.

Table K–10. Accident Impacts of Pit Conversion Facility in FPF at INEEL

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Fire	1.2×10^{-5}	Unlikely	Mean	2.5×10^{-6}	1.0×10^{-9}	3.0×10^{-7}	1.5×10^{-10}	5.6×10^{-5}	2.8×10^{-8}
			95th percentile	6.4×10^{-6}	2.5×10^{-9}	1.1×10^{-6}	5.3×10^{-10}	2.1×10^{-4}	1.0×10^{-7}
Explosion	3.2×10^{-3}	Unlikely	Mean	6.5×10^{-4}	2.6×10^{-7}	7.8×10^{-5}	3.9×10^{-8}	1.5×10^{-2}	7.4×10^{-6}
			95th percentile	1.7×10^{-3}	6.7×10^{-7}	2.8×10^{-4}	1.4×10^{-7}	5.5×10^{-2}	2.7×10^{-5}
Leaks/spills of nuclear material	4.4×10^{-6}	Extremely unlikely	Mean	9.1×10^{-7}	3.6×10^{-10}	1.1×10^{-7}	5.4×10^{-11}	2.1×10^{-5}	1.0×10^{-8}
			95th percentile	2.3×10^{-6}	9.3×10^{-10}	3.9×10^{-7}	1.9×10^{-10}	7.7×10^{-5}	3.8×10^{-8}
Tritium release	2.0×10^{1}	Extremely unlikely	Mean	1.0×10^{-1}	4.2×10^{-5}	1.2×10^{-2}	6.2×10^{-6}	2.4	1.2×10^{-3}
			95th percentile	2.7×10^{-1}	1.1×10^{-4}	4.5×10^{-2}	2.2×10^{-5}	8.8	4.4×10^{-3}
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	1.1×10^{-2}	4.4×10^{-6}	4.8×10^{-4}	2.4×10^{-7}	2.2×10^{-2}	1.1×10^{-5}
			95th percentile	3.3×10^{-2}	1.3×10^{-5}	1.6×10^{-3}	7.9×10^{-7}	8.5×10^{-2}	4.2×10^{-5}
Design basis earthquake	3.9×10^{-4}	Unlikely	Mean	8.0×10^{-5}	3.2×10^{-8}	9.5×10^{-6}	4.8×10^{-9}	1.8×10^{-3}	9.1×10^{-7}
			95th percentile	2.1×10^{-4}	8.2×10^{-8}	3.4×10^{-5}	1.7×10^{-8}	6.8×10^{-3}	3.4×10^{-6}
Beyond-design-basis fire	1.7×10^{-2}	Beyond extremely unlikely	Mean	3.0×10^{-2}	1.2×10^{-5}	8.1×10^{-4}	4.1×10^{-7}	9.6×10^{-2}	4.8×10^{-5}
			95th percentile	1.1×10^{-1}	4.5×10^{-5}	2.9×10^{-3}	1.5×10^{-6}	3.6×10^{-1}	1.8×10^{-4}
Beyond-design-basis earthquake	3.9×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	7.0×10^{1}	2.8×10^{-2}	1.9	9.3×10^{-4}	2.2×10^{2}	1.1×10^{-1}
			95th percentile	2.6×10^{2}	1.0×10^{-1}	6.7	3.3×10^{-3}	8.4×10^{2}	4.2×10^{-1}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 mi] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: FPF, Fuel Processing Facility.

Note: Calculated using the source terms in the pit conversion data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1998f.

Table K–11. Accident Impacts of New MOX Facility at INEEL

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	1.9×10^{-1}	7.4×10^{-5}	4.3×10^{-3}	2.1×10^{-6}	2.7×10^{-1}	1.4×10^{-4}
			95th percentile	7.5×10^{-1}	3.0×10^{-4}	1.6×10^{-2}	8.2×10^{-6}	1.0	5.2×10^{-4}
Explosion in sintering furnace	5.5×10^{-4}	Extremely unlikely	Mean	8.3×10^{-4}	3.3×10^{-7}	2.2×10^{-5}	1.1×10^{-8}	3.1×10^{-3}	1.5×10^{-6}
			95th percentile	3.6×10^{-3}	1.4×10^{-6}	8.4×10^{-5}	4.2×10^{-8}	1.2×10^{-2}	5.8×10^{-6}
Ion exchange exotherm	2.4×10^{-5}	Unlikely	Mean	3.6×10^{-5}	1.4×10^{-8}	9.5×10^{-7}	4.8×10^{-10}	1.3×10^{-4}	6.7×10^{-8}
			95th percentile	1.6×10^{-4}	6.3×10^{-8}	3.7×10^{-6}	1.8×10^{-9}	5.1×10^{-4}	2.5×10^{-7}
Fire	4.0×10^{-6}	Unlikely	Mean	6.0×10^{-6}	2.4×10^{-9}	1.6×10^{-7}	7.9×10^{-11}	2.2×10^{-5}	1.1×10^{-8}
			95th percentile	2.6×10^{-5}	1.0×10^{-8}	6.1×10^{-7}	3.1×10^{-10}	8.5×10^{-5}	4.2×10^{-8}
Spill	5.0×10^{-6}	Extremely unlikely	Mean	7.5×10^{-6}	3.0×10^{-9}	2.0×10^{-7}	9.9×10^{-11}	2.8×10^{-5}	1.4×10^{-8}
			95th percentile	3.3×10^{-5}	1.3×10^{-8}	7.7×10^{-7}	3.8×10^{-10}	1.1×10^{-4}	5.3×10^{-8}
Design basis earthquake	7.9×10^{-5}	Unlikely	Mean	1.2×10^{-4}	4.7×10^{-8}	3.1×10^{-6}	1.6×10^{-9}	4.4×10^{-4}	2.2×10^{-7}
			95th percentile	5.1×10^{-4}	2.1×10^{-7}	1.2×10^{-5}	6.0×10^{-9}	1.7×10^{-3}	8.3×10^{-7}
Beyond-design-basis fire	6.0×10^{-2}	Beyond extremely unlikely	Mean	1.1×10^{-1}	4.3×10^{-5}	2.9×10^{-3}	1.4×10^{-6}	3.4×10^{-1}	1.7×10^{-4}
			95th percentile	4.1×10^{-1}	1.6×10^{-4}	1.0×10^{-2}	5.2×10^{-6}	1.3	6.5×10^{-4}
Beyond-design-basis earthquake	9.5×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.7×10^{2}	6.8×10^{-2}	4.6	2.3×10^{-3}	5.4×10^{2}	2.7×10^{-1}
			95th percentile	6.5×10^{2}	2.6×10^{-1}	1.6×10^{1}	8.2×10^{-3}	2.1×10^{3}	1.0
			95th percentile						

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Note: Calculated using the source terms in the MOX data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1998g.

K.4 FACILITY ACCIDENT IMPACTS AT PANTEX

The potential source terms and consequences of postulated bounding facility accidents for each facility option for Pantex are presented in Tables K–12 and K–13. Accident scenarios and source terms were developed from data reports prepared for each technology. Consequences were estimated using the MACCS2 computer code and local population and meteorology data. The consequences are presented for mean and 95th percentile meteorological conditions.

Meteorological data are based on 10-m (33-ft) weather readings from the Pantex Tower for the 1996 calendar year.[7] In accordance with MACCS2 format requirements, the data set consists of 8,760 consecutive hourly readings of windspeed, wind direction, Pasquill-Gifford stability class, and accumulated rainfall.

Population estimates for Pantex are for the year 2010, are based on the *Census of Population and Housing, 1990* (DOC 1992), and are identical to the estimates used for the analysis of normal operations in the SPD EIS. Population values are formatted into 16 sectors centered around the 16 standard compass directions, which are further subdivided into 10 radial distance intervals out to 80 km (50 mi).

[7] The choice of calendar year was based primarily on data quality. For some combinations of site and calendar year, the data set contains significant gaps, making that data undesirable for use in dispersion modeling. As a result, not all sites were analyzed using meteorological data for the same calendar year.

Table K–12. Accident Impacts of New Pit Conversion Facility at Pantex

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Fire	1.2×10^{-5}	Unlikely	Mean	2.3×10^{-6}	9.1×10^{-10}	7.6×10^{-7}	3.8×10^{-10}	1.8×10^{-4}	9.1×10^{-8}
			95th percentile	5.2×10^{-6}	2.1×10^{-9}	2.1×10^{-6}	1.0×10^{-9}	8.6×10^{-4}	4.3×10^{-7}
Explosion	3.2×10^{-3}	Unlikely	Mean	6.0×10^{-4}	2.4×10^{-7}	2.0×10^{-4}	9.9×10^{-8}	4.8×10^{-2}	2.4×10^{-5}
			95th percentile	1.4×10^{-3}	5.4×10^{-7}	5.4×10^{-4}	2.7×10^{-7}	2.2×10^{-1}	1.1×10^{-4}
Leaks/spills of nuclear material	4.4×10^{-6}	Extremely unlikely	Mean	8.4×10^{-7}	3.3×10^{-10}	2.8×10^{-7}	1.4×10^{-10}	6.7×10^{-5}	3.3×10^{-8}
			95th percentile	1.9×10^{-6}	7.6×10^{-10}	7.6×10^{-7}	3.8×10^{-10}	3.1×10^{-4}	1.6×10^{-7}
Tritium release	2.0×10^{1}	Extremely unlikely	Mean	9.6×10^{-2}	3.8×10^{-5}	3.2×10^{-2}	1.6×10^{-5}	7.7	3.8×10^{-3}
			95th percentile	2.2×10^{-1}	8.7×10^{-5}	8.7×10^{-2}	4.4×10^{-5}	3.6×10^{1}	1.8×10^{-2}
Criticality	1.0×10^{19} Fissions	Extremely unlikely	Mean	6.1×10^{-3}	2.5×10^{-6}	2.7×10^{-3}	1.3×10^{-6}	2.7×10^{-1}	1.4×10^{-4}
			95th percentile	1.5×10^{-2}	6.0×10^{-6}	6.0×10^{-3}	3.0×10^{-6}	1.6	7.9×10^{-4}
Design basis earthquake	3.9×10^{-4}	Unlikely	Mean	7.4×10^{-5}	2.9×10^{-8}	2.4×10^{-5}	1.2×10^{-8}	5.9×10^{-3}	2.9×10^{-6}
			95th percentile	1.7×10^{-4}	6.7×10^{-8}	6.7×10^{-5}	3.3×10^{-8}	2.8×10^{-2}	1.4×10^{-5}
Beyond-design-basis fire	1.7×10^{-2}	Beyond extremely unlikely	Mean	9.6×10^{-3}	3.8×10^{-6}	1.5×10^{-3}	7.5×10^{-7}	2.8×10^{-1}	1.4×10^{-4}
			95th percentile	2.8×10^{-2}	1.1×10^{-5}	4.4×10^{-3}	2.2×10^{-6}	1.3	6.3×10^{-4}
Beyond-design-basis earthquake	3.9×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	2.2×10^{1}	8.8×10^{-3}	3.5	1.7×10^{-3}	6.4×10^{2}	3.2×10^{-1}
			95th percentile	6.4×10^{1}	2.6×10^{-2}	1.0×10^{1}	5.1×10^{-3}	3.0×10^{3}	1.5
Aircraft crash	1.2×10^{2}	Beyond extremely unlikely	Mean	6.8×10^{1}	2.7×10^{-2}	1.1×10^{1}	5.4×10^{-3}	2.0×10^{3}	1.0
			95th percentile	2.0×10^{2}	7.9×10^{-2}	3.1×10^{1}	1.6×10^{-2}	9.2×10^{3}	4.5

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Note: Calculated using the source terms in the pit conversion data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1998e.

Table K–13. Accident Impacts of New MOX Facility at Pantex

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	7.5×10^{-2}	3.0×10^{-5}	1.9×10^{-2}	9.3×10^{-6}	1.9	9.4×10^{-4}
			95th percentile	2.4×10^{-1}	9.5×10^{-5}	4.7×10^{-2}	2.3×10^{-5}	1.1×10^{1}	5.4×10^{-3}
Explosion in sintering furnace	5.5×10^{-4}	Extremely unlikely	Mean	2.8×10^{-4}	1.1×10^{-7}	4.8×10^{-5}	2.4×10^{-8}	9.1×10^{-3}	4.5×10^{-6}
			95th percentile	8.9×10^{-4}	3.5×10^{-7}	1.3×10^{-4}	6.6×10^{-8}	4.2×10^{-2}	2.1×10^{-5}
Ion exchange exotherm	2.4×10^{-5}	Unlikely	Mean	1.2×10^{-5}	5.0×10^{-9}	2.1×10^{-6}	1.0×10^{-9}	4.0×10^{-4}	2.0×10^{-7}
			95th percentile	3.9×10^{-5}	1.5×10^{-8}	5.8×10^{-6}	2.9×10^{-9}	1.8×10^{-3}	9.0×10^{-7}
Fire	4.0×10^{-6}	Unlikely	Mean	2.1×10^{-6}	8.3×10^{-10}	3.5×10^{-7}	1.7×10^{-10}	6.6×10^{-5}	3.3×10^{-8}
			95th percentile	6.4×10^{-6}	2.6×10^{-9}	9.6×10^{-7}	4.8×10^{-10}	3.0×10^{-4}	1.5×10^{-7}
Spill	5.0×10^{-6}	Extremely unlikely	Mean	2.6×10^{-6}	1.0×10^{-9}	4.4×10^{-7}	2.2×10^{-10}	8.3×10^{-5}	4.1×10^{-8}
			95th percentile	8.1×10^{-6}	3.2×10^{-9}	1.2×10^{-6}	6.0×10^{-10}	3.8×10^{-4}	1.9×10^{-7}
Design basis earthquake	7.9×10^{-5}	Unlikely	Mean	4.1×10^{-5}	1.6×10^{-8}	6.8×10^{-6}	3.4×10^{-9}	1.3×10^{-3}	6.5×10^{-7}
			95th percentile	1.3×10^{-4}	5.1×10^{-8}	1.9×10^{-5}	9.4×10^{-9}	5.9×10^{-3}	3.0×10^{-6}
Beyond-design-basis fire	6.0×10^{-2}	Beyond extremely unlikely	Mean	3.4×10^{-2}	1.4×10^{-5}	5.4×10^{-3}	2.7×10^{-6}	1.0	5.0×10^{-4}
			95th percentile	9.9×10^{-2}	4.0×10^{-5}	1.6×10^{-2}	7.8×10^{-6}	4.6	2.3×10^{-3}
Beyond-design-basis earthquake	9.5×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	5.4×10^{1}	2.2×10^{-2}	8.5	4.3×10^{-3}	1.6×10^{3}	7.9×10^{-1}
			95th percentile	1.6×10^{2}	6.3×10^{-2}	2.5×10^{1}	1.2×10^{-2}	7.3×10^{3}	3.6
Aircraft crash	7.1×10^{2}	Beyond extremely unlikely	Mean	4.0×10^{2}	1.6×10^{-1}	6.3×10^{1}	3.2×10^{-2}	1.2×10^{4}	5.9
			95th percentile	1.2×10^{3}	4.7×10^{-1}	1.9×10^{2}	9.3×10^{-2}	5.4×10^{4}	2.7×10^{1}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Note: Calculated using the source terms in the MOX data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1998h.

K.5 FACILITY ACCIDENT IMPACTS AT SRS

The potential source terms and consequences of postulated bounding facility accidents for each facility option for SRS are presented in Tables K–14 through K–19. Accident scenarios and source terms were developed from data reports prepared for each technology. Consequences were estimated using the MACCS2 computer code and local population and meteorology data. The consequences are presented for both mean and 95th percentile meteorological conditions.

Meteorological data are based on 10-m (33-ft) weather readings at SRS, are identical to the data used in *F-Canyon Plutonium Solutions Environmental Impact Statement*, and included in Sample Problem D of the MACCS2 User's Guide (Chanin and Young 1997:4-4). In accordance with MACCS2 format requirements, the data set consists of 8,760 consecutive hourly readings of windspeed, wind direction, Pasquill-Gifford stability class, and accumulated rainfall.

Population estimates for SRS are for the year 2010, are based on the *Census of Population and Housing, 1990* (DOC 1992), and are identical to the estimates used for the analysis of normal operations in the SPD EIS. Population values are formatted into 16 sectors centered around the 16 standard compass directions, which are further subdivided into 10 radial distance intervals out to 80 km (50 mi).

[Tables deleted.]

Table K–14. Accident Impacts of New Pit Conversion Facility at SRS

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Proability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Fire	1.2×10^{-5}	Unlikely	Mean	2.6×10^{-6}	1.1×10^{-9}	2.1×10^{-7}	1.0×10^{-10}	5.4×10^{-4}	2.7×10^{-7}
			95th percentile	6.2×10^{-6}	2.5×10^{-9}	6.7×10^{-7}	3.3×10^{-10}	2.4×10^{-3}	1.2×10^{-6}
Explosion	3.2×10^{-3}	Unlikely	Mean	6.9×10^{-4}	2.8×10^{-7}	5.4×10^{-5}	2.7×10^{-8}	1.4×10^{-1}	7.0×10^{-5}
			95th percentile	1.6×10^{-3}	6.5×10^{-7}	1.8×10^{-4}	8.8×10^{-8}	6.2×10^{-1}	3.1×10^{-4}
Leaks/spills of nuclear material	4.4×10^{-6}	Extremely unlikely	Mean	9.6×10^{-7}	3.9×10^{-10}	7.5×10^{-8}	3.8×10^{-11}	2.0×10^{-4}	9.8×10^{-8}
			95th percentile	2.3×10^{-6}	9.1×10^{-10}	2.5×10^{-7}	1.2×10^{-10}	8.7×10^{-4}	4.3×10^{-7}
Tritium release	2.0×10^{1}	Extremely unlikely	Mean	1.1×10^{-1}	4.4×10^{-5}	8.6×10^{-3}	4.3×10^{-6}	2.3×10^{1}	1.1×10^{-2}
			95th percentile	2.6×10^{-1}	1.0×10^{-4}	2.8×10^{-2}	1.4×10^{-5}	1.0×10^{2}	5.0×10^{-2}
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	7.9×10^{-3}	3.2×10^{-6}	5.8×10^{-4}	2.9×10^{-7}	4.2×10^{-1}	2.1×10^{-4}
			95th percentile	1.7×10^{-2}	6.7×10^{-6}	1.8×10^{-3}	9.2×10^{-7}	1.8	9.0×10^{-4}
Design basis earthquake	3.9×10^{-4}	Unlikely	Mean	8.5×10^{-5}	3.4×10^{-8}	6.6×10^{-6}	3.3×10^{-9}	1.7×10^{-2}	8.6×10^{-6}
			95th percentile	2.0×10^{-4}	8.0×10^{-8}	2.2×10^{-5}	1.1×10^{-8}	7.7×10^{-2}	3.8×10^{-5}
Beyond-design-basis fire	1.7×10^{-2}	Beyond extremely unlikely	Mean	1.1×10^{-2}	4.4×10^{-6}	4.8×10^{-4}	2.4×10^{-7}	8.8×10^{-1}	4.4×10^{-4}
			95th percentile	4.0×10^{-2}	1.6×10^{-5}	1.6×10^{-3}	7.8×10^{-7}	3.7	1.9×10^{-3}
Beyond-design-basis earthquake	3.9×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	2.5×10^{1}	1.0×10^{-2}	1.1	5.5×10^{-4}	2.0×10^{3}	1.0
			95th percnetile	9.2×10^{1}	3.7×10^{-2}	3.6	1.8×10^{-3}	8.5×10^{3}	4.3

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] (or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Note: Calculated using the source terms in the pit conversion data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1998c.

Table K–15. Accident Impacts of Ceramic Immobilization Facility in New Construction and DWPF at SRS (Hybrid Case)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	5.3×10^{-3}	2.1×10^{-6}	4.6×10^{-4}	2.3×10^{-7}	3.5×10^{-1}	1.8×10^{-4}
			95th percentile	1.0×10^{-2}	4.2×10^{-6}	1.6×10^{-3}	7.8×10^{-7}	1.5	7.5×10^{-4}
Explosion in HYDOX furnace	3.4×10^{-3}	Unlikely	Mean	3.9×10^{-4}	1.6×10^{-7}	5.3×10^{-5}	2.7×10^{-8}	1.6×10^{-1}	7.8×10^{-5}
			95th percentile	8.6×10^{-4}	3.4×10^{-7}	1.6×10^{-4}	8.1×10^{-8}	7.1×10^{-1}	3.5×10^{-4}
Glovebox fire (calcining furnace)	2.7×10^{-7}	Extremely unlikely	Mean	3.1×10^{-8}	1.2×10^{-11}	4.2×10^{-9}	2.1×10^{-12}	1.2×10^{-5}	6.2×10^{-9}
			95th percentile	6.8×10^{-8}	2.7×10^{-11}	1.3×10^{-8}	6.5×10^{-12}	5.6×10^{-5}	2.8×10^{-8}
Hydrogen explosion	3.8×10^{-4}	Unlikely	Mean	4.3×10^{-5}	1.7×10^{-8}	5.9×10^{-6}	2.9×10^{-9}	1.7×10^{-2}	8.6×10^{-6}
			95th percentile	9.5×10^{-5}	3.8×10^{-8}	1.8×10^{-5}	9.0×10^{-9}	7.8×10^{-2}	3.8×10^{-5}
Glovebox fire (sintering furnace)	1.5×10^{-6}	Extremely unlikely	Mean	1.7×10^{-7}	6.9×10^{-11}	2.4×10^{-8}	1.2×10^{-11}	6.9×10^{-5}	3.4×10^{-8}
			95th percentile	3.8×10^{-7}	1.5×10^{-10}	7.2×10^{-8}	3.6×10^{-11}	3.1×10^{-4}	1.5×10^{-7}
Design basis earthquake	3.8×10^{-4}	Unlikely	Mean	4.4×10^{-5}	1.7×10^{-8}	5.9×10^{-6}	3.0×10^{-9}	1.7×10^{-2}	8.7×10^{-6}
			95th percentile	9.6×10^{-5}	3.8×10^{-8}	1.8×10^{-5}	9.1×10^{-9}	7.9×10^{-2}	3.9×10^{-5}
Beyond-design-basis fire	2.1×10^{-3}	Beyond extremely unlikely	Mean	1.7×10^{-3}	6.9×10^{-7}	7.6×10^{-5}	3.8×10^{-8}	1.4×10^{-1}	7.0×10^{-5}
			95th percentile	6.3×10^{-3}	2.5×10^{-6}	2.5×10^{-4}	1.2×10^{-7}	5.8×10^{-1}	2.9×10^{-4}
Beyond-design-basis earthquake	1.9×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.6×10^{1}	6.3×10^{-3}	6.8×10^{-1}	3.4×10^{-4}	1.3×10^{3}	6.3×10^{-1}
			95th percentile	5.7×10^{1}	2.3×10^{-2}	2.2	1.1×10^{-3}	5.3×10^{3}	2.7

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility; HYDOX, hydride oxidation.

Note: Calculated using the source terms in the immobilization data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1999c.

Table K–16. Accident Impacts of Glass Immobilization Facility in New Construction and DWPF at SRS (Hybrid Case)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	5.3×10^{-3}	2.1×10^{-6}	4.6×10^{-4}	2.3×10^{-7}	3.5×10^{-1}	1.8×10^{-4}
			95th percentile	1.0×10^{-2}	4.2×10^{-6}	1.6×10^{-3}	7.8×10^{-7}	1.5	7.5×10^{-4}
Explosion in HYDOX furnace	3.4×10^{-3}	Unlikely	Mean	3.9×10^{-4}	1.6×10^{-7}	5.3×10^{-5}	2.7×10^{-8}	1.6×10^{-1}	7.8×10^{-5}
			95th percentile	8.6×10^{-4}	3.4×10^{-7}	1.6×10^{-4}	8.1×10^{-8}	7.1×10^{-1}	3.5×10^{-4}
Glovebox fire (calcining furnace)	2.7×10^{-7}	Extremely unlikely	Mean	3.1×10^{-8}	1.2×10^{-11}	4.2×10^{-9}	2.1×10^{-12}	1.2×10^{-5}	6.2×10^{-9}
			95th percentile	6.8×10^{-8}	2.7×10^{-11}	1.3×10^{-8}	6.5×10^{-12}	5.6×10^{-5}	2.8×10^{-8}
Hydrogen explosion	3.8×10^{-4}	Unlikely	Mean	4.3×10^{-5}	1.7×10^{-8}	5.9×10^{-6}	2.9×10^{-9}	1.7×10^{-2}	8.6×10^{-6}
			95th percentile	9.5×10^{-5}	3.8×10^{-8}	1.8×10^{-5}	9.0×10^{-9}	7.8×10^{-2}	3.8×10^{-5}
Melter eruption	1.4×10^{-6}	Unlikely	Mean	1.6×10^{-7}	6.4×10^{-11}	2.2×10^{-8}	1.1×10^{-11}	6.4×10^{-5}	3.2×10^{-8}
			95th percentile	3.5×10^{-7}	1.4×10^{-10}	6.7×10^{-8}	3.3×10^{-11}	2.9×10^{-4}	1.4×10^{-7}
Melter spill	3.3×10^{-7}	Unlikely	Mean	3.8×10^{-8}	1.5×10^{-11}	5.1×10^{-9}	2.6×10^{-12}	1.5×10^{-5}	7.5×10^{-9}
			95th percentile	8.3×10^{-8}	3.3×10^{-11}	1.6×10^{-8}	7.8×10^{-12}	6.8×10^{-5}	3.3×10^{-8}
Design basis earthquake	3.3×10^{-4}	Unlikely	Mean	3.8×10^{-5}	1.5×10^{-8}	5.2×10^{-6}	2.6×10^{-9}	1.5×10^{-2}	7.6×10^{-6}
			95th percentile	8.3×10^{-5}	3.3×10^{-8}	1.6×10^{-5}	7.9×10^{-9}	6.9×10^{-2}	3.4×10^{-5}
Beyond-design-basis fire	3.8×10^{-4}	Beyond extremely unlikely	Mean	3.1×10^{-4}	1.2×10^{-7}	1.4×10^{-5}	6.8×10^{-9}	2.5×10^{-2}	1.3×10^{-5}
			95th percentile	1.1×10^{-3}	4.6×10^{-7}	4.4×10^{-5}	2.2×10^{-8}	1.0×10^{-1}	5.3×10^{-5}
Beyond-design-basis earthquake	1.7×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.4×10^{1}	5.5×10^{-3}	6.0×10^{-1}	3.0×10^{-4}	1.1×10^{3}	5.5×10^{-1}
			95th percentile	5.0×10^{1}	2.0×10^{-2}	2.0	9.8×10^{-4}	4.6×10^{3}	2.3

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility; HYDOX, hydride oxidation.

Note: Calculated using the source terms in the immobilization data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1999d.

Table K–17. Accident Impacts of Ceramic Immobilization Facility in New Construction and DWPF at SRS (50-t Case)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[s]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	5.3×10^{-3}	2.1×10^{-6}	4.6×10^{-4}	2.3×10^{-7}	3.5×10^{-1}	1.8×10^{-4}
			95th percentile	1.0×10^{-2}	4.2×10^{-6}	1.6×10^{-3}	7.8×10^{-7}	1.5	7.5×10^{-4}
Explosion in HYDOX furnace	3.4×10^{-3}	Unlikely	Mean	3.9×10^{-4}	1.6×10^{-7}	5.3×10^{-5}	2.7×10^{-8}	1.6×10^{-1}	7.8×10^{-5}
			95th percentile	8.6×10^{-4}	3.4×10^{-7}	1.6×10^{-4}	8.1×10^{-8}	7.1×10^{-1}	3.5×10^{-4}
Glovebox fire (calcining furnace)	2.7×10^{-7}	Extremely unlikely	Mean	3.1×10^{-8}	1.2×10^{-11}	4.2×10^{-9}	2.1×10^{-12}	1.2×10^{-5}	6.2×10^{-9}
			95th percentile	6.8×10^{-8}	2.7×10^{-11}	1.3×10^{-8}	6.5×10^{-12}	5.6×10^{-5}	2.8×10^{-8}
Hydrogen explosion	3.8×10^{-4}	Unlikely	Mean	4.3×10^{-5}	1.7×10^{-8}	5.9×10^{-6}	2.9×10^{-9}	1.7×10^{-2}	8.6×10^{-6}
			95th percentile	9.5×10^{-5}	3.8×10^{-8}	1.8×10^{-5}	9.0×10^{-9}	7.8×10^{-2}	3.8×10^{-5}
Glovebox fire (sintering furnace)	1.5×10^{-6}	Extremely unlikely	Mean	1.7×10^{-7}	6.9×10^{-11}	2.4×10^{-8}	1.2×10^{-11}	6.9×10^{-5}	3.4×10^{-8}
			95th percentile	3.8×10^{-7}	1.5×10^{-10}	7.2×10^{-8}	3.6×10^{-11}	3.1×10^{-4}	1.5×10^{-7}
Design basis earthquake	3.8×10^{-4}	Unlikely	Mean	4.0×10^{-5}	1.6×10^{-8}	5.5×10^{-6}	2.7×10^{-9}	1.6×10^{-2}	8.0×10^{-6}
			95th percentile	8.8×10^{-5}	3.5×10^{-8}	1.7×10^{-5}	8.3×10^{-9}	7.2×10^{-2}	3.6×10^{-5}
Beyond-design-basis fire	2.1×10^{-3}	Beyond extremely unlikely	Mean	1.7×10^{-3}	6.9×10^{-7}	7.6×10^{-5}	3.8×10^{-8}	1.4×10^{-1}	7.0×10^{-5}
			95th percentile	6.3×10^{-3}	2.5×10^{-6}	2.5×10^{-4}	1.2×10^{-7}	5.8×10^{-1}	2.9×10^{-4}
Beyond-design-basis earthquake	1.9×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.4×10^{1}	5.7×10^{-3}	6.3×10^{-1}	3.1×10^{-4}	1.2×10^{3}	5.8×10^{-1}
			95th percentile	5.3×10^{1}	2.1×10^{-2}	2.1	1.0×10^{-3}	4.8×10^{3}	2.5

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility; HYDOX, hydride oxidation.

Note: Calculated using the source terms in the immobilization data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1999c.

Table K–18. Accident Impacts of Glass Immobilization Facility in New Construction and DWPF at SRS (50-t Case)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	5.3×10^{-3}	2.1×10^{-6}	4.6×10^{-4}	2.3×10^{-7}	3.5×10^{-1}	1.8×10^{-4}
			95th percentile	1.0×10^{-2}	4.2×10^{-6}	1.6×10^{-3}	7.8×10^{-7}	1.5	7.5×10^{-4}
Explosion in HYDOX furnace	3.4×10^{-3}	Unlikely	Mean	3.9×10^{-4}	1.6×10^{-7}	5.3×10^{-5}	2.7×10^{-8}	1.6×10^{-1}	7.8×10^{-5}
			95th percentile	8.6×10^{-4}	3.4×10^{-7}	1.6×10^{-4}	8.1×10^{-8}	7.1×10^{-1}	3.5×10^{-4}
Glovebox fire (calcining furnace)	2.7×10^{-7}	Extremely unlikely	Mean	3.1×10^{-8}	1.2×10^{-11}	4.2×10^{-9}	2.1×10^{-12}	1.2×10^{-5}	6.2×10^{-9}
			95th percentile	6.8×10^{-8}	2.7×10^{-11}	1.3×10^{-8}	6.5×10^{-12}	5.6×10^{-5}	2.8×10^{-8}
Hydrogen explosion	3.8×10^{-4}	Unlikely	Mean	4.3×10^{-5}	1.7×10^{-8}	5.9×10^{-6}	2.9×10^{-9}	1.7×10^{-2}	8.6×10^{-6}
			95th percentile	9.5×10^{-5}	3.8×10^{-8}	1.8×10^{-5}	9.0×10^{-9}	7.8×10^{-2}	3.8×10^{-5}
Melter eruption	1.4×10^{-6}	Unlikely	Mean	1.6×10^{-7}	6.4×10^{-11}	2.2×10^{-8}	1.1×10^{-11}	6.4×10^{-5}	3.2×10^{-8}
			95th percentile	3.5×10^{-7}	1.4×10^{-10}	6.7×10^{-8}	3.3×10^{-11}	2.9×10^{-4}	1.4×10^{-7}
Melter spill	3.3×10^{-7}	Unlikely	Mean	3.8×10^{-8}	1.5×10^{-11}	5.1×10^{-9}	2.6×10^{-12}	1.5×10^{-5}	7.5×10^{-9}
			95th percentile	8.3×10^{-8}	3.3×10^{-11}	1.6×10^{-8}	7.8×10^{-12}	6.8×10^{-5}	3.3×10^{-8}
Design basis earthquake	3.3×10^{-4}	Unlikely	Mean	3.5×10^{-5}	1.4×10^{-8}	4.8×10^{-6}	2.4×10^{-9}	1.4×10^{-2}	7.0×10^{-6}
			95th percentile	7.7×10^{-5}	3.1×10^{-8}	1.5×10^{-5}	7.3×10^{-9}	6.4×10^{-2}	3.1×10^{-5}
Beyond-design-basis fire	3.8×10^{-4}	Beyond extremely unlikely	Mean	3.1×10^{-4}	1.2×10^{-7}	1.4×10^{-5}	6.8×10^{-9}	2.5×10^{-2}	1.3×10^{-5}
			95th percentile	1.1×10^{-3}	4.6×10^{-7}	4.4×10^{-5}	2.2×10^{-8}	1.0×10^{-1}	5.3×10^{-5}
Beyond-design-basis earthquake	1.7×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.3×10^{1}	5.1×10^{-3}	5.6×10^{-1}	2.8×10^{-4}	1.0×10^{3}	5.1×10^{-1}
			95th percentile	4.7×10^{1}	1.9×10^{-2}	1.8	9.1×10^{-4}	4.3×10^{3}	2.2

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: DWPF, Defense Waste Processing Facility; HYDOX, hydride oxidation.

Note: Calculated using the source terms in the immobilization data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1999d.

Table K–19. Accident Impacts of New MOX Facility at SRS

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	8.8×10^{-2}	3.5×10^{-5}	4.0×10^{-3}	2.0×10^{-6}	3.9	1.9×10^{-3}
			95th percentile	3.0×10^{-1}	1.2×10^{-4}	1.6×10^{-2}	8.0×10^{-6}	1.6×10^{1}	8.0×10^{-3}
Explosion in sintering furnace	5.5×10^{-4}	Extremely unlikely	Mean	3.3×10^{-4}	1.3×10^{-7}	1.2×10^{-5}	6.1×10^{-9}	2.9×10^{-2}	1.4×10^{-5}
			95th percentile	1.2×10^{-3}	4.6×10^{-7}	4.8×10^{-5}	2.4×10^{-8}	1.2×10^{-1}	6.1×10^{-5}
Ion exchange exotherm	2.4×10^{-5}	Unlikely	Mean	1.4×10^{-5}	5.7×10^{-9}	5.3×10^{-7}	2.7×10^{-10}	1.2×10^{-3}	6.2×10^{-7}
			95th percentile	5.1×10^{-5}	2.0×10^{-8}	2.1×10^{-6}	1.1×10^{-9}	5.3×10^{-3}	2.7×10^{-6}
Fire	4.0×10^{-6}	Unlikely	Mean	2.4×10^{-6}	9.5×10^{-10}	8.9×10^{-8}	4.4×10^{-11}	2.1×10^{-4}	1.0×10^{-7}
			95th percentile	8.4×10^{-6}	3.4×10^{-9}	3.5×10^{-7}	1.8×10^{-10}	8.8×10^{-4}	4.4×10^{-7}
Spill	5.0×10^{-6}	Extremely unlikely	Mean	3.0×10^{-6}	1.2×10^{-9}	1.1×10^{-7}	5.6×10^{-11}	2.6×10^{-4}	1.3×10^{-7}
			95th percentile	1.1×10^{-5}	4.2×10^{-9}	4.4×10^{-7}	2.2×10^{-10}	1.1×10^{-3}	5.5×10^{-7}
Design basis earthquake	7.9×10^{-5}	Unlikely	Mean	4.6×10^{-5}	1.9×10^{-8}	1.7×10^{-6}	8.7×10^{-10}	4.1×10^{-3}	2.0×10^{-6}
			95th percentile	1.7×10^{-4}	6.6×10^{-8}	6.9×10^{-6}	3.5×10^{-9}	1.7×10^{-2}	8.7×10^{-6}
Beyond-design-basis fire	6.0×10^{-2}	Beyond extremely unlikely	Mean	3.9×10^{-2}	1.6×10^{-5}	1.7×10^{-3}	8.5×10^{-7}	3.2	1.6×10^{-3}
			95th percentile	1.4×10^{-1}	5.7×10^{-5}	5.6×10^{-3}	2.8×10^{-6}	1.3×10^{1}	6.7×10^{-3}
Beyond-design-basis earthquake	9.5×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	6.2×10^{1}	2.5×10^{-2}	2.7	1.4×10^{-3}	5.0×10^{3}	2.5
			95th percentile	2.3×10^{2}	9.1×10^{-2}	8.8	4.4×10^{-3}	2.1×10^{4}	1.1×10^{1}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or at the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Note: Calculated using the source terms in the MOX data report, as modified in Appendix K.1.5.1, site meteorology, projected regional population, and the MACCS2 computer code.

Source: UC 1998d.

K.6 LEAD ASSEMBLY ACCIDENT IMPACTS

Tables K–20 through K–25 present the source terms and accident impacts of fabrication of lead assemblies for the candidate sites.

Table K–20. Accident Impacts of Lead Assembly Fabrication at ANL–W

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	2.5×10^{-2}	9.9×10^{-6}	1.3×10^{-3}	6.4×10^{-7}	6.8×10^{-2}	3.4×10^{-5}
			95th percentile	7.7×10^{-2}	3.1×10^{-5}	4.9×10^{-3}	2.5×10^{-6}	3.4×10^{-1}	1.7×10^{-4}
Design basis earthquake	3.9×10^{-5}	Unlikely	Mean	5.0×10^{-5}	2.0×10^{-8}	2.0×10^{-6}	1.0×10^{-9}	5.1×10^{-4}	2.6×10^{-7}
			95th percentile	1.7×10^{-4}	6.8×10^{-8}	7.7×10^{-6}	3.9×10^{-9}	2.7×10^{-3}	1.4×10^{-6}
Design basis fire	1.7×10^{-5}	Unlikely	Mean	2.2×10^{-5}	8.6×10^{-9}	8.7×10^{-7}	4.4×10^{-10}	2.2×10^{-4}	1.1×10^{-7}
			95th percentile	7.4×10^{-5}	2.9×10^{-8}	3.3×10^{-6}	1.7×10^{-9}	1.2×10^{-3}	5.9×10^{-7}
Design basis explosion	2.7×10^{-4}	Extremely unlikely	Mean	3.5×10^{-4}	1.4×10^{-7}	1.4×10^{-5}	7.1×10^{-9}	3.6×10^{-3}	1.8×10^{-6}
			95th percentile	1.2×10^{-3}	4.8×10^{-7}	5.4×10^{-5}	2.7×10^{-8}	1.9×10^{-2}	9.6×10^{-6}
Beyond-design-basis earthquake	1.1×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	2.0×10^{1}	7.9×10^{-3}	7.7×10^{-1}	3.8×10^{-4}	1.5×10^{2}	7.4×10^{-2}
			95th percentile	7.4×10^{1}	3.0×10^{-2}	2.8	1.4×10^{-3}	7.9×10^{2}	3.9×10^{-1}
Beyond-design-basis fire	2.4×10^{-2}	Beyond extremely unlikely	Mean	4.4×10^{-2}	1.8×10^{-5}	1.7×10^{-3}	8.5×10^{-7}	3.3×10^{-1}	1.6×10^{-4}
			95th percentile	1.7×10^{-1}	6.6×10^{-5}	6.2×10^{-3}	3.1×10^{-6}	1.8	8.7×10^{-4}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: ANL–W, Argonne National Laboratory–West.

Source: O'Connor et al. 1998a.

Table K–21. Accident Impacts of Lead Assembly Fabrication at Hanford (27-m Stack Height)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatalities[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	1.4×10^{-2}	5.6×10^{-6}	1.4×10^{-3}	6.8×10^{-7}	8.7×10^{-1}	4.3×10^{-4}
			95th percentile	4.0×10^{-2}	1.6×10^{-5}	4.2×10^{-3}	2.1×10^{-6}	5.5	2.7×10^{-3}
Design basis earthquake	3.9×10^{-5}	Unlikely	Mean	1.6×10^{-5}	6.5×10^{-9}	1.9×10^{-6}	9.6×10^{-10}	2.9×10^{-3}	1.4×10^{-6}
			95th percentile	4.8×10^{-5}	1.9×10^{-8}	6.3×10^{-6}	3.2×10^{-9}	1.7×10^{-2}	8.6×10^{-6}
Design basis fire	1.7×10^{-5}	Unlikely	Mean	7.1×10^{-6}	2.8×10^{-9}	8.4×10^{-7}	4.2×10^{-10}	1.2×10^{-3}	6.2×10^{-7}
			95th percentile	2.1×10^{-5}	8.4×10^{-9}	2.7×10^{-6}	1.4×10^{-9}	7.4×10^{-3}	3.7×10^{-6}
Design basis explosion	2.7×10^{-4}	Extremely unlikely	Mean	1.1×10^{-4}	4.6×10^{-8}	1.4×10^{-5}	6.8×10^{-9}	2.0×10^{-2}	1.0×10^{-5}
			95th percentile	3.4×10^{-4}	1.4×10^{-7}	4.4×10^{-5}	2.2×10^{-8}	1.2×10^{-1}	6.0×10^{-5}
Beyond-design-basis earthquake	1.1×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.9×10^{1}	7.5×10^{-3}	7.4×10^{-1}	3.7×10^{-4}	1.0×10^{3}	5.1×10^{-1}
			95th percentile	7.1×10^{1}	8×10^{-2}	2.7	1.3×10^{-3}	6.5×10^{3}	3.2
Beyond-design-basis fire	2.4×10^{-2}	Beyond extremely unlikely	Mean	4.1×10^{-2}	1.7×10^{-5}	1.6×10^{-3}	8.2×10^{-7}	2.2	1.1×10^{-3}
			95th percentile	1.6×10^{-1}	6.3×10^{-5}	5.9×10^{-3}	3.0×10^{-6}	1.4×10^{1}	7.2×10^{-3}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Source: O'Connor et al. 1998b.

Table K–22. Accident Impacts of Lead Assembly Fabrication at Hanford (36-m Stack Height)

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatalities[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	1.1×10^{-2}	4.4×10^{-6}	1.2×10^{-3}	6.0×10^{-7}	8.5×10^{-1}	4.3×10^{-4}
			95th percentile	3.3×10^{-2}	1.3×10^{-5}	3.4×10^{-3}	1.7×10^{-6}	5.4	2.7×10^{-3}
Design basis earthquake	3.9×10^{-5}	Unlikely	Mean	9.1×10^{-6}	3.6×10^{-9}	1.7×10^{-6}	8.5×10^{-10}	2.8×10^{-3}	1.4×10^{-6}
			95th percentile	3.5×10^{-5}	1.4×10^{-8}	5.2×10^{-6}	2.6×10^{-9}	1.7×10^{-2}	8.5×10^{-6}
Design basis fire	1.7×10^{-5}	Unlikely	Mean	3.9×10^{-6}	1.6×10^{-9}	7.3×10^{-7}	3.7×10^{-10}	1.2×10^{-3}	6.1×10^{-7}
			95th percentile	1.5×10^{-5}	6.0×10^{-9}	2.3×10^{-6}	1.1×10^{-9}	7.4×10^{-3}	3.7×10^{-6}
Design basis explosion	2.7×10^{-4}	Extremely unlikely	Mean	6.4×10^{-5}	2.5×10^{-8}	1.2×10^{-5}	5.9×10^{-9}	2.0×10^{-2}	9.9×10^{-6}
			95th percentile	2.4×10^{-4}	9.8×10^{-8}	3.7×10^{-5}	1.8×10^{-8}	1.2×10^{-1}	5.9×10^{-5}
Beyond-design-basis earthquake	1.1×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.9×10^{1}	7.5×10^{-3}	7.4×10^{-1}	3.7×10^{-4}	1.0×10^{3}	5.1×10^{-1}
			95th percentile	7.1×10^{1}	2.8×10^{-2}	2.7	1.3×10^{-3}	6.5×10^{3}	3.2
Beyond-design-basis fire	2.4×10^{-2}	Beyond extremely unlikely	Mean	4.1×10^{-2}	1.7×10^{-5}	1.6×10^{-3}	8.2×10^{-7}	2.2	1.1×10^{-3}
			95th percentile	1.6×10^{-1}	6.3×10^{-5}	5.9×10^{-3}	3.0×10^{-6}	1.4×10^{1}	7.2×10^{-3}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (single noninvolved worker at a distance of 1,000 m [3,281 ft] or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Source: O'Connor et al. 1998b.

Table K–23. Accident Impacts of Lead Assembly Fabrication at LLNL

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatalities[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	7.0×10^{-2}	2.8×10^{-5}	6.7×10^{-2}	3.3×10^{-5}	1.1×10^{1}	5.7×10^{-3}
			95th percentile	5.3×10^{-1}	2.1×10^{-4}	5.3×10^{-1}	2.7×10^{-4}	6.4×10^{1}	3.2×10^{-2}
Design basis earthquake	3.9×10^{-5}	Unlikely	Mean	1.8×10^{-4}	7.2×10^{-8}	2.2×10^{-4}	1.1×10^{-7}	5.5×10^{-2}	2.8×10^{-5}
			95th percentile	1.3×10^{-3}	5.3×10^{-7}	1.7×10^{-3}	8.5×10^{-7}	2.8×10^{-1}	1.4×10^{-4}
Design basis fire	1.7×10^{-5}	Unlikely	Mean	7.8×10^{-5}	3.1×10^{-8}	9.3×10^{-5}	4.7×10^{-8}	2.4×10^{-2}	1.2×10^{-5}
			95th percentile	5.7×10^{-4}	2.3×10^{-7}	7.4×10^{-4}	3.7×10^{-7}	1.2×10^{-1}	6.0×10^{-5}
Design basis explosion	2.7×10^{-4}	Extremely unlikely	Mean	1.3×10^{-3}	5.0×10^{-7}	1.5×10^{-3}	7.6×10^{-7}	3.9×10^{-1}	1.9×10^{-4}
			95th percentile	9.3×10^{-3}	3.7×10^{-6}	1.2×10^{-2}	6.0×10^{-6}	1.9	9.7×10^{-4}
Beyond-design-basis fire	2.4×10^{-2}	Beyond extremely unlikely	Mean	1.4×10^{-1}	5.7×10^{-5}	1.3×10^{-1}	6.7×10^{-5}	3.5×10^{1}	1.8×10^{-2}
			95th percentile	1.1	4.3×10^{-4}	1.1	5.3×10^{-4}	1.7×10^{2}	8.7×10^{-2}

[a] The closest point to the site boundary is 563 m (1,847 ft), which is less than 1,000 m (3,281 ft). Therefore, doses to the onsite worker are assessed at 1,000 m [3,281 ft] only in those directions where the site boundary is greater than 1,000 m (3,281 ft) away. For other directions, doses are assessed at the site boundary.

[b] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m (3,281 ft) or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: LLNL, Lawrence Livermore National Laboratory.

Note: A beyond-design-basis earthquake was not evaluated for Building 332 at LLNL because extensive analyses of the seismic hazard at the site and the response of the building to those hazards indicate that the scenario is beyond the range of "reasonably foreseeable." Current estimates are that the frequency of collapse is on the order of 1.0×10^{-7} per year or less.

Source: Murray 1998; O'Connor et al. 1998c.

Table K–24. Accident Impacts of Lead Assembly Fabrication at LANL

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatalities[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	2.2×10^{-2}	8.7×10^{-6}	1.1×10^{-2}	5.7×10^{-6}	1.5	7.5×10^{-4}
			95th percentile	6.5×10^{-2}	2.6×10^{-5}	2.8×10^{-2}	1.4×10^{-5}	6.6	3.2×10^{-3}
Design basis earthquake	3.9×10^{-5}	Unlikely	Mean	3.4×10^{-5}	1.4×10^{-8}	1.3×10^{-5}	6.5×10^{-9}	3.1×10^{-3}	1.5×10^{-6}
			95th percentile	1.1×10^{-4}	4.3×10^{-8}	4.1×10^{-5}	2.1×10^{-8}	1.4×10^{-2}	6.8×10^{-6}
Design basis fire	1.7×10^{-5}	Unlikely	Mean	1.5×10^{-5}	6.0×10^{-9}	5.7×10^{-6}	2.8×10^{-9}	1.3×10^{-3}	6.7×10^{-7}
			95th percentile	4.7×10^{-5}	1.9×10^{-8}	1.8×10^{-5}	9.0×10^{-9}	5.9×10^{-3}	2.9×10^{-6}
Design basis explosion	2.7×10^{-4}	Extremely unlikely	Mean	2.4×10^{-4}	9.7×10^{-8}	9.2×10^{-5}	4.6×10^{-8}	2.2×10^{-2}	1.1×10^{-5}
			95th percentile	7.6×10^{-4}	3.0×10^{-7}	2.9×10^{-4}	1.5×10^{-7}	9.5×10^{-2}	4.8×10^{-5}
Beyond-design-basis earthquake	1.1×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	1.3×10^{1}	5.3×10^{-3}	4.4	2.2×10^{-3}	9.5×10^{2}	4.8×10^{-1}
			95th percentile	5.1×10^{1}	2.1×10^{-2}	1.4×10^{1}	7.0×10^{-3}	4.2×103	2.1
Beyond-design-basis fire	2.4×10^{-2}	Beyond extremely unlikely	Mean	2.9×10^{-2}	1.2×10^{-5}	9.7×10^{-3}	4.9×10^{-6}	2.1	1.1×10^{-3}
			95th percentile	1.1×10^{-1}	4.6×10^{-5}	3.1×10^{-2}	1.6×10^{-5}	9.2	4.6×10^{-3}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Key: LANL, Los Alamos National Laboratory.

Source: O'Connor et al. 1998d.

Table K–25. Accident Impacts of Lead Assembly Fabrication at SRS H-Area

				Impacts on Noninvolved Worker		Impacts at Site Boundary		Impacts on Population Within 80 km	
Accident	**Source Term (g)**	**Frequency (per year)**	**Meteorology**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatalities[a]**	**Dose (person-rem)**	**Latent Cancer Fatalities[b]**
Criticality	1.0×10^{19} fissions	Extremely unlikely	Mean	5.2×10^{-3}	2.1×10^{-6}	3.4×10^{-4}	1.7×10^{-7}	3.0×10^{-1}	1.5×10^{-4}
			95th percentile	1.0×10^{-2}	4.0×10^{-6}	9.3×10^{-4}	4.6×10^{-7}	1.3	6.5×10^{-4}
Design basis earthquake	3.9×10^{-5}	Unlikely	Mean	3.5×10^{-6}	1.4×10^{-9}	4.4×10^{-7}	2.2×10^{-10}	1.3×10^{-3}	6.3×10^{-7}
			95th percentile	7.8×10^{-6}	3.1×10^{-9}	1.3×10^{-6}	6.7×10^{-10}	5.6×10^{-3}	2.8×10^{-6}
Design basis fire	1.7×10^{-5}	Unlikely	Mean	1.5×10^{-6}	6.1×10^{-10}	1.9×10^{-7}	9.5×10^{-11}	5.4×10^{-4}	2.7×10^{-7}
			95th percentile	3.4×10^{-6}	1.3×10^{-9}	5.8×10^{-7}	2.9×10^{-10}	2.4×10^{-3}	1.2×10^{-6}
Design basis explosion	2.7×10^{-4}	Extremely unlikely	Mean	2.5×10^{-5}	9.9×10^{-9}	3.1×10^{-6}	1.5×10^{-9}	8.8×10^{-3}	4.4×10^{-6}
			95th percentile	5.5×10^{-5}	2.2×10^{-8}	9.5×10^{-6}	4.7×10^{-9}	3.9×10^{-2}	2.0×10^{-5}
Beyond-design-basis earthquake	1.1×10^{1}	Extremely unlikely to beyond extremely unlikely	Mean	7.1	2.9×10^{-3}	2.0×10^{-1}	9.8×10^{-5}	5.1×10^{2}	2.6×10^{-1}
			95th percentile	2.6×10^{1}	1.0×10^{-2}	8.8×10^{-1}	4.4×10^{-4}	2.2×10^{3}	1.1
			95th percentile						
Beyond-design-basis fire	2.4×10^{-2}	Beyond extremely unlikely	Mean	1.6×10^{-2}	6.3×10^{-6}	4.4×10^{-4}	2.2×10^{-7}	1.1	5.7×10^{-4}
			95th percentile	5.8×10^{-2}	2.3×10^{-5}	2.0×10^{-3}	9.8×10^{-7}	4.9	2.4×10^{-3}

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single noninvolved worker at a distance of 1,000 m [3,281 ft] or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes that the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) if exposed to the indicated dose. The value assumes that the accident has occurred.

Source: O'Connor et al. 1998e.

K.7 COMMERCIAL REACTOR ACCIDENT ANALYSIS

K.7.1 Introduction

Postulated design basis and beyond-design-basis accidents were analyzed using the MACCS2 computer code for each of the three proposed reactor sites, Catawba Nuclear Station, McGuire Nuclear Station, and North Anna Power Station (NRC 1990, SNL 1997). Only those accidents with the potential for substantial radiological releases to the environment were evaluated. Two design basis accidents (a loss-of-coolant accident [LOCA] and a fuel-handling accident) and four beyond-design-basis accidents (a steam generator tube rupture, an early containment failure, a late containment failure, and an interfacing systems loss-of-coolant accident [ISLOCA]) meet this criteria. Each of these accidents was analyzed twice, once using the current low-enriched uranium (LEU) core, and again, assuming a partial (40 percent) MOX core. Doses (consequences) and risks to a noninvolved worker, the offsite MEI, and the general public within 80 km (50 mi) of each plant from each accident scenario were calculated. These results were then compared, by plant, for each postulated accident.

The MEI dose is calculated at the exclusion area boundary of each plant. The exclusion area boundary is that area surrounding the reactor in which the reactor licensee has the authority to determine all activities, including exclusion or removal of personnel and property from the area. This area may be traversed by a highway, railroad, or waterway, provided any one of these is not so close to the facility that it interferes with normal operation of the facility, and appropriate and effective arrangements are made to control traffic and protect public health and safety on the highway, railroad, or waterway in an emergency. There are generally no residences within an exclusion area. However, if there were residents, they would be subject to ready removal in case of necessity. Activities unrelated to operation of the reactor may be permitted in an exclusion area under appropriate limitations, provided that no significant hazards to the public health and safety would result.

K.7.2 Reactor Accident Identification and Quantification

Catawba and McGuire are similar plants, both with two 3,411-MWt Westinghouse pressurized water reactors (PWRs) with ice condenser containments. Because of these similarities, the release paths and mitigating mechanisms for the two plants are almost identical. The conservative assumptions of the NRC regulatory guidance produce identical radiological releases to the environment (source terms) for the two plants. However, site-specific population and meteorological inputs result in different consequences from the two plants. The North Anna site has two 2,893 MWt Westinghouse PWRs with subatmospheric containments.

Both the design basis and beyond-design-basis accidents were identified from plant documents. Design basis accidents were selected by reviewing the Updated Final Safety Analysis Report (UFSAR) for each plant (Duke Power 1996, 1997; Virginia Power 1998). Beyond-design-basis accidents were identified from the submittals (Duke Power 1991, 1992; Virginia Power 1992) in response to the NRC's Generic Letter 88–20 (NRC 1988), which required reactor licensees to perform Individual Plant Examinations (IPEs) for severe accident vulnerabilities. Source terms for each accident for LEU-only cores were identified from these documents, source terms for partial MOX cores were developed based on these LEU source terms, and analyses were performed assuming both the current LEU-only cores and partial MOX cores containing 40 percent MOX fuel and 60 percent LEU fuel. After the source term is developed, the consequences (in terms of LCFs and prompt fatalities) can be determined. To determine the risk, however, the frequency (probability) of occurrence of the accident must be determined. Then the consequences are multiplied by the frequency to determine the risk.

For this analysis, the frequencies of occurrence for the accidents with a 40 percent MOX core are assumed to be the same as those with an LEU core. The National Academy of Sciences reported (NAS 1995) that "any approach to the use of MOX fuel in U.S. power reactors must and will receive a thorough, formal safety review before it is licensed. While we are not in a position to predict what if any modifications to existing reactor types

will be required as a result of such licensing reviews, we expect that the final outcome will be certification that whatever LWR type is chosen will be able, with modifications if appropriate, to operate within prevailing reactivity and thermal margins using sufficient plutonium loadings to accomplish the disposition mission in a small number of reactors. We believe, further, that under these circumstances no important overall adverse impact of MOX use ion the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities will involve factors not related to fuel composition and hence unaffected by the use of MOX rather than LEU fuel." Considering the National Academy of Sciences statements, the lack of empirical data, and the degree of uncertainty associated with accident frequencies, this analysis assumes that the accident frequencies are the same for a 40 percent MOX core as those for a 100 percent LEU core.

K.7.2.1 MOX Source Term Development

MOX source terms were developed by applying the calculated ratio for individual radioisotopes present in both the MOX and LEU cores to the source term for each of the LEU accidents. MOX source term development required several steps. The analysis assumes that the initial isotopic composition of the plutonium is that delivered to the MOX facility for fabrication into MOX fuel. The MOX facility includes a polishing step that removes impurities, including americium 241, a major contributor to the dose from plutonium 235. This analysis conservatively assumes that the polishing step reduces the americium 241 to 1 part per million (ppm), then ages the plutonium for 1 year after polishing prior to being loaded into a reactor. Table K–26 provides the assumed isotopic composition for the plutonium source material.

Table K–26. Isotopic Breakdown of Plutonium

Isotope	Prior to Polishing (wt %)	After Polishing and Aging (wt %)
Plutonium 236	<1 ppb	1 ppb
Plutonium 238	0.03	0.03
Plutonium 239	92.2	93.28
Plutonium 240	6.46	6.54
Plutonium 241	0.05	0.05
Plutonium 242	0.1	0.1
Americium 241	0.9	25 ppm

Key: ppb, parts per billion; ppm, parts per million; wt %, weight percent.

The SPD EIS assumes that MOX fuel would be fabricated using depleted uranium (0.25 weight percent uranium 235) (White 1997). The MOX assemblies are assumed to be 4.37 percent plutonium/americium and the LEU assemblies are assumed to be 4.37 percent uranium 235. To simulate a normal plant refueling cycle, the MOX portion was assumed to be 50 percent once-burned and 50 percent twice-burned assemblies. The LEU portion of the MOX was assumed to be 33.3 percent once-burned, 33.3 percent twice-burned, and 33.3 percent thrice-burned assemblies. The LEU-only cores were assumed to be equally divided between once-, twice-, and thrice-burned assemblies. All analyses assumed end-of-cycle inventories to produce the highest consequences. Fuel cycles were based on an 18-month refueling schedule with a 40-day downtime between cycles. The source terms for the LEU-only accident analyses were those identified in plant documents. Source terms for the partial MOX cores were developed using the isotopic ratios in Table K–27 provided by Oak Ridge National Laboratory (ORNL 1999). The MOX core inventory for each isotope was divided by the LEU core inventory for that isotope to provide a MOX/LEU ratio for each isotope. These ratios were then applied to LEU releases for each accident to estimate the MOX releases.

Table K–27. MOX/LEU Core Inventory Isotopic Ratios

Isotope	Ratio	Isotope	Ratio	Isotope	Ratio
Americium 241	2.06	Krypton 85m	0.86	Strontium 91	0.86
Antimony 127	1.15	Krypton 87	0.85	Strontium 92	0.89
Antimony 129	1.07	Krypton 88	0.84	Technetium 99m	0.99
Barium 139	0.97	Lanthanum 140	0.97	Tellurium 127	1.16
Barium 140	0.98	Lanthanum 141	0.97	Tellurium 127m	1.20
Cerium 141	0.98	Lanthanum 142	0.97	Tellurium 129	1.08
Cerium 143	0.95	Molybdenum 99	0.99	Tellurium 129m	1.09
Cerium 144	0.91	Neodymium 147	0.98	Tellurium 131m	1.11
Cesium 134	0.85	Neptunium 239	0.99	Tellurium 132	1.01
Cesium 136	1.09	Niobium 95	0.94	Tritium	0.95
Cesium 137	0.91	Plutonium 238	0.76	Xenon 131m	1.02
Cobalt 58	0.86	Plutonium 239	2.06	Xenon 133	1.00
Cobalt 60	0.72	Plutonium 240	2.20	Xenon 133m	1.01
Curium 242	1.43	Plutonium 241	1.79	Xenon 135	1.28
Curium 244	0.94	Praseodymium 143	0.95	Xenon 135m	1.04
Iodine 131	1.03	Rhodium 105	1.19	Xenon 138	0.96
Iodine 132	1.02	Rubidium 86	0.77	Yttrium 90	0.76
Iodine 133	1.00	Ruthenium 103	1.11	Yttrium 91	0.85
Iodine 134	0.98	Ruthenium 105	1.18	Yttrium 92	0.89
Iodine 135	1.00	Ruthenium 106	1.28	Yttrium 93	0.91
Krypton 83m	0.89	Strontium 89	0.83	Zirconium 95	0.94
Krypton 85	0.78	Strontium 90	0.75	Zirconium 97	0.98

The NRC licensing process will thoroughly review precise enrichments and fuel management schemes. The enrichments and fuel management schemes analyzed in the SPD EIS were chosen as realistic upper bounds. The accidents also assumed a maximum 40 percent MOX core. Taken together, these assumptions are sufficiently conservative to account for uncertainties associated with the MOX/LEU ratios.

K.7.2.2 Meteorological Data

Meteorological data for each specific reactor site were used. The meteorological data characteristic of the site region are described by 1 year of hourly data (8,760 measurements). This data includes wind speed, wind direction, atmospheric stability, and rainfall (DOE 1999b).

K.7.2.3 Population Data

The population distribution around each plant was determined using 1990 census data extrapolated to the year 2015. The population was then split into segments that correspond to the chosen polar coordinate grid. The polar coordinate grid for this analysis consists of 12 radial intervals aligned with the 16 compass directions. For Catawba and McGuire, the distances (in kilometers) of the 12 radial intervals are: 0.64, 0.762, 1.61, 3.22, 4.83, 6.44, 8.05, 16.09, 32.18, 48.27, 64.36, 80.45. For North Anna, these distances (in kilometers) are: 0.64, 1.350, 1.61, 3.22, 4.83, 6.44, 8.05, 16.09, 32.18, 48.27, 64.36, 80.45. The first of the 12 segments represents the location of the noninvolved worker and the second is the location of the site boundary. Projected population data for the year 2015 corresponding to the grid segments at Catawba, McGuire, and North Anna are presented in Tables K–28, K–29, and K–30, respectively.

Table K–28. Projected Catawba Population for Year 2015

Direction	Distance in Kilometers From Release Point											
	0.64	**0.762**	**1.61**	**3.22**	**4.83**	**6.44**	**8.05**	**16.09**	**32.18**	**48.27**	**64.36**	**80.45**
N	0	0	6	14	73	469	800	2,642	51,540	31,112	49,551	33,306
NNE	0	0	6	112	250	334	362	9,394	173,036	135,229	102,558	66,298
NE	0	0	7	119	239	394	595	6,442	212,814	143,650	22,571	20,108
ENE	0	0	11	81	504	1,409	1,042	5,842	72,488	52,784	32,588	10,919
E	0	0	21	5	863	1,059	570	7,959	12,144	27,800	22,844	10,995
ESE	0	0	23	47	295	388	679	7,449	8,607	18,196	12,293	9,290
SE	0	0	20	25	284	893	1,060	37,300	14,279	14,657	12,776	3,692
SSE	0	0	6	80	278	706	891	16,458	10,249	4,190	1,599	11,376
S	0	0	24	165	275	606	819	4,529	4,457	15,062	1,579	1,874
SSW	0	0	17	137	245	238	346	2,268	3,563	2,093	12,970	4,245
SW	0	0	20	114	162	208	267	5,538	9,559	2,040	11,272	12,302
WSW	0	0	21	84	159	205	257	2,493	4,756	8,947	31,712	80,518
W	0	0	23	113	202	272	345	4,979	6,978	17,182	26,070	35,091
WNW	0	0	23	103	199	283	363	3,011	17,814	32,751	29,031	8,706
NW	0	0	23	96	165	274	363	3,099	65,856	28,474	33,819	45,793
NNW	0	0	21	85	125	1,153	1,296	3,404	48,431	24,219	32,537	52,530

Table K–29. Projected McGuire Population for Year 2015

Direction	Distance in Kilometers From Release Point											
	0.64	**0.762**	**1.61**	**3.22**	**4.83**	**6.44**	**8.05**	**16.09**	**32.18**	**48.27**	**64.36**	**80.45**
N	0	0	44	0	269	110	203	3,153	14,870	28,254	12,987	15,726
NNE	0	0	28	0	124	569	1,728	9,493	21,903	12,317	24,826	43,937
NE	0	0	30	0	5	832	1,016	6,944	30,939	44,064	55,186	44,691
ENE	0	0	184	144	405	684	591	4,289	51,928	37,373	13,039	28,160
E	0	0	217	180	448	381	493	7,575	26,495	21,992	16,957	14,635
ESE	0	0	65	69	271	381	507	7,423	119,345	79,039	36,221	26,552
SE	0	0	15	59	130	244	273	8,387	219,183	204,614	46,100	24,527
SSE	0	0	15	59	99	138	100	9,530	90,900	95,688	79,859	15,954
S	0	0	14	83	165	182	165	6,429	35,178	21,241	41,638	9,071
SSW	0	0	18	101	169	240	221	3,261	61,514	29,814	10,774	9,327
SW	0	0	26	101	169	236	305	5,338	20,195	31,064	47,641	43,067
WSW	0	0	19	101	169	236	296	2,741	20,873	17,334	15,815	15,077
W	6	0	14	112	184	252	312	2,048	24,932	11,715	12,705	43,357
WNW	0	0	3	101	444	811	338	2,187	14,985	57,262	74,708	60,953
NW	0	0	0	224	200	1,005	793	4,260	8,528	22,380	26,093	12,511
NNW	0	0	0	0	4	0	36	1,989	8,570	40,993	13,101	10,686

Table K–30. Projected North Anna Population for Year 2015

Direction	Distance in Kilometers From Release Point											
	0.64	**1.35**	**1.61**	**3.22**	**4.83**	**6.44**	**8.05**	**16.09**	**32.18**	**48.27**	**64.36**	**80.45**
N	0	0	0	39	98	122	153	576	7,816	5,149	17,803	42,233
NNE	0	0	2	37	58	160	206	1,236	7,634	10,765	25,976	172,658
NE	0	0	2	30	43	94	100	1,122	38,833	90,820	34,429	77,097
ENE	0	0	0	15	103	40	64	1,373	5,822	6,693	11,426	17,324
E	0	0	0	17	112	42	34	1,183	6,128	5,175	1,839	4,296
ESE	0	0	2	7	17	97	135	950	5,595	5,454	5,161	7,909
SE	0	0	1	18	77	9	12	575	2,989	19,343	59,057	76,396
SSE	0	0	3	50	29	27	40	919	5,051	15,259	443,326	392,420
S	0	0	0	42	20	30	40	669	4,413	11,763	20,254	34,375
SSW	0	0	0	10	12	54	65	554	3,098	5,803	5,616	6,222
SW	0	0	0	4	14	54	86	1,186	2,678	2,845	5,482	4,576
WSW	0	0	0	19	42	31	63	1,381	4,402	6,729	8,905	8,094
W	0	0	0	31	24	24	29	466	2,883	4,529	109,205	21,748
WNW	0	0	0	30	79	52	29	606	2,725	8,371	17,931	9,934
NW	0	0	1	35	52	92	81	662	3,327	11,604	11,816	3,090
NNW	0	0	0	28	64	13	25	771	4,725	9,040	25,534	10,041

K.7.2.4 Design Basis Events

Design basis events are defined by the American Nuclear Society as Condition IV occurrences or limiting faults. Condition IV occurrences are faults which are not expected to take place, but are postulated because their consequences would include the potential for the release of substantial radioactive material. These are the most serious events which must be designed against and represent limiting design cases.

The accident analyses presented in the UFSARs are conservative design basis analyses and therefore the dose consequences are bounding (i.e., a realistically based analysis would result in lower doses). The results, however, provide a comparison of the potential consequences resulting from design basis accidents. The consequences also provide insight into which design basis accidents should be analyzed in an environmental impact statement, such as the SPD EIS. After reviewing the UFSAR accident analyses, the design basis accidents chosen for evaluation in the SPD EIS are a large-break LOCA and a fuel-handling accident.

LOCA. A design basis large-break LOCA was chosen for evaluation because it is the limiting reactor design basis accident at each of the three plants. The analysis was performed in accordance with the methodology and assumptions in Regulatory Guide 1.4 (NRC 1974). The large-break LOCA is defined as a break equivalent in size to a double-ended rupture of the largest pipe of the reactor coolant system. Following a postulated double-ended rupture of a reactor coolant pipe, the emergency core cooling system keeps cladding temperatures well below melting, ensuring that the core remains intact and in a coolable geometry. As a result of the increase in cladding temperature and rapid depressurization of the core, however, some cladding failure may occur in the hottest regions of the core. Thus, a fraction of the fission products accumulated in the pellet-cladding gap may be released to the reactor coolant system and thereby to the containment. Although no core melting would occur for the design basis LOCA, a gross release of fission products is evaluated. The only postulated mechanism for such a release would require a number of simultaneous and extended failures to occur in the engineered safety feature systems, producing severe physical degradation of core geometry and partial melting of the fuel.

Development of the LOCA source term is based on the conservative assumptions specified in Regulatory Guide 1.4. Consistent with this Regulatory Guide, 100 percent of the noble gas inventory and 25 percent of the iodine inventory in the core are assumed to be immediately available for leakage from the primary containment.

However, all of this radioactivity is not released directly to the environment because there are a number of mitigating mechanisms which can delay or retain radioisotopes. The principal mechanism, the primary containment, substantially restricts the release rate of the radioisotopes. Following a postulated LOCA, another potential source of fission product release to the environment is the leakage of radioactive water from engineered safety feature equipment located outside containment. The fission products could then be released from the water into the atmosphere, resulting in offsite radiological consequences that contribute to the total dose from the LOCA.

The LOCA radiological consequence analysis for the LEU cores was performed assuming a ground-level release based on offeror-supplied plant-specific radioisotope release data. All possible leak paths (containment, bypass, and the emergency core cooling system) were included. Were a LOCA to occur, a substantial percentage of the releases would be expected to be elevated, which would be expected to reduce the consequences from those calculated in this analysis. To analyze the accident for a partial MOX core, the LEU isotopic activity was multiplied by the MOX/LEU ratios (from Table K–27) to provide a MOX core activity for each isotope. The LEU and MOX LOCA releases for Catawba and McGuire are provided in Table K–31 and for North Anna in Table K–32.

Table K–31. Catawba and McGuire LOCA Source Term

Isotope	LEU LOCA Release (Ci)	MOX/LEU Ratio	40% MOX Core Release (Ci)
Iodine 131	2.42×10^{4}	1.03	2.49×10^{4}
Iodine 132	7.76×10^{2}	1.02	7.92×10^{2}
Iodine 133	3.22×10^{3}	1.00	3.22×10^{3}
Iodine 134	6.55×10^{2}	0.98	6.42×10^{2}
Iodine 135	2.51×10^{3}	1.00	2.51×10^{3}
Krypton 83m	3.62×10^{3}	0.89	3.22×10^{3}
Krypton 85	1.96×10^{4}	0.78	1.53×10^{4}
Krypton 85m	1.96×10^{4}	0.86	1.68×10^{4}
Krypton 87	1.04×10^{4}	0.85	8.82×10^{3}
Krypton 88	3.23×10^{4}	0.84	2.72×10^{4}
Xenon 131m	2.79×10^{4}	1.02	2.84×10^{4}
Xenon 133	2.33×10^{6}	1.00	2.33×10^{6}
Xenon 133m	3.45×10^{4}	1.01	3.49×10^{4}
Xenon 135	2.90×10^{5}	1.28	3.71×10^{5}
Xenon 135m	1.40×10^{3}	1.04	1.46×10^{3}
Xenon 138	7.21×10^{3}	0.96	6.92×10^{3}

Key: LEU, low-enriched uranium; LOCA, loss-of-coolant accident.

Fuel-Handling Accident. The fuel-handling accident analysis was performed in a conservative manner, in accordance with Regulatory Guide 1.25 methodology (NRC 1972). In the fuel-handling accident scenario, a spent fuel assembly is dropped. The drop results in a breach of the fuel rod cladding, and a portion of the volatile fission gases from the damaged fuel rods is released. A fuel-handling accident would realistically result in only a fraction of the fuel rods being damaged. However, consistent with NRC methodology, all the fuel rods in the assembly are assumed to be damaged.

Table K–32. North Anna LOCA Source Term

Isotope	LEU LOCA Release (Ci)	MOX/LEU Ratio	40% MOX Core Release (Ci)
Iodine 131	3.68×10^{2}	1.03	3.79×10^{2}
Iodine 132	3.45×10^{2}	1.02	3.52×10^{2}
Iodine 133	5.87×10^{2}	1.00	5.87×10^{2}
Iodine 134	5.10×10^{2}	0.98	5.00×10^{2}
Iodine 135	5.01×10^{2}	1.00	5.01×10^{2}
Krypton 83m	4.26×10^{2}	0.89	3.79×10^{2}
Krypton 85	5.06×10^{1}	0.78	3.95×10^{1}
Krypton 85m	1.48×10^{3}	0.86	1.27×10^{3}
Krypton 87	2.22×10^{3}	0.85	1.89×10^{3}
Krypton 88	3.50×10^{3}	0.84	2.94×10^{3}
Xenon 131m	3.20×10^{1}	1.02	3.26×10^{1}
Xenon 133	6.91×10^{3}	1.00	6.91×10^{3}
Xenon 133m	1.70×10^{2}	1.01	1.72×10^{2}
Xenon 135	6.37×10^{3}	1.28	8.15×10^{3}
Xenon 135m	6.72×10^{2}	1.04	6.99×10^{2}
Xenon 138	1.90×10^{3}	0.96	1.82×10^{3}

Key: LEU, low-enriched uranium; LOCA, loss-of-coolant accident.

The accident is assumed to occur at the earliest time fuel-handling operations may begin after shutdown as identified in each plant's Technical Specifications.[8] The assumed accident time is 72 hr after shutdown at Catawba and McGuire. North Anna Technical Specifications require a minimum of 150 hr between shutdown and the initiation of fuel movement, but assumed an accident time of 100 hr.

As assumed in Regulatory Guide 1.25, the damaged assembly is the highest powered assembly being removed from the reactor. The values for individual fission product inventories in the damaged assembly are calculated assuming full power operation at the end of core life immediately preceding shutdown. All of the gap activity in the damaged rods is assumed to be released to the spent fuel pool. Noble gases released to the spent fuel pool are immediately released at ground level to the environment, but the water in the spent fuel pool greatly reduces the iodine available for release to the environment. It is assumed that all of the iodine escaping from the spent fuel pool is released to the environment at ground level over a 2-hr time period through the fuel-handling building ventilation system. The Catawba and McGuire UFSARs assume iodine filter efficiencies of 95 percent for both the inorganic and organic species. The North Anna UFSAR assumes a filter efficiency of 90 percent for the inorganic iodine and 70 percent for the organic iodine. The LEU and MOX source terms for Catawba and McGuire are provided in Table K–33 and the source terms for North Anna are provided in Table K–34.

The frequencies for the design basis LOCAs, obtained from the IPEs, are Catawba, 7.50×10^{-6}; McGuire, 1.50×10^{-5}; and North Anna, 2.10×10^{-5}. The frequencies of the fuel-handling accidents were estimated in lieu of plant-specific data. For conservatism, a frequency of 1×10^{-4} was chosen for the analysis.

[8] Technical Specifications are plant-specific operating conditions that control safety-related parameters of plant operation. Technical Specifications are part of the operating license and require an operating license amendment to change.

Table K–33. Catawba and McGuire Fuel-Handling Accident Source Term

	LEU	MOX/LEU	40% MOX Core
Nuclide	**Release (Ci)**	**Ratio**	**Release**
Iodine 131	3.83×10^{1}	1.03	3.94×10^{1}
Iodine 132	5.55×10^{1}	1.02	5.66×10^{1}
Iodine 133	8.00×10^{1}	1.00	8.00×10^{1}
Iodine 134	8.80×10^{1}	0.98	8.62×10^{1}
Iodine 135	7.55×10^{1}	1.00	7.55×10^{1}
Krypton 83m	9.47×10^{3}	0.89	8.43×10^{3}
Krypton 85	1.11×10^{3}	0.78	8.66×10^{2}
Krypton 85m	2.16×10^{4}	0.86	1.86×10^{4}
Krypton 87	4.04×10^{4}	0.85	3.43×10^{4}
Krypton 88	5.58×10^{4}	0.84	4.69×10^{4}
Xenon 133	1.60×10^{5}	1.00	1.60×10^{5}
Xenon 133m	4.81×10^{3}	1.01	4.86×10^{3}
Xenon 135	1.65×10^{5}	1.28	2.11×10^{5}
Xenon 135m	2.96×10^{4}	1.04	3.08×10^{4}
Xenon 138	1.34×10^{5}	0.96	1.29×10^{5}

Key: LEU, low-enriched uranium; LOCA, loss-of-coolant accident.

Table K–34. North Anna Fuel-Handling Accident Source Term

	LEU	MOX/LEU	40% MOX Core
Nuclide	**Release (Ci)**	**Ratio**	**Release**
Iodine 131	9.05×10^{1}	1.03	9.32×10^{1}
Iodine 132	1.37×10^{2}	1.02	1.40×10^{2}
Iodine 133	2.01×10^{2}	1.00	2.01×10^{2}
Iodine 134	2.36×10^{2}	0.98	2.31×10^{2}
Iodine 135	1.82×10^{2}	1.00	1.82×10^{2}
Krypton 85	2.60×10^{3}	0.78	2.03×10^{3}
Krypton 85m	2.65×10^{4}	0.86	2.28×10^{4}
Krypton 87	5.10×10^{4}	0.85	4.34×10^{4}
Krypton 88	7.25×10^{4}	0.84	6.09×10^{4}
Xenon 131m	4.56×10^{2}	1.02	4.65×10^{2}
Xenon 133	1.36×10^{5}	1.00	1.36×10^{5}
Xenon 133m	3.46×10^{3}	1.01	3.49×10^{3}
Xenon 135	3.70×10^{4}	1.28	4.74×10^{4}
Xenon 135m	3.74×10^{4}	1.04	3.89×10^{4}
Xenon 138	1.22×10^{5}	0.96	1.17×10^{5}

Key: LEU, low-enriched uranium; LOCA, loss-of-coolant accident.

K.7.2.5 Beyond-Design-Basis Events

Beyond-design-basis accidents (severe reactor accidents) are less likely to occur than reactor design basis accidents. In the reactor design basis accidents, the mitigating systems are assumed to be available. In the severe reactor accidents, even though the initiating event could be a design basis event (e.g., large-break LOCA), additional failures of mitigating systems would cause some degree of physical deterioration of the fuel in the

reactor core and a possible breach of the containment structure leading to the direct release of radioactive materials to the environment.

The beyond-design-basis accident evaluation in the SPD EIS included a review of each plant's IPE. In 1988, the NRC required all licensees of operating plants to perform IPEs for severe accident vulnerabilities (Generic Letter 88-20) (NRC 1988), and indicated that a Probabalistic Risk Assessment (PRA) would be an acceptable approach to performing the IPE. A PRA evaluates, in full detail (quantitatively), the consequences of all potential events caused by the operating disturbances (known as internal initiating events) within each plant. The state-of-the-art PRA uses realistic criteria and assumptions in evaluating the accident progression and the systems required to mitigate each accident.

A plant-specific PRA for severe accident vulnerabilities starts with identification of initiating events (i.e., challenges to normal plant operation or accidents) that require successful mitigation to prevent core damage. These events are grouped into initiating event classes that have similar characteristics and require the same overall plant response.

Event trees are developed for each initiating event class. These event trees depict the possible sequence of events that could occur during the plant's response to each initiating event class. The trees delineate the possible combinations (sequences) of functional and/or system successes and failures that lead to either successful mitigation of the initiating event or core damage. Functional and/or system success criteria are developed based on the plant response to the class of accident sequences. Failure modes of systems that are functionally important to preventing core damage are modeled. This modeling process is usually done with fault trees that define the combinations of equipment failures, equipment outages, and human errors that could cause the failure of systems to perform the desired functions.

Quantification of the event trees leads to hundreds, or even thousands, of different end states representing various accident sequences that are either mitigated or lead to core damage. Each accident sequence and its associated end state has a unique "signature" because of the particular combination of system successes and failures. These end states are grouped together into plant damage states, each of which collects sequences for which the progression of core damage, the release of fission products from the fuel, the status of containment and its systems, and the potential for mitigating source terms are similar. The sum of all core damage accident sequences will then represent an estimate of plant core damage frequency. The analysis of core damage frequency calculations is called a Level 1 PRA, or front-end analysis.

Next, an analysis of accident progression, containment loading[9] resulting from the accident, and the structural response to the accident loading is performed. The primary objective of this analysis, which is called a Level 2 PRA, is to characterize the potential for, and magnitude of, a release of radioactive material from the reactor fuel to the environment, given the occurrence of an accident that damages the core. The analysis includes an assessment of containment performance in response to a series of severe accidents. Analysis of the progression of an accident (an accident sequence within a plant damage state) generates a time history of loads imposed on the containment pressure boundary. These loads would then be compared against the containment's structural performance limits. If the loads exceed the performance limits, the containment would be expected to fail; conversely, if the containment performance limits exceed the calculated loads, the containment would be expected to survive. Four modes of containment failure are defined: containment isolation failure, containment bypass, early containment failure, and late containment failure.

[9] Challenges to containment integrity such as elevated temperature or pressure are referred to as containment loading.

The magnitude of the radioactive release to the atmosphere in an accident is dependent on the timing of the reactor vessel failure and the containment failure. To determine the magnitude of the release, a containment event tree representing the time sequence of major phenomenological events that could occur during the formation and relocation of core debris (after core melt), availability of the containment heat removal system, and the expected mode of containment failures (i.e., bypass, early, and late), is developed. A reduced set of plant damage states is defined by culling the lower frequency plant damage states into higher frequency ones that have relatively similar severity and consequence potential. This condensed set is known as the key plant damage states. These key plant damage states would then become the initiating events for the containment event tree. The outcome of each sequence in this event tree represents a specific release category. Release categories that can be represented by similar source terms are grouped. Source terms associated with various release categories describe the fractional releases for representative radionuclide groups, as well as the timing, duration, and energy of release.

Beyond-design-basis accidents evaluated in the SPD EIS included only those scenarios that lead to containment bypass or failure because the public and environmental consequences would be significantly less for accident scenarios that do not lead to containment bypass or failure. The accidents evaluated consisted of a steam generator tube rupture, an early containment failure, a late containment failure, and an ISLOCA.

Steam Generator Tube Rupture. A beyond-design-basis steam generator tube rupture induced by high temperatures represents a containment bypass event. Analyses have indicated a potential for very high gas temperatures in the reactor coolant system during accidents involving core damage when the primary system is at high pressure. The high temperature could fail the steam generator tubes. As a result of the tube rupture, the secondary side may be exposed to full Reactor Coolant System pressures. These pressures are likely to cause relief valves to lift on the secondary side as they are designed to do. If these valves fail to close after venting, an open pathway from the reactor vessel to the environment can result.

Early Containment Failure. This accident is defined as the failure of containment prior to or very soon (within a few hours) after breach of the reactor vessel. A variety of mechanisms such as direct contact of core debris with the containment, rapid pressure and temperature loads, hydrogen combustion, and fuel-coolant interactions can cause structural failure of the containment. Early containment failure can be important because it tends to result in shorter warning times for initiating public protective measures, and because radionuclide releases would generally be more severe than if the containment fails late.

Late Containment Failure. A late containment failure involves structural failure of the containment several hours after breach of the reactor vessel. A variety of mechanisms such as gradual pressure and temperature increase, hydrogen combustion, and basemat melt-through by core debris can cause late containment failure.

ISLOCA. An ISLOCA refers to a class of accidents in which the reactor coolant system pressure boundary interfacing with a supporting system of lower design pressure is breached. If this occurs, the lower pressure system will be overpressurized and could rupture outside the containment. This failure would establish a flow path directly to the environment or, sometimes, to another building of small-pressure capacity.

For each of the proposed reactors, an assessment was made of the pre-accident inventories of each radioactive species in the reactor fuel, using information on the thermal power and refueling cycles. For the source term and offsite consequence analysis, the radioactive species were collected into groups that exhibit similar chemical behavior. The following groups represent the radionuclides considered to be most important to offsite consequences: noble gases, iodine, cesium, tellurium, strontium, ruthenium, lanthanum, cerium, and barium.

The LEU end-of-cycle isotopic activities (inventories) were multiplied by the MOX/LEU ratio to provide a MOX end-of-cycle activity for each isotope. The LEU and MOX core activities for Catawba and McGuire are provided in Table K–35. The activities for North Anna are provided in Table K–36.

Table K–35. Catawba and McGuire End-of-Cycle Core Activities

Isotope	LEU Core Activity (Ci)	MOX/ LEU Ratio	40% MOX Core Activity (Ci)	Isotope	LEU Core Activity (Ci)	MOX/ LEU Ratio	40% MOX Core Activity (Ci)
Americium 241	3.13×10^{3}	2.06	6.45×10^{3}	Niobium 95	1.41×10^{8}	0.94	1.33×10^{8}
Antimony 127	7.53×10^{6}	1.15	8.66×10^{6}	Plutonium 238	9.90×10^{4}	0.76	7.53×10^{4}
Antimony 129	2.67×10^{7}	1.07	2.85×10^{7}	Plutonium 239	2.23×10^{4}	2.06	4.60×10^{4}
Barium 139	1.70×10^{8}	0.97	1.65×10^{8}	Plutonium 240	2.82×10^{4}	2.20	6.20×10^{4}
Barium 140	1.68×10^{8}	0.98	1.65×10^{8}	Plutonium 241	4.74×10^{6}	1.79	8.49×10^{6}
Cerium 141	1.53×10^{8}	0.98	1.50×10^{8}	Praseodymium 143	1.46×10^{8}	0.95	1.39×10^{8}
Cerium 143	1.48×10^{8}	0.95	1.41×10^{8}	Rhodium 105	5.53×10^{7}	1.19	6.58×10^{7}
Cerium 144	9.20×10^{7}	0.91	8.37×10^{7}	Rubidium 86	5.10×10^{4}	0.77	3.93×10^{4}
Cesium 134	1.17×10^{7}	0.85	9.93×10^{6}	Ruthenium 103	1.23×10^{8}	1.11	1.36×10^{8}
Cesium 136	3.56×10^{6}	1.09	3.88×10^{6}	Ruthenium 105	7.98×10^{7}	1.18	9.42×10^{7}
Cesium 137	6.53×10^{6}	0.91	5.94×10^{6}	Ruthenium 106	2.79×10^{7}	1.28	3.57×10^{7}
Cobolt 58	8.71×10^{5}	0.86	7.49×10^{5}	Strontium 89	9.70×10^{7}	0.83	8.05×10^{7}
Cobolt 60	6.66×10^{5}	0.72	4.80×10^{5}	Strontium 90	5.24×10^{6}	0.75	3.93×10^{6}
Curium 242	1.20×10^{6}	1.43	1.71×10^{6}	Strontium 91	1.25×10^{8}	0.86	1.07×10^{8}
Curium 244	7.02×10^{4}	0.94	6.60×10^{4}	Strontium 92	1.30×10^{8}	0.89	1.16×10^{8}
Iodine 131	8.66×10^{7}	1.03	8.92×10^{7}	Technetium 99m	1.42×10^{8}	0.99	1.41×10^{8}
Iodine 132	1.28×10^{8}	1.02	1.30×10^{8}	Tellurium 127	7.28×10^{6}	1.16	8.44×10^{6}
Iodine 133	1.83×10^{8}	1.00	1.83×10^{8}	Tellurium 127m	9.63×10^{5}	1.20	1.16×10^{6}
Iodine 134	2.01×10^{8}	0.98	1.97×10^{8}	Tellurium 129	2.50×10^{7}	1.08	2.70×10^{7}
Iodine 135	1.73×10^{8}	1.00	1.73×10^{8}	Tellurium 129m	6.60×10^{6}	1.09	7.20×10^{6}
Krypton 85	6.69×10^{5}	0.78	5.22×10^{5}	Tellurium 131m	1.26×10^{7}	1.11	1.40×10^{7}
Krypton 85m	3.13×10^{7}	0.86	2.69×10^{7}	Tellurium 132	1.26×10^{8}	1.01	1.27×10^{8}
Krypton 87	5.72×10^{7}	0.85	4.87×10^{7}	Xenon 133	1.83×10^{8}	1.00	1.83×10^{8}
Krypton 88	7.74×10^{7}	0.84	6.50×10^{7}	Xenon 135	3.44×10^{7}	1.28	4.40×10^{7}
Lanthanum 140	1.72×10^{8}	0.97	1.67×10^{8}	Yttrium 90	5.62×10^{6}	0.76	4.27×10^{6}
Lanthanum 141	1.57×10^{8}	0.97	1.53×10^{8}	Yttrium 91	1.18×10^{8}	0.85	1.00×10^{8}
Lanthanum 142	1.52×10^{8}	0.97	1.47×10^{8}	Yttrium 92	1.30×10^{8}	0.89	1.16×10^{8}
Molybdenum 99	1.65×10^{8}	0.99	1.63×10^{8}	Yttrium 93	1.47×10^{8}	0.91	1.34×10^{8}
Neodymium 147	6.52×10^{7}	0.98	6.39×10^{7}	Zirconium 95	1.49×10^{8}	0.94	1.40×10^{8}
Neptunium 239	1.75×10^{9}	0.99	1.73×10^{9}	Zirconium 97	1.56×10^{8}	0.98	1.53×10^{8}

Key: LEU, low-enriched uranium.

Table K–36. North Anna End-of-Cycle Core Activities

Isotope	LEU Core Activity (Ci)	MOX/ LEU Ratio	40% MOX Core Activity (Ci)	Isotope	LEU Core Activity (Ci)	MOX/ LEU Ratio	40% MOX Core Activity (Ci)
Americium 241	1.03×10^{4}	2.06	2.13×10^{4}	Plutonium 238	1.99×10^{5}	0.76	1.51×10^{5}
Antimony 127	6.36×10^{6}	1.15	7.31×10^{6}	Plutonium 239	2.70×10^{4}	2.06	5.57×10^{4}
Antimony 129	2.41×10^{7}	1.07	2.58×10^{7}	Plutonium 240	3.43×10^{4}	2.20	7.54×10^{4}
Barium 139	1.39×10^{8}	0.97	1.35×10^{8}	Plutonium 241	9.82×10^{6}	1.79	1.76×10^{7}
Barium 140	1.37×10^{8}	0.98	1.34×10^{8}	Praseodymium 143	1.17×10^{8}	0.95	1.11×10^{8}
Cerium 141	1.25×10^{8}	0.98	1.22×10^{8}	Rhodium 105	7.22×10^{7}	1.19	8.59×10^{7}
Cerium 143	1.18×10^{8}	0.95	1.12×10^{8}	Rubidium 86	1.45×10^{4}	0.77	1.12×10^{4}
Cerium 144	9.70×10^{7}	0.91	8.82×10^{7}	Rubidium 103	1.16×10^{8}	1.11	1.28×10^{8}
Cesium 134	1.28×10^{7}	0.85	1.09×10^{7}	Rubidium 105	7.84×10^{7}	1.18	9.25×10^{7}
Cesium 136	3.42×10^{6}	1.09	3.72×10^{6}	Rubidium 106	3.83×10^{7}	1.28	4.90×10^{7}
Cesium 137	8.41×10^{6}	0.91	7.66×10^{6}	Strontium 89	7.48×10^{7}	0.83	6.21×10^{7}
Curium 242	2.72×10^{6}	1.43	3.88×10^{6}	Strontium 90	6.22×10^{6}	0.75	4.66×10^{6}
Curium 244	2.75×10^{5}	0.94	2.58×10^{5}	Strontium 91	9.36×10^{7}	0.86	8.05×10^{7}
Iodine 131	7.33×10^{7}	1.03	7.55×10^{7}	Strontium 92	1.04×10^{8}	0.89	9.23×10^{7}
Iodine 132	1.07×10^{8}	1.02	1.09×10^{8}	Technetium 99m	1.26×10^{8}	0.99	1.25×10^{8}
Iodine 133	1.52×10^{8}	1.00	1.52×10^{8}	Tellurium 127	6.21×10^{6}	1.16	7.21×10^{6}
Iodine 134	1.75×10^{8}	0.98	1.71×10^{8}	Tellurium 127m	9.87×10^{5}	1.20	1.18×10^{6}
Iodine 135	1.49×10^{8}	1.00	1.49×10^{8}	Tellurium 129	2.29×10^{7}	1.08	2.47×10^{7}
Krypton 85	3.51×10^{6}	0.78	2.74×10^{6}	Tellurium 129m	4.20×10^{6}	1.09	4.58×10^{6}
Krypton 85m	8.69×10^{5}	0.86	7.48×10^{5}	Tellurium 132	1.07×10^{8}	1.01	1.08×10^{8}
Krypton 87	3.86×10^{7}	0.85	3.28×10^{7}	Xenon 133	1.59×10^{8}	1.00	1.59×10^{8}
Krypton 88	5.46×10^{7}	0.84	4.59×10^{7}	Xenon 133m	4.69×10^{6}	1.01	4.73×10^{6}
Lanthanum 140	1.42×10^{8}	0.97	1.37×10^{8}	Xenon 135	4.47×10^{7}	1.28	5.72×10^{7}
Lanthanum 141	1.28×10^{8}	0.97	1.24×10^{8}	Yttrium 90	6.21×10^{6}	0.76	4.72×10^{6}
Lanthanum 142	1.24×10^{8}	0.97	1.21×10^{8}	Yttrium 91	9.93×10^{7}	0.85	8.44×10^{7}
Molybdenum 99	1.43×10^{8}	0.99	1.42×10^{8}	Yttrium 92	1.01×10^{8}	0.89	8.97×10^{7}
Neodymium 147	5.12×10^{7}	0.98	5.02×10^{7}	Yttrium 93	1.16×10^{8}	0.91	1.05×10^{8}
Neptunium 239	1.51×10^{9}	0.99	1.50×109	Zirconium 95	1.27×10^{8}	0.94	1.20×10^{8}
Niobium 95	1.31×10^{8}	0.94	1.23×10^{8}	Zirconium 97	1.28×10^{8}	0.98	1.26×10^{8}

Key: LEU, low-enriched uranium.

The source term for each accident, taken from each plant's PRA, is described by the release height, timing, duration, and heat content of the plume, the fraction of each isotope group released, and the warning time (time when offsite officials are warned that an emergency response should be initiated). The PRAs included several release categories for each bypass and failure scenario. These release categories were screened for each accident scenario to determine which release category resulted in the highest risk. The risk was determined by multiplying the consequences by the frequency for each release category. The release category with the highest risk for each scenario was used in the SPD EIS analysis. The highest risk release category source terms for Catawba, McGuire, and North Anna are presented in Table K–37. Also included in each release category characterization is the frequency of occurrence.

The overall risk from beyond-design-basis accidents can be described by the sum of risks from all beyond-design-basis accidents. The group of accidents derived from the screening process results in the highest risks from the containment bypass and failure scenarios. The screened-out accidents in these categories not only

Table K–37. Beyond-Design-Basis Accident Source Terms

Accident	Parameters	Release Category	Frequency	Release Fractions								
				Xe/Kr	I	Cs/Rb	Te/Sb	Sr	Ru/Mo	La	Ce	Ba
CATAWBA												
SG tube rupture[a]	Time: 20 hr Duration: 1.0 hr Energy: 1.0×10^{4} cal/sec (4.2×10^{4} W) Elevation: 10.0 m Warning time: 7.5 hr	1.04	6.31×10^{-10}	1.0	7.7×10^{-1}	7.9×10^{-1}	7.3×10^{-1}	5.0×10^{-3}	9.4×10^{-2}	1.3×10^{-4}	NA	4.0×10^{-2}
Early containment failure	Time: 6.0 hr Duration: 0.5 hr Energy: 2.0×10^{7} cal/sec (8.37×10^{7} W) Elevation: 10.0 m Warning time: 5.5 hr	5.01	3.42×10^{-8}	1.0	5.5×10^{-2}	4.8×10^{-2}	3.0×10^{-2}	2.5×10^{-4}	2.2×10^{-3}	1.2×10^{-4}	NA	1.7×10^{-3}
Late containment failure	Time: 18.5 hr Duration: 0.5 hr Energy: 1.0×10^{7} cal/sec (4.2×10^{7} W) Elevation: 10.0 m Warning time: 18.0 hr	6.01	1.21×10^{-5}	1.0	3.6×10^{-3}	3.9×10^{-3}	1.8×10^{-3}	5.2×10^{-5}	3.8×10^{-4}	2.6×10^{-5}	NA	1.6×10^{-4}
Interfacing systems LOCA	Time: 6.0 hr Duration: 1.0 hr Energy: 1.0×10^{4} cal/sec (4.2×10^{4} W) Elevation: 10.0 m Warning time: 5.5 hr	2.04	6.9×10^{-8}	1.0	8.2×10^{-1}	8.2×10^{-1}	7.9×10^{-1}	5.8×10^{-2}	2.1×10^{-1}	3.1×10^{-2}	NA	1.4×10^{-1}

Table K–37. Beyond-Design-Basis Accident Source Terms (Continued)

Accident	Parameters	Release Category	Frequency	Release Fractions								
				Xe/Kr	I	Cs/Rb	Te/Sb	Sr	Ru/Mo	La	Ce	Ba
				McGUIRE								
SG tube rupture	Time: 20.0 hr Duration: 1.0 hr Energy: 1.0×10^{4} cal/sec (4.2×10^{4} W) Elevation: 10.0 m Warning time: 7.5 hr	1.04	5.81×10^{-9}	1.0	7.7×10^{-1}	7.9×10^{-1}	7.3×10^{-1}	5.0×10^{-3}	9.4×10^{-2}	1.3×10^{-4}	NA	4.0×10^{-2}
Early containment failure	Time: 6.0 hr Duration: 0.5 hr Energy: 2.0×10^{7} cal/sec (8.37×10^{7} W) Elevation: 10.0 m Warning time: 5.5 hr	5.01	9.89×10^{-8}	1.0	4.4×10^{-2}	3.5×10^{-2}	2.1×10^{-2}	1.4×10^{-4}	4.3×10^{-3}	2.0×10^{-5}	NA	1.4×10^{-3}
Late containment failure	Time: 32.0 hr Duration: 0.5 hr Energy: 1.0×10^{7} cal/sec (4.2×10^{7} W) Elevation: 10.0 m Warning time: 31.5 hr	6.01	7.21×10^{-6}	1.0	3.2×10^{-3}	2.4×10^{-3}	3.3×10^{-3}	1.0×10^{-8}	5.8×10^{-8}	1.0×10^{-9}	NA	1.8×10^{-7}
Interfacing systems LOCA	Time: 3.0 hr Duration: 1.0 hr Energy: 1.0×10^{4} cal/sec (4.2×10^{4} W) Elevation: 10.0 m Warning time: 2.0 hr	2.04	6.35×10^{-7}	1.0	7.5×10^{-1}	7.5×10^{-1}	6.6×10^{-1}	4.2×10^{-2}	1.5×10^{-1}	2.0×10^{-2}	NA	9.8×10^{-2}

Table K–37. Beyond-Design-Basis Accident Source Terms (Continued)

Accident	Parameters	Release Category	Frequency	Release Fractions								
				Xe/Kr	I	Cs/Rb	Te/Sb	Sr	Ru/Mo	La	Ce	Ba
NORTH ANNA												
SG tube rupture	Time: 20.3 hr Duration: 1.0 hr Energy: 8.48×10^{3} cal/sec (3.55×10^{4} W) Elevation: 10.0 m Warning time: 7.8 hr	24	7.38×10^{-6}	9.96×10^{-1}	5.2×10^{-1}	5.4×10^{-1}	2.6×10^{-3}/ 6.8×10^{-1}	3.4×10^{-2}	1.4×10^{-1}	5.5×10^{-5}	5.2×10^{-3}	2.1×10^{-2}
Early containment failure	Time: 3.056 hr Duration: 0.5 hr Energy: 1.696×10^{7} cal/sec (7.1×10^{7} W) Elevation: 10.0 m Warning time: 2.556 hr	7	1.60×10^{-7}	9.0×10^{-1}	7.4×10^{-2}	9.7×10^{-2}	1.4×10^{-2}/ 1.3×10^{-1}	1.5×10^{-2}	2.5×10^{-2}	8.1×10^{-6}	9.7×10^{-5}	8.7×10^{-3}
Late containment failure	Time: 8.33 hr Duration: 0.5 hr Energy: 8.48×10^{6} cal/sec (3.55×10^{7} W) Elevation: 10.0 m Warning time: 7.83 hr	9	2.46×10^{-6}	8.2×10^{-1}	2.3×10^{-6}	1.4×10^{-5}	1.6×10^{-5}/ 1.2×10^{-4}	3.2×10^{-4}	3.9×10^{-4}	1.8×10^{-11}	1.4×10^{-11}	1.3×10^{-5}
Interfacing systems LOCA[b]	Time: 5.56 hr Duration: 1.0 hr Energy: 8.48×10^{3} cal/sec (3.55×10^{4} W) Elevation: 10.0 m Warning time: 4.56 hr	23	2.40×10^{-7}	9.4×10^{-1}	2.9×10^{-1}	3.1×10^{-1}	1.6×10^{-5}/ 5.0×10^{-1}	2.3×10^{-1}	2.8×10^{-1}	3.6×10^{-4}	3.7×10^{-2}	1.5×10^{-1}

[a] McGuire data was used for the Catawba steam generator tube rupture event to compare similar scenarios.
[b] McGuire release duration, elevation, and warning time span were used for North Anna in lieu of plant-specific information.
Key: LOCA, loss-of-coolant accident; NA, not applicable; SG, steam generator.

result in lower consequences, but also have much lower probabilities, often resulting in risks several orders of magnitude lower. The other type of severe accident scenario for these reactors results in an intact containment. The risks from these events are several orders of magnitude lower than the risks from the bypass and failure scenarios. Therefore, a summation of the severe accident risks presented in the SPD EIS is a good indicator of overall risk.

Evacuation Information. This analysis conservatively assumes that 95 percent of the population within the 16-km (10-mi) emergency planning zone participated in an evacuation. It was also assumed that the five percent of the population that did not participate in the initial evacuation was relocated within 12 to 24 hr after plume passage, based on the measured concentrations of radioactivity in the surrounding area and the comparison of projected doses with Environmental Protection Agency (EPA) guidelines. Longer term countermeasures (e.g., crop or land interdiction) were based on EPA Protective Action Guides.

Each beyond-design-basis accident scenario has a warning time and a subsequent release time. The warning time is the time at which notification is given to offsite emergency response officials to initiate protective measures for the surrounding population. The release time is the time when the release to the environment begins. The minimum time between the warning time and the release time is one-half hour. The minimum time of one-half hour is enough time to evacuate onsite personnel (i.e., noninvolved workers). This also conservatively assumes that an onsite emergency has not been declared prior to initiating an offsite notification. Intact containment severe accident scenarios, which were not analyzed because of their insignificant offsite consequences, take place on an even longer time frame.

K.7.2.6 Accident Impacts

Accident impacts are presented in terms of increased risk. Increased risk is defined as the additional risk resulting from using a partial MOX core rather than an LEU core. For example, if the risk of an LCF from an accident with an LEU core is 1.0×10^{-6} and the risk of an LCF from the same accident with a MOX core is 1.1×10^{-6}, then the increased risk of an LCF is 1.0×10^{-7} ($1.1\times10^{-6} - 1.0\times10^{-6} = 1.0\times10^{-7}$).

Tables K–38 through K–43 present the consequences and risks of the postulated set of accidents at Catawba, McGuire, and North Anna, respectively. The receptors include a noninvolved worker located 640 m (0.4 mi) from the release point, the MEI, and the population within an 80-km (50-mi) radius of the reactor site. The consequences and risks are presented for both the current LEU-only and the proposed 40 percent MOX core configurations.

Table K–44 shows the ratios of accident impacts with the proposed 40 percent MOX core to the impacts with the current LEU core. This table shows that the increased risk from accidents to the surrounding population from a MOX core is, on average, less than 5 percent. For the fuel-handling accident at all three plants, the risk is reduced when using MOX fuel.

Severe accident scenarios that postulate large abrupt releases could result in prompt fatalities if the radiation dose is sufficiently high. Of the accidents analyzed in the SPD EIS, the ISLOCA and steam generator tube rupture at Catawba and McGuire, and the ISLOCA at North Anna were the only accidents that resulted in doses high enough to cause prompt fatalities. However, the number of prompt fatalities is expected to increase only for the ISLOCA scenarios. Table K–45 shows the estimated number of prompt fatalities estimated to result from these accidents.

Table K–38. Design Basis Accident Impacts for Catawba With LEU and MOX Fuels

			Impacts on Noninvolved Worker			Impacts at Site Boundary			Impacts on Population Within 80 km		
Accident	**Frequency (per year)**	**LEU or MOX Core**	**Dose (rem)**	**Probability of Latent Cancer Fatality[a]**	**Risk of Latent Cancer Fatality (over campaign)[b]**	**Dose (rem)**	**Probability of Latent Cancer Fatality[a]**	**Risk of Latent Cancer Fatality (over campaign)[b]**	**Dose (person-rem)**	**Latent Cancer Fatalities[c]**	**Risk of Latent Cancer Fatalities (over campaign)[d]**
Loss-of-coolant accident	7.50×10^{-6}	LEU	3.78	1.51×10^{-3}	1.81×10^{-7}	1.44	7.20×10^{-4}	8.64×10^{-8}	3.64×10^{3}	1.82	2.19×10^{-4}
		MOX	3.85	1.54×10^{-3}	1.86×10^{-7}	1.48	7.40×10^{-4}	8.88×10^{-8}	3.75×10^{3}	1.88	2.26×10^{-4}
Spent-fuel-handling accident[e]	1.00×10^{-4}	LEU	0.275	1.10×10^{-4}	1.78×10^{-7}	0.138	6.90×10^{-5}	1.10×10^{-7}	1.12×10^{2}	5.61×10^{-2}	8.98×10^{-5}
		MOX	0.262	1.05×10^{-4}	1.68×10^{-7}	0.131	6.55×10^{-5}	1.05×10^{-7}	1.10×10^{2}	5.48×10^{-2}	8.77×10^{-5}

[a] Likelihood (or probability) of cancer fatality for a hypothetical individual—a noninvolved worker at a distance of 640 m (2,100 ft) or the maximally exposed offsite individual at the site boundary—given exposure (762 m [2,500 ft]) to the indicated dose.

[b] Risk of cancer fatality over the estimated 16-year campaign to a hypothetical individual—a noninvolved worker at a distance of 640 m (2,100 ft) or the maximally exposed offsite individual at the site boundary (762 m [2,500 ft]).

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose.

[d] Risk of a cancer fatality over the estimated 16-year campaign in the entire offsite population out to a distance of 80 km (50 mi).

[e] Postulated design basis accidents at commercial reactors are considered extremely unlikely events. They are estimated to have a frequency of between 1.0×10^{-4} and 1.0×10^{-6} per year. Because a spent-fuel-handling accident does not have a calculated frequency associated with it, it has been estimated to have the highest frequency for the purposes of this analysis.

Key: LEU, low-enriched uranium.

Table K–39. Beyond-Design-Basis Accident Impacts for Catawba With LEU and MOX Fuels

			Impacts at Site Boundary			Impacts on Population Within 80 km		
Accident	**Frequency (per year)**	**LEU or MOX Core**	**Dose (rem)**	**Probability of Latent Cancer Fatality[a]**	**Risk of Latent Cancer Fatality (over campaign)[b]**	**Dose (person-rem)**	**Latent Cancer Fatalities[c]**	**Risk of Latent Cancer Fatalities (over campaign)[d]**
SG tube rupture[e]	6.31×10^{-10}	LEU	3.46×10^{2}	0.346	3.49×10^{-9}	5.71×10^{6}	5.20×10^{3}	5.25×10^{-5}
		MOX	3.67×10^{2}	0.367	3.71×10^{-9}	5.93×10^{6}	5.42×10^{3}	5.47×10^{-5}
Early containment failure	3.42×10^{-8}	LEU	5.97	2.99×10^{-3}	1.63×10^{-9}	7.70×10^{5}	4.62×10^{2}	2.53×10^{-4}
		MOX	6.01	3.01×10^{-3}	1.65×10^{-9}	8.07×10^{5}	4.84×10^{2}	2.66×10^{-4}
Late containment failure	1.21×10^{-5}	LEU	3.25	1.63×10^{-3}	3.15×10^{-7}	3.93×10^{5}	1.97×10^{2}	3.81×10^{-2}
		MOX	3.48	1.74×10^{-3}	3.38×10^{-7}	3.78×10^{5}	1.90×10^{2}	3.68×10^{-2}
ISLOCA	6.90×10^{-8}	LEU	1.40×10^{4}	1	1.10×10^{-6}	2.64×10^{7}	1.56×10^{4}	1.73×10^{-2}
		MOX	1.60×10^{4}	1	1.10×10^{-6}	2.96×10^{7}	1.69×10^{4}	1.87×10^{-2}

[a] Likelihood (or probability) of cancer fatality to a hypothetical individual—the maximally exposed offsite individual at the site boundary (762 m [2,500 ft])—given exposure to the indicated dose.
[b] Risk of cancer fatality over the estimated 16-year campaign to a hypothetical individual—the maximally exposed offsite individual at the site boundary (762 m [2,500 ft]).
[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose.
[d] Risk of cancer fatality over the estimated 16-year campaign in the entire offsite population out to a distance of 80 km (50 mi).
[e] McGuire timing and release fractions were used to compare like scenarios.
Key: ISLOCA, interfacing systems loss-of-coolant accident; LEU, low-enriched uranium; SG, steam generator.

Table K–40. Design Basis Accident Impacts for McGuire With LEU and MOX Fuels

			Impacts on Noninvolved Worker			Impacts at Site Boundaries			Impacts on Population Within 80 km		
Accident	**Frequency (per year)**	**LEU or MOX Core**	**Dose (rem)**	**Probability of Latent Cancer Fatality[a]**	**Risk of Latent Cancer Fatality (over campaign)[b]**	**Dose (rem)**	**Probability of Latent Cancer Fatality[a]**	**Risk of Latent Cancer Fatality (over campaign)[b]**	**Dose (person-rem)**	**Latent Cancer Fatalities[c]**	**Risk of Latent Cancer Fatalities (over campaign)[d]**
Loss-of-coolant accident	1.50×10^{-5}	LEU	5.31	2.12×10^{-3}	5.10×10^{-7}	2.28	1.14×10^{-3}	2.74×10^{-7}	3.37×10^{3}	1.69	4.06×10^{-4}
		MOX	5.46	2.18×10^{-3}	5.25×10^{-7}	2.34	1.17×10^{-3}	2.82×10^{-7}	3.47×10^{3}	1.74	4.18×10^{-4}
Spent-fuel-handling accident[e]	1.00×10^{-4}	LEU	0.392	1.57×10^{-4}	2.51×10^{-7}	0.212	1.06×10^{-4}	1.70×10^{-7}	99.1	4.96×10^{-2}	7.94×10^{-5}
		MOX	0.373	1.49×10^{-4}	2.38×10^{-7}	0.201	1.01×10^{-4}	1.62×10^{-7}	97.3	4.87×10^{-2}	7.79×10^{-5}

[a] Likelihood (or probability) of cancer fatality for a hypothetical individual–a noninvolved worker at a distance of 640 m (2,100 ft) or the maximally exposed offsite individual at the site boundary (762 m [2,500 ft])—given exposure to the indicated dose.

[b] Risk of cancer fatality over the estimated 16-year campaign to a hypothetical individual—a noninvolved worker at a distance of 640 m (2,100 ft) or the maximally exposed offsite individual at the site boundary (762 m [2,500 ft]).

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose.

[d] Risk of a cancer fatality over the estimated 16-year campaign in the entire offsite population out to a distance of 80 km (50 mi).

[e] Postulated design basis accidents at commercial reactors are considered extremely unlikely events. They are estimated to have a frequency of between 1.0×10^{-4} and 1.0×10^{-6} per year. Because a spent-fuel-handling accident does not have a calculated frequency associated with it, it has been estimated to have the highest frequency for the purposes of this analysis.

Key: LEU, low-enriched uranium.

Table K–41. Beyond-Design-Basis Accident Impacts for McGuire With LEU and MOX Fuels

			Impacts at Site Boundary			Impacts on Population Within 80 km		
Accident	**Frequency (per year)**	**LEU or MOX Core**	**Dose (rem)**	**Probability of Latent Cancer Fatality[a]**	**Risk of Latent Cancer Fatality (over campaign)[b]**	**Dose (person-rem)**	**Latent Cancer Fatalities[c]**	**Risk of Latent Cancer Fatalities (over campaign)[d]**
SG tube rupture[e]	5.81×10^{-9}	LEU	6.10×10^{2}	0.610	5.66×10^{-8}	5.08×10^{6}	4.65×10^{3}	4.32×10^{-4}
		MOX	6.47×10^{2}	0.647	6.02×10^{-8}	5.28×10^{6}	4.85×10^{3}	4.51×10^{-4}
Early containment failure	9.89×10^{-8}	LEU	12.2	6.10×10^{-3}	9.65×10^{-9}	7.90×10^{5}	4.57×10^{2}	7.23×10^{-4}
		MOX	12.6	6.30×10^{-3}	9.97×10^{-9}	8.04×10^{5}	4.67×10^{2}	7.39×10^{-4}
Late containment failure	7.21×10^{-6}	LEU	2.18	1.09×10^{-3}	1.26×10^{-7}	3.04×10^{5}	1.52×10^{2}	1.76×10^{-2}
		MOX	2.21	1.11×10^{-3}	1.28×10^{-7}	2.96×10^{5}	1.48×10^{2}	1.71×10^{-2}
ISLOCA	6.35×10^{-7}	LEU	1.95×10^{4}	1	1.02×10^{-5}	1.79×10^{7}	1.19×10^{4}	0.121
		MOX	2.19×10^{4}	1	1.02×10^{-5}	1.97×10^{7}	1.27×10^{4}	0.129

[a] Likelihood (or probability) of cancer fatality to a hypothetical individual—the maximally exposed offsite individual at the site boundary (762 m [2,500 ft])—given exposure to the indicated dose.
[b] Risk of cancer fatality over the estimated 16-year campaign to a hypothetical individual—the maximally exposed offsite individual at the site boundary (762 m [2,500 ft]).
[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose.
[d] Risk of cancer fatalities over the estimated 16-year campaign in the entire offsite population out to a distance of 80 km (50 mi).
[e] McGuire timing and release fractions were used to compare like scenarios.

Key: ISLOCA, interfacing systems loss-of-coolant accident; LEU, low-enriched uranium; SG, steam generator.

Table K–42. Design Basis Accident Impacts for North Anna With LEU and MOX Fuels

			Impacts on Noninvolved Worker			Impacts at Site Boundary			Impacts on Population Within 80 km		
Accident	**Frequency (per year)**	**LEU or MOX Core**	**Dose (rem)**	**Probability of Latent Cancer Fatality[a]**	**Risk of Latent Cancer Fatality (over campaign)[b]**	**Dose (rem)**	**Probability of Latent Cancer Fatality[a]**	**Risk of Latent Cancer Fatality (over campaign)[b]**	**Dose (person-rem)**	**Latent Cancer Fatalities[c]**	**Risk of Latent Cancer Fatalities (over campaign)[d]**
Loss-of-coolant accident	2.10×10^{-5}	LEU	0.114	4.56×10^{-5}	1.53×10^{-8}	3.18×10^{-2}	1.59×10^{-5}	5.34×10^{-9}	39.4	1.97×10^{-2}	6.62×10^{-6}
		MOX	0.115	4.60×10^{-5}	1.55×10^{-8}	3.20×10^{-2}	1.60×10^{-5}	5.38×10^{-9}	40.3	2.02×10^{-2}	6.78×10^{-6}
Spent-fuel-handling accident[e]	1.00×10^{-4}	LEU	0.261	1.04×10^{-4}	1.66×10^{-7}	9.54×10^{-2}	4.77×10^{-5}	7.63×10^{-8}	29.4	1.47×10^{-2}	2.35×10^{-5}
		MOX	0.239	9.56×10-5	1.53×10^{-7}	8.61×10^{-2}	4.31×10^{-5}	6.90×10^{-8}	27.5	1.38×10^{-2}	2.21×10^{-5}

[a] Likelihood (or probability) of cancer fatality for a hypothetical individual—a noninvolved worker at a distance of 640 m (2,100 ft) or the maximally exposed offsite individual at the site boundary (1,349 m [4,426 ft])—given exposure to the indicated dose.

[b] Risk of cancer fatality over the estimated 16-year campaign to a hypothetical individual—a noninvolved worker at a distance of 640 m (2,100 ft) or the maximally exposed offsite individual at the site boundary (1,349 m [4,426 ft]).

[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose.

[d] Risk of a cancer fatality over the estimated 16-year campaign in the entire offsite population out to a distance of 80 km (50 mi).

[e] Postulated design basis accidents at commercial reactors are considered extremely unlikely events. They are estimated to have a frequency of between 1.0×10^{-4} and 1.0×10^{-6} per year. Because a spent-fuel-handling accident does not have a calculated frequency associated with it, it has been estimated to have the highest frequency for the purposes of this analysis.

Key: LEU, low-enriched uranium.

Table K–43. Beyond-Design-Basis Accident Impacts for North Anna With LEU and MOX Fuels

			Impacts on Site Boundary			Impacts on Population Within 80 km		
Accident	Frequency (per year)	LEU or MOX Core	Dose (rem)	Probability of Latent Cancer Fatality[a]	Risk of Latent Cancer Fatality (over campaign)[b]	Dose (person-rem)	Latent Cancer Fatalities[c]	Risk of Latent Cancer Fatalities (over campaign)[d]
SG tube rupture[e]	7.38×10^{-6}	LEU	2.09×10^{2}	0.209	2.46×10^{-5}	1.73×10^{6}	1.22×10^{3}	0.144
		MOX	2.43×10^{2}	0.243	2.86×10^{-5}	1.84×10^{6}	1.33×10^{3}	0.157
Early containment failure[e]	1.60×10^{-7}	LEU	19.6	1.96×10^{-2}	5.02×10^{-8}	8.33×10^{5}	4.52×10^{2}	1.16×10^{-3}
		MOX	21.6	2.16×10^{-2}	5.54×10^{-8}	8.42×10^{5}	4.61×10^{2}	1.18×10^{-3}
Late containment failure[e]	2.46×10^{-6}	LEU	1.12	5.60×10^{-4}	2.21×10^{-8}	4.04×10^{4}	20.2	7.95×10^{-4}
		MOX	1.15	5.75×10^{-4}	2.26×10^{-8}	4.43×10^{4}	22.1	8.70×10^{-4}
ISLOCA[e]	2.40×10^{-7}	LEU	1.00×10^{4}	1	3.84×10^{-6}	4.68×10^{6}	2.98×10^{3}	1.14×10^{-2}
		MOX	1.22×10^{4}	1	3.84×10^{-6}	5.41×10^{6}	3.39×10^{3}	1.30×10^{-2}

[a] Likelihood (or probability) of cancer fatality to a hypothetical individual—the maximally exposed offsite individual at the site boundary (1,349 m [4,426 ft])—given exposure to the indicated dose.
[b] Risk of cancer fatality over the estimated 16-year campaign to a hypothetical individual—the maximally exposed offsite individual at the site boundary (1,349 m [4,426 ft]).
[c] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km (50 mi) given exposure to the indicated dose.
[d] Risk of cancer fatalities over the estimated 16-year campaign in the entire offsite population out to a distance of 80 km (50 mi).
[e] McGuire release durations and warning times were used in lieu of site specific data.
Key: ISLOCA, interfacing systems loss-of-coolant accident; LEU, low-enriched uranium; SG, steam generator.

Table K–44. Ratio of Accident Impacts for MOX-Fueled and LEU-Fueled Reactors (MOX Impacts/Uranium Impacts)

	Catawba			McGuire			North Anna		
Accident	Worker	MEI	Population	Worker	MEI	Population	Worker	MEI	Population
LOCA	1.019	1.028	1.033	1.028	1.026	1.030	1.009	1.006	1.025
FHA	0.953	0.949	0.977	0.952	0.948	0.982	0.916	0.903	0.939
SGTR	NA	1.061	1.042	NA	1.061	1.043	NA	1.163	1.090
Early	NA	1.007	1.048	NA	1.033	1.022	NA	1.102	1.020
Late	NA	1.071	0.964	NA	1.014	0.974	NA	1.027	1.094
ISLOCA	NA	1.143	1.083	NA	1.123	1.067	NA	1.220	1.138

Key: Early, early containment; FHA, fuel-handling accident; ISLOCA, interfacing systems loss-of-coolant accident; Late, late containment; LEU, low-enriched uranium; LOCA, loss-of-coolant accident; MEI, maximally exposed individual; NA, not applicable; SGTR, steam generator tube rupture.

K.7.2.6.1 Catawba

Design Basis Accidents. Table K–38 shows the risks and consequences associated with a LOCA and spent-fuel-handling accident at Catawba. The greatest risk increase to the surrounding population for a design basis accident with a MOX core configuration is approximately 3.3 percent from the LOCA. If this accident were to occur, the consequences in terms of LCFs in the surrounding population within 80 km (50 mi) would be 1.82 LCFs for an LEU core and 1.88 LCFs for a partial MOX core. The increased risk, in terms of an LCF, to the noninvolved worker is 1 in 200 million (5.0×10^{-9}) per 16-year campaign; the MEI, one 1 in 420 million (2.4×10^{-9}) per 16-year campaign; and the population, 1 in 140,000 (7.0×10^{-6}) per 16-year campaign.

Table K–45. Prompt Fatalities for MOX-Fueled and LEU-Fueled Reactors

Accident Scenario	LEU	MOX
Steam generator tube rupture		
Catawba	1	1
McGuire	1	1
North Anna	0	0
Interfacing systems loss-of-coolant accident		
Catawba	815	843
McGuire	398	421
North Anna	54	60

Key: LEU, low-enriched uranium.

Beyond-Design-Basis Accidents. Table K–39 shows the risks and consequences associated with four beyond-design-basis accidents at Catawba. Table K–45 shows prompt fatalities. The greatest risk increase to the surrounding population from a beyond-design-basis accident with a MOX core configuration is approximately 8.3 percent from the ISLOCA. If this accident were to occur, the consequences in terms of LCFs and prompt fatalities in the surrounding population within 80 km (50 mi) would be approximately 16,400 fatalities for an LEU core and 17,700 fatalities for a partial MOX core. The increased risk, in terms of an LCF, to the population is 1 in 710 (1.4×10^{-3}) per 16-year campaign. The increased risk of a prompt fatality is 1 in 32,000 (3.1×10^{-5}) per 16-year campaign.

K.7.2.6.2 McGuire

Design Basis Accidents. Table K–40 shows the risks and consequences associated with a LOCA and spent-fuel-handling accident at McGuire. The greatest risk increase to the surrounding population for a design basis accident with a MOX core configuration is 3.0 percent from the LOCA. If this accident were to occur, the consequences in terms of LCFs in the surrounding population within 80 km (50 mi) would be 1.69 LCFs for an LEU core and 1.74 LCFs for a partial MOX core. The increased risk, in terms of an LCF, to the noninvolved worker is 1 in 67 million (1.5×10^{-8}) per 16-year campaign; the MEI, 1 in 120 million (8.0×10^{-9}) per 16-year campaign; and the population, 1 in 83,000 (1.2×10^{-5}) per 16-year campaign.

Beyond-Design-Basis Accidents. Table K–41 shows the risks and consequences associated with four beyond-design-basis accidents at McGuire. Table K–45 shows prompt fatalities. The greatest risk increase to the surrounding population for a beyond-design-basis accident with a MOX core configuration is approximately 6.6 percent from the ISLOCA. If this accident were to occur, the consequences in terms of LCFs and prompt fatalities in the surrounding population within 80 km (50 mi) would be approximately 12,300 fatalities with an LEU core and 13,100 with a partial MOX core. The increased risk of an LCF to the population is 1 in 120 (8.0×10^{-3}) per 16-year campaign. The increased risk of a prompt fatality is 1 in 4,300 (2.3×10^{-4}) per 16-year campaign.

K.7.2.6.3 North Anna

Design Basis Accidents. Table K–42 shows the risks and consequences associated with a LOCA and spent-fuel-handling accident at North Anna. The greatest risk increase to the surrounding population for a design-basis-accident with a MOX core configuration is approximately 2.5 percent from the LOCA. If this accident were to occur, the consequences in terms of LCFs in the surrounding population within 80 km (50 mi) would be 1.97×10^{-2} LCF for an LEU core and 2.02×10^{-2} LCF for a partial MOX core. The increased risk, in

terms of an LCF, to the noninvolved worker is 1 in 5.0 billion (2.0×10^{-10}) per 16-year campaign; the MEI, 1 in 25 billion (4.0×10^{-11}) per 16-year campaign; and the population, 1 in 6.2 million (1.6×10^{-7}) per 16-year campaign.

Beyond-Design-Basis Accidents. Table K–43 shows the risks and consequences associated with four beyond-design-basis accidents at North Anna. Table K–45 shows prompt fatalities. The greatest risk increase to the surrounding population from a beyond-design-basis accident with a MOX core configuration is approximately 14 percent from the ISLOCA. If this accident were to occur, the consequences in terms of LCFs and prompt fatalities in the surrounding populations within 80 km (50 mi) would be approximately 3,000 fatalities for an LEU core and 3,450 fatalities for a partial MOX core. The increased risk of an LCF to the population is 1 in 620 (1.6×10^{-3}) per 16-year campaign. The increased risk of a prompt fatality is 1 in 43,000 (2.3×10^{-5}) per 16-year campaign.

K.8 REFERENCES

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Appendix L
Evaluation of Human Health Effects From Transportation

L.1 INTRODUCTION

The overland transportation of any commodity involves a risk to both transportation crew members and members of the public. This risk results directly from transportation-related accidents and indirectly from the increased levels of pollution from vehicle emissions, regardless of the cargo. The transportation of certain materials, such as hazardous or radioactive waste, can pose an additional risk due to the unique nature of the material. In order to permit a complete appraisal of the environmental impacts of the proposed action and alternatives, the human health risks associated with the overland transportation of plutonium and other hazardous materials have been assessed.

This appendix provides an overview of the approach used to assess the human health risks that may result from the overland transportation. The appendix includes a discussion of the scope of the assessment, analytical methods used for the risk assessment (i.e., computer models), important assessment assumptions, and a determination of potential transportation routes. It also presents the results of the assessment. In addition, to aid in the understanding and interpretation of the results, specific areas of uncertainty are described, with an emphasis on how the uncertainties may affect comparisons of the alternatives.

The approach used in this appendix is modeled after that used in the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (PEIS) (DOE 1996a). The fundamental assumptions used in the analysis for the *Surplus Plutonium Disposition Environmental Impact Statement* are consistent with those used in the PEIS, and the same computer codes and generic release and accident data are used.

The risk assessment results are presented in this appendix in terms of "per-shipment" risk factors, as well as for the total risks associated with each alternative. Per-shipment risk factors provide an estimate of the risk from a single hazardous material shipment between a specific origin and destination. The total risks for a given alternative are found by multiplying the expected number of shipments by the appropriate per-shipment risk factors.

L.2 SCOPE OF ASSESSMENT

The scope of the overland transportation human health risk assessment, including the alternatives and options, transportation activities, potential radiological and nonradiological impacts, transportation modes considered, and receptors, is described below. Additional details of the assessment are provided in the remaining sections of the appendix.

- Proposed Action and Alternatives—The transportation risk assessment conducted for the SPD EIS estimates the human health risks associated with the transportation of plutonium and other hazardous materials for a number of disposition alternatives.

- Radiological Impacts—For each alternative, radiological risks (i.e., those risks that result from the radioactive nature of the plutonium and other hazardous materials) are assessed for both incident-free (i.e., normal) and accident transportation conditions. The radiological risk associated with incident-free transportation conditions would result from the potential exposure of people to external radiation in the vicinity of a loaded shipment. The radiological risk from transportation accidents would come from the potential release and dispersal of radioactive material into the environment during an accident and the

subsequent exposure of people through multiple exposure pathways (i.e., exposure to contaminated ground or air, or ingestion of contaminated food).

- All radiological impacts are calculated in terms of effective dose and associated health effects in the exposed populations. The radiation dose calculated is the total effective dose equivalent, which is the sum of the effective dose equivalent from external radiation exposure and the 50-year committed effective dose equivalent from internal radiation exposure (NRC 1998). Radiation doses are presented in units of roentgen equivalent man (rem) for individuals and person-rem for collective populations. The impacts are further expressed as health risks in terms of latent cancer fatalities (LCFs) and cancer incidence in exposed populations. The health risk conversion factors (expected health effects per dose absorbed) were taken from the *1990 Recommendations of the International Commission on Radiological Protection* (ICRP 1991).

- Nonradiological Impacts—In addition to the radiological risks posed by overland transportation activities, vehicle-related risks are also assessed for nonradiological causes (i.e., related to the transport vehicles and not the radioactive cargo) for the same transportation routes. The nonradiological transportation risks are independent of the radioactive nature of the cargo and would be incurred for similar shipments of any commodity. The nonradiological risks are assessed for both incident-free and accident conditions. Nonradiological risks during incident-free transportation conditions would be caused by potential exposure to increased vehicle exhaust emissions. The nonradiological accident risk refers to the potential occurrence of transportation accidents that directly result in fatalities unrelated to the cargo. State-specific transportation fatality rates are used in the assessment. Nonradiological risks are presented in terms of estimated fatalities.

- Transportation Modes—All overland shipments were assumed to take place by truck.

- Receptors—Transportation-related risks are calculated and presented separately for workers and members of the general public. The workers considered are truck crew members involved in the actual overland transportation. The general public includes all persons who could be exposed to a shipment while it is moving or stopped enroute. Potential risks are estimated for the collective populations of exposed people, as well as for the hypothetical maximally exposed individual. The collective population risk is a measure of the radiological risk posed to society as a whole by the alternative being considered. As such, the collective population risk is used as the primary means of comparing various alternatives.

L.3 PACKAGING AND REPRESENTATIVE SHIPMENT CONFIGURATIONS

Regulations that govern the transportation of radioactive materials are designed to protect the public from the potential loss or dispersal of radioactive materials as well as from routine radiation doses during transit. The primary regulatory approach to promote safety is through the specification of standards for the packaging of radioactive materials. Because packaging represents the primary barrier between the radioactive material being transported and radiation exposure to the public and the environment, packaging requirements are an important consideration for the transportation risk assessment. Regulatory packaging requirements are discussed briefly below and in Chapter 5. In addition, the representative packaging and shipment configurations assumed for the SPD EIS are described.

L.3.1 Packaging Overview

Although several Federal and State organizations are involved in the regulation of radioactive materials transportation, primary regulatory responsibility resides with the U.S. Department of Transportation (DOT) and the U.S. Nuclear Regulatory Commission (NRC). All transportation activities must take place in accordance with

the applicable regulations of these agencies specified in Title 49 of the Code of Federal Regulations (CFR) Part 173 (DOT 1992a) and 10 CFR 71 (NRC 1996).

Transportation packaging for small quantities of radioactive materials must be designed, constructed, and maintained to contain and shield their contents during normal transport conditions. For large quantities and for more highly radioactive material, such as spent nuclear fuel or plutonium, they must contain and shield their contents in the event of severe accident conditions. The type of packaging used is determined by the total radioactive hazard presented by the material within the packaging; 10 CFR 71 (NRC 1996) provides the rules for this determination. Four basic types of packaging are used: Excepted, Industrial, Type A, and Type B. Another packaging option, Strong and Tight, is still available for some domestic shipments.

Excepted packagings are limited to transporting materials with extremely low levels of radioactivity. Industrial packagings are used to transport materials that, because of their low concentration of radioactive materials, present a limited hazard to the public and the environment. Type A packagings are designed to protect and retain their contents under normal transport conditions and must maintain sufficient shielding to limit radiation exposure to handling personnel. These packagings are used to transport radioactive materials with higher concentrations or amounts of radioactivity than Excepted or Industrial packagings. Strong and Tight packagings are used in the United States for shipment of certain materials with low levels of radioactivity, such as natural uranium and rubble from the decommissioning of nuclear reactors. Type B packages are described in detail in Appendix L.3.1.6.

L.3.1.1 Uranium Hexafluoride Packaging

DOE would ship uranium hexafluoride in a commercial vehicle from the Portsmouth Gaseous Diffusion Plant to a fuel fabrication facility in Model 30B cylinders, which are Type A packages (for the purposes of the SPD EIS). Uranium hexafluoride shipments are regulated under 49 CFR 173.420, which requires the packaging to be in accordance with ANSI N14.1, *Uranium Hexafluoride–Packaging for Transport*. Because uranium hexafluoride breaks down into hydrofluoric acid and uranyl fluoride when exposed to air, packages would be marked with the primary hazard label as “Radioactive Yellow-II” and a secondary hazard label as “Corrosive.” The transport vehicle would be required to show the primary placard “Radioactive” and the secondary placard “Corrosive.”

L.3.1.2 Uranium Dioxide Packaging

DOE would ship uranium dioxide in a commercial vehicle from the fuel fabrication facility to DOE’s mixed oxide (MOX) facility in gasketed, open-head, 208-l (55-gal) drums with heavy plastic liners, which are Industrial Package Type 1 packages. Uranium dioxide shipments are regulated under 49 CFR 173.425. Because uranium dioxide is a low-specific-activity material, no primary hazard label would be required, and because it is chemically stable, no secondary hazard label would be required. The transport vehicle would be required to show the primary placard “Radioactive” and no secondary placard.

L.3.1.3 MOX Fuel Packaging

DOE will design the container for the MOX fuel assemblies. For analysis purposes, it is assumed that DOE would ship the unirradiated MOX fuel bundles in a safe, secure trailer/SafeGuards Transport (SST/SGT) to the reactor site(s) in Type B packages. Two conceptual packaging ideas are end-loading and lateral-loading packages (Ludwig et al. 1997). The fuel assembly weight per container is approximately 2800 kg (6,000 lb) for either pressurized water reactor (PWR) or boiling water reactor (BWR) fuel. The container could hold either four PWR or eight BWR assemblies.

L.3.1.4 Highly Enriched Uranium Packaging

DOE would ship highly enriched uranium (HEU) in an SST/SGT from the pit conversion facility to the Y–12 facility near Oak Ridge, Tennessee. The DOE-approved container type for these shipments is the DT–22.

L.3.1.5 Plutonium Packaging

DOE would ship all plutonium in Type B containers. DOE would ship nonpit plutonium in an SST/SGT from DOE sites (Hanford, Idaho National Engineering and Environmental Laboratory [INEEL], Lawrence Livermore National Laboratory [LLNL], Los Alamos National Laboratory [LANL], Rocky Flats Environmental Technology Site [RFETS], and Savannah River Site [SRS]) to the immobilization facility (Hanford or SRS) in a variety of containers, such as Type 3013, Type 2R, and Foodpac containers, which would be transported inside various casks, such as radial reflector, SAFEKEG (Type 9517), Model 60 FFTA DFA pins shipping or Specification 6M packages. DOE would ship plutonium pits from DOE sites to the pit conversion facility in DOE-approved FL containers and the piece parts resulting from pit disassembly in DOE-approved UC–609 and USA/9975 containers. Plutonium dioxide produced at the pit conversion facility would be loaded into packaging that meets DOE-STD-3013-96, *Criteria for Preparing and Packaging Plutonium Metals and Oxides for Long-Term Storage* (DOE 1996b) or equivalent. This package provides for safe storage of plutonium oxides for at least 50 years or until final disposition and serves as the primary containment vessel for shipping. DOE-STD-3013-96 specifies a design goal that the Type 3013 container could be shipped in a qualified shipping container without further reprocessing or repackaging. The Type 3013 primary containment vessel is designed for shipping and would be compatible with a Type B package. No Type B package has been specifically constructed or licensed for shipping DOE-STD-3013-96 primary containment vessels.

A Type B package is required when transporting commercial quantities of plutonium materials, including unirradiated MOX fuel assemblies. DOE is developing a conceptual design for a MOX container that optimizes SST/SGT load-carrying capacity and ensures compatibility with fuel-handling systems at commercial reactors (Ludwig et al. 1997).

L.3.1.6 Overview of Type B Containers

The transportation of highway-route controlled quantities of plutonium (more than a few grams, depending on activity level) requires the use of Type B packaging. In addition to meeting the standards for Type A packaging, Type B packaging must provide a high degree of assurance that, even in severe accidents, the integrity of the package will be maintained with essentially no loss of the radioactive contents or serious impairment of the shielding and maintain subcriticality capability. Type B packaging must satisfy stringent testing criteria specified in 10 CFR 71 (NRC 1996). The testing criteria were developed to simulate severe accident conditions, including impact, puncture, fire, and water immersion.

Beyond meeting DOT standards showing it can withstand normal conditions of transport without loss or dispersal of its radioactive contents or allowance of significant radiation fields, Type B packaging must also meet the 10 CFR 71 requirements administered by the NRC. The complete sequence of tests is listed below:

- Free-Drop Test—A 9-m (30-ft) free-drop onto a flat, essentially unyielding, horizontal surface, striking the surface in a position for which maximum damage to the package is expected.

- Puncture Test—A 1-m (40-in) drop onto the upper end of a 15-cm (6-in) diameter solid, vertical, cylindrical, mild steel bar (at least 20-cm [8-in] long) mounted on an essentially unyielding, horizontal surface.

- Thermal Test—Exposure to a heat flux of no less than that of a thermal radiation environment of 800 °C (1,475 °F) with an emissivity coefficient of at least 0.9 for a period of 30 minutes.

- Water Immersion Test—A separate, undamaged package specimen is subjected to water pressure equivalent to immersion under a head of water of at least 15-m (50-ft) for no less than 8 hours.

Effective April 1, 1996, 10 CFR 71 was revised to require an additional immersion test in 200 m (660 ft) of water for Type B casks designed to contain material with activity levels greater than 1 million curies (Ci) (NRC 1996). Containers used for shipping plutonium will not necessarily be subject to this test because they will contain much less than one million curies. The packaging may also be required to undergo the crush test if it is considered a light-weight, low-density package as most drum-type packages are. The crush test consists of dropping a 500-kg (1100-lb) steel plate from 9 m (30 ft) onto the package, which is resting on an essentially unyielding surface.

Additional restrictions apply to package surface contamination levels, but these restrictions are not limiting for the transportation radiological risk assessment. For risk assessment purposes, it is important to note that all packaging of a given type is designed to meet the same performance criteria. Therefore, two different Type B designs would be expected to perform similarly during incident-free and accident transportation conditions. The specific containers selected, however, will determine the total number of shipments necessary to transport a given quantity of plutonium.

External radiation from a package must be below specified limits that minimize the exposure of the handling personnel and general public. For these types of shipments, the external radiation dose rate during normal transportation conditions must be maintained below the following limits of 49 CFR 173 (DOT 1992a):

- 10 mrem/hr at any point 2 m (6.6 ft) from the vertical planes projected by the outer lateral surfaces of the transport vehicle (referred to as the regulatory limit throughout this document)

- 2 mrem/hr in any normally occupied position in the transport vehicle

L.3.2 Safe, Secure Transportation

DOE anticipates that any transportation of plutonium pits, nonpit plutonium, plutonium dioxide, MOX fuel, or HEU would be required to be made through use of the Transportation Safeguards System and shipped using SST/SGTs. The SST/SGT is a fundamental component of the Transportation Safeguards System. The Transportation Safeguards System is operated by the DOE Transportation Safeguards Division of the Albuquerque Operations Office for the DOE Headquarters Office of Defense Programs. Based on operational experience between FY84 and FY98, the mean probability of an accident requiring the tow-away of the SST/SGT was 0.058 accident per million kilometers (0.096 accident per million miles). By contrast, the rate for commercial trucking in 1989 was about 0.3 accident per million kilometers (0.5 accident per million miles). Commercial trucking accident rates (Saricks and Kvitek 1994) were used in the human health effects analysis. Since its establishment in 1975, the Transportation Safeguards Division has accumulated more than 151 million km (94 million mi) of over-the-road experience transporting DOE-owned cargo with no accidents resulting in a fatality or release of radioactive material.

The SST/SGT is a specially designed component of an 18-wheel tractor-trailer vehicle. Although details of vehicle enhancements and some operational aspects are classified, key characteristics of the SST/SGT system include the following:

- Enhanced structural characteristics and a highly reliable tie-down system to protect cargo from impact
- Heightened thermal resistance to protect the cargo in case of fire (newer SST/SGT models)
- Established operational and emergency plans and procedures governing the shipment of nuclear materials
- Various deterrents to prevent unauthorized removal of cargo
- An armored tractor component that provides courier protection against attack and contains advanced communications equipment
- Specially designed escort vehicles containing advanced communications and additional couriers
- 24-hour-a-day real-time communications to monitor the location and status of all SST/SGT shipments via DOE's Security Communication system
- Couriers who are armed Federal Officers, receive rigorous specialized training, and who are closely monitored through DOE's Personnel Assurance Program
- Significantly more stringent maintenance standards than those for commercial transport equipment
- Conduct of periodic appraisals of the Transportation Safeguards System operations by the DOE Office of Defense Programs to ensure compliance with DOE orders and management directives, and continuous improvement in transportation and emergency management programs

L.3.3 Ground Transportation Route Selection Process

According to DOE guidelines, plutonium shipments must comply with both NRC and DOT regulatory requirements. Commercial shipments are also required by law to comply with both NRC and DOT requirements. NRC regulations cover the packaging and transport of plutonium, whereas DOT specifically regulates the carriers and the conditions of transport, such as routing, handling and storage, and vehicle and driver requirements. The highway routing of nuclear material is systematically determined according to DOT regulations 49 CFR 171–179 and 49 CFR 397 for commercial shipments. The dates and times that specific transportation routes would be used are classified information and would not be publicized before a shipment.

The DOT routing regulations require that a shipment of a "highway route-controlled quantity" of radioactive material be transported over a preferred highway network including interstate highways, with preference toward interstate system bypasses around cities, and State-designated preferred routes. A State or tribe may designate a preferred route to replace or supplement the interstate highway system in accordance with DOT guidelines (DOT 1992b).

Carriers of highway route-controlled quantities are required to use the preferred network, unless moving from origin to the nearest interstate or from the interstate to the destination, when making necessary repair or rest stops, or when emergency conditions render the interstate unsafe or impassible. The primary criterion for selecting the preferred route for a shipment is travel time. Preferred routing takes into consideration accident rate, transit time, population density, activities, time of day, and day of week.

The HIGHWAY computer code (Johnson et al. 1993) may be used for selecting highway routes in the United States. The HIGHWAY database is a computerized road atlas that currently describes about 386,400 km (240,000 mi) of roads. The Interstate System and all U.S. (U.S.-designated) highways are completely described in the database. In addition, most of the principal State highways and many local and community roads are also identified. The code is updated periodically to reflect current road conditions and has been benchmarked against reported mileages and observations of commercial truck firms. Features in the HIGHWAY code allow the user to select routes that conform to DOT regulations. Additionally, the HIGHWAY code contains data on the population densities along the routes. The distance and population data from the HIGHWAY code are part of the information used for the transportation impact analysis in the SPD EIS.

L.4 METHODS FOR CALCULATING TRANSPORTATION RISKS

The overland transportation risk assessment methodology is summarized in Figure L–1. After the alternatives were identified and goals of the shipping campaign were understood, the first step was to collect data on material characteristics and accident parameters. Physical, radiological, and packaging data were provided in reports from the DOE national laboratories. Accident parameters are largely based on the DOE-funded study of transportation accidents (Saricks and Kvitek 1994).

Representative routes that may be used for the shipment of plutonium were selected using the HIGHWAY code. These routes were selected for risk assessment purposes. They do not necessarily represent the actual routes that would be used to transport nuclear materials. Specific routes cannot be identified in advance because the routes would not be finalized until DOE has actually planned the shipping campaign. The selection of the actual route would be responsive to environmental and other conditions that would be in effect or could be predicted at the time of shipment. Such conditions could include adverse weather conditions, road conditions, bridge closures, and local traffic problems. For security reasons, details about a planned shipment would not be publicized before the shipment.

The first analytic step in the ground transportation analysis was to determine the incident-free and accident risk factors, on a per-shipment basis, for transportation. Risk factors, as any risk estimate, are the product of the probability of exposure and the magnitude of the exposure. Accident risk factors were calculated for radiological and nonradiological traffic accidents. The probabilities, which are much lower than 1, and the magnitudes of exposure were multiplied, yielding risk numbers. Incident-free risk factors were calculated for crew and public exposure to radiation emanating from the shipping container (cask) and public exposure to the chemical toxicity of the transportation vehicle exhaust. The probability of incident-free exposure is unity (one).

Radiological risk factors are expressed in units of rem. Later in the analysis, they are multiplied by the *1990 Recommendations of the International Commission on Radiological Protection* (ICRP 1991) conversion factors and estimated number of shipments to give risk estimates in units of LCFs. The vehicle emission risk factors are calculated in LCFs, and the vehicle accident risk factors are calculated in fatalities.

For each alternative, risks were assessed for both incident-free transportation and accident conditions. For the incident-free assessment, risks were calculated for collective populations of potentially exposed individuals and for maximally exposed individuals. The accident assessment consists of two components: (1) a probabilistic accident risk assessment that considers the probabilities and consequences of a range of possible transportation accident environments, including low-probability accidents that have high consequences and

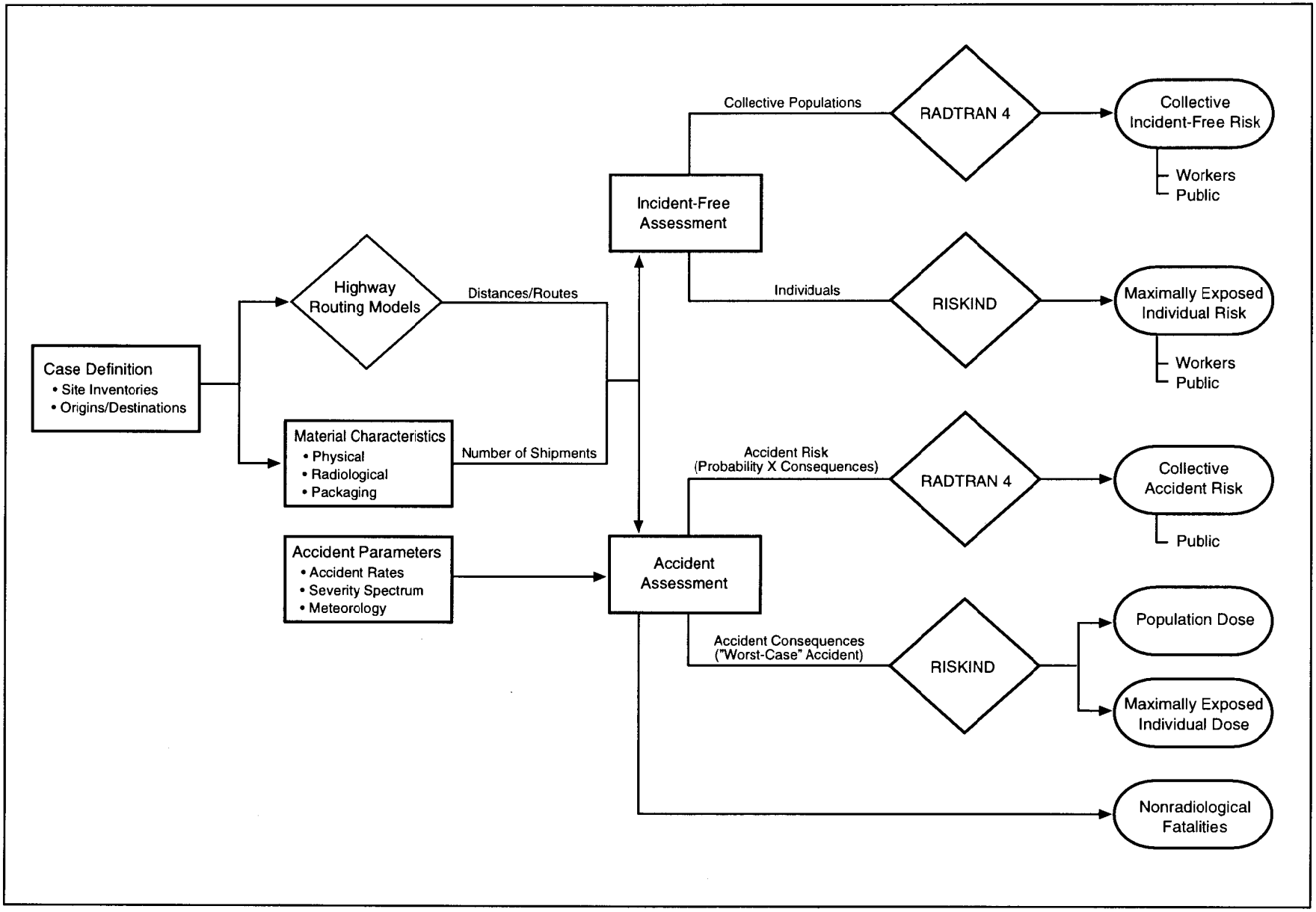

Figure L–1. Overland Transportation Risk Assessment

high-probability accidents that have low consequences, and (2) an accident consequence assessment that considers only the consequences of the most severe transportation accidents postulated.

The RADTRAN 4 computer code (Neuhauser and Kanipe 1995) is used for incident-free and accident risk assessments to estimate the impacts on collective populations. RADTRAN 4 was developed by Sandia National Laboratories to calculate population risks associated with the transportation of radioactive materials by a variety of modes, including truck, rail, air, ship, and barge.

The RADTRAN 4 population risk calculations take into account both the consequences and probabilities of potential exposure events. The collective population risk is a measure of the total radiological risk posed to society as a whole by the alternative being considered. As such, the collective population risk is used as the primary means of comparing the various alternatives. The RISKIND computer code (Yuan et al. 1995) is used to estimate the incident-free doses to maximally exposed individuals and for estimating impacts for the accident consequence assessment. The RISKIND computer code was developed for DOE's Office of Civilian Radioactive Waste Management to analyze the exposure of individuals during incident-free transportation. In addition, the RISKIND code was designed to allow a detailed assessment of the consequences to individuals and population subgroups from severe transportation accidents under various environmental settings.

The RISKIND calculations were conducted to supplement the collective risk results calculated with RADTRAN 4. Whereas the collective risk results provide a measure of the overall risks of each alternative, the RISKIND calculations are meant to address areas of specific concern to individuals and population subgroups. Essentially, the RISKIND analyses are meant to address "What if" questions, such as "What if I live next to a site access road?" or "What if an accident happens near my town?"

If highly specialized analytic codes had been used to model SST/SGT behavior in an accident (*DOE-Developed Analysis of Dispersal Risk Occurring in Transportation* or ADROIT [Clauss et al. 1995:689–696]), the code would have provided a probabilistic risk analysis of special nuclear materials shipped in an SST/SGT. ADROIT is designed to provide a focused analysis of a release caused by partial detonation of explosive material. The approach and the code could be tailored for the materials shipped as part of the surplus plutonium disposition program. However, detailed thermal and mechanical models have not been created for most of the packages used in the SPD EIS.

L.5 ALTERNATIVES, PARAMETERS, AND ASSUMPTIONS

The transportation risk assessment is designed to ensure—through uniform and judicious selection of models, data, and assumptions—that relative comparisons of risk among the various alternatives are meaningful. The major input parameters and assumptions used in the transportation risk assessment are discussed below.

L.5.1 Transportation Alternatives

The proposed action would involve transporting plutonium and other nuclear materials between DOE and commercial sites. Except for the No Action Alternative, each alternative in the SPD EIS has extensive and unique requirements for the transportation of hazardous materials. In this section, the assumptions and logic used to model the intersite transportation requirements are described.

Alternatives 2 through 12 require transporting plutonium metal and pits from various DOE sites to the pit conversion facility at Hanford, INEEL, Pantex, or SRS. The pit conversion facility would disassemble pits and convert the plutonium metal into plutonium dioxide. During the pit disassembly process, HEU would be recovered and shipped from the pit conversion facility to the Y–12 facility at Oak Ridge. In addition, some pit parts would be recovered and shipped to LANL. The plutonium dioxide would be shipped to the MOX facility

or the immobilization facility depending on the alternative. In many of the alternatives, the pit conversion facility is located on the same site as the MOX facility or immobilization facility, limiting the need for intersite transportation of the plutonium dioxide. In these alternatives, the plutonium dioxide would be transported between the facilities via a secure tunnel between the facilities.

In addition to reducing the number of trips required and the distance that would have to be traveled to transport surplus pits to the pit conversion facility, by placing the pit conversion facility at Pantex the dose associated with repackaging pits for intersite shipment could be reduced by nearly 40 percent. This is because pits can be transferred to the pit conversion facility at Pantex in their current storage containers (mainly the AL–R8 container) without having to be repackaged. If the pits are transported to another site, they have to be moved to a shipping container (e.g., FL-type, 9975).

Based on estimates presented in the *Final EIS for the Continued Operation of Pantex and Associated Storage of Nuclear Weapons Components (Pantex Sitewide EIS)* (DOE 1996c), about 50 workers would be needed to repackage approximately 13,000 pits from their current storage containers into containers that could also be used for shipping.[1] Work is currently under way to repackage pits from the AL–R8 container into the AL–R8 sealed insert (SI) container as discussed in the *Supplement Analysis for the Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components—AL–R8 Sealed Insert Container* (DOE 1998). This effort could be completed over 10 years, and the estimated annual dose received from repackaging activities would be about 208 mrem per worker (Low 1999). By locating the pit conversion facility at Pantex, it is expected that the additional dose associated with repackaging the surplus pits into shipping containers could be avoided. This would effectively reduce the total expected dose for these activities by 50 percent. If the pit conversion facility were sited at Pantex, the pits would be slowly moved from storage locations in storage containers on specially designed vehicles to the pit conversion facility instead of having to be put into offsite shipping containers. Over the 10-year operating life of the pit conversion facility, this would reduce the total estimated dose to involved Pantex transportation and staging workers by 104 person-rem from 208 person-rem to 104 person-rem.[2] Under either scenario, the estimated number of excess cancer fatalities associated with repackaging activities would be 0.1 or less.

In August 1998, DOE prepared a supplement analysis (DOE 1998) for the *Pantex Sitewide EIS* that compares all environmental impact parameters to those analyzed in the *Pantex Sitewide EIS* and final determinations made in the Record of Decision that was signed on January 17, 1997, with respect to the use of the AL–R8 SI. Results of the analysis indicated that both the AT–400A container and the modified AL–R8 container, or AL–R8 SI, comply with the latest pit storage specifications to provide an improved storage environment for the pits and would be considered feasible solutions to long-term pit storage at Pantex. The containers were further analyzed with respect to the parameters established in the *Pantex Sitewide EIS* for public, personnel, and environmental impact potential. Based on conclusions drawn from this analysis, DOE concluded that the use of the AL–R8 SI containers does not constitute new circumstances or information or substantial change in the proposed action relevant to environmental concerns; therefore, no supplemental EIS, no new EIS, nor further NEPA documentation is required.

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[1] In the analysis presented in the *Pantex Sitewide EIS* (DOE 1996c), pits are assumed to be repackaged in AT–400A containers. The amount of effort involved in repackaging a pit in an AT–400A container is more intense than the effort needed to repackage a pit in an FL-type container or equivalent; therefore, the doses would be expected to be higher. Since the *Pantex Sitewide EIS* was completed, it has been decided that surplus pits would not be repackaged in AT–400A containers. As a result, the dose estimates associated with repackaging pits as presented in the *Pantex Sitewide EIS* are conservatively high for the SPD EIS. No effort has been made to reestimate the dose associated with repackaging pits. The doses presented in the SPD EIS are based on using the AT–400A container, and therefore represent upper bounds on the expected dose to involved workers.

[2] Extremity doses are estimated to be approximately nine times higher than the whole body dose, but would be expected to stay within DOE's administrative limit of 2 rem/yr, or in the case at Pantex, 5 rem/yr (Low 1999).

Alternatives 2 through 12 involve immobilization of nonpit plutonium at Hanford (Alternative 2, 4, 8, 10, or 11) or SRS (Alternative 3, 5, 6, 7, 9, or 12). This material would be transported from its current location at various DOE sites to the chosen immobilization facility. If the immobilization facility uses a ceramic process, uranium oxide would be required. One of the United States Enrichment Corporation's gaseous diffusion plants would fill cylinders with depleted uranium hexafluoride, which would be transported to a commercial facility for conversion to uranium oxide. (For the purpose of this analysis, the gaseous diffusion plant in Portsmouth, Ohio, and the nuclear fuel fabrication facility in Wilmington, North Carolina, were chosen as representative sites for these activities.) The uranium oxide would be transported to the immobilization facility at Hanford or SRS. After the material is immobilized, it is assumed that the additional canisters of high level waste would be shipped to a potential geologic repository consistent with the assumptions made in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE 1997a). Figure L–2 shows the transportation requirements for the proposed immobilization disposition activities.

The production of MOX fuel (Alternatives 2 through 10) requires transporting plutonium dioxide from the pit conversion facility to the MOX facility at Hanford, INEEL, Pantex, or SRS. However, in every alternative except Alternatives 4 and 5, the pit conversion facility and MOX facility are collocated so there would not be any intersite transportation required for the plutonium dioxide as discussed above. In the case of Alternative 4, the pit conversion facility would be located at Pantex and the plutonium dioxide would be shipped to Hanford. Under Alternative 5, the pit conversion facility would also be at Pantex but the plutonium dioxide would be shipped to SRS. Uranium oxide needed to produce MOX fuel would be converted from uranium hexafluoride, originally from Portsmouth, at Wilmington, and then transported to the MOX facility. If MOX fuel rods are bundled with low-enriched uranium fuel rods, the uranium fuel rods may come from a separate fabrication facility. Transportation of the uranium fuel rods to the MOX facility is equivalent to transportation of uranium fuel to a commercial reactor site. This transportation activity is covered under the *Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes* (NRC 1977). The MOX fuel would be transported to a domestic, commercial reactor for power production. For the purposes of this analysis, all MOX fuel was assumed to be transported to North Anna, the commercial reactor farthest from the MOX facility. Because the proposed reactor sites are in the same general area of the country, this approach closely models the risk of implementing each alternative. Figure L–3 shows the transportation requirements for the proposed MOX disposition activities.

Alternatives 2 through 10 include the production of MOX fuel. If this alternative is chosen by DOE, lead assembly fabrication and irradiation may precede the actual production of MOX fuel. Plutonium dioxide at LANL would be shipped to one of five DOE facilities (Argonne National Laboratory–West [ANL–W], Hanford, LLNL, LANL, or SRS). Low-enriched uranium (LEU) oxide would be produced from LEU hexafluoride, originally from Portsmouth, at Wilmington, and then transported to the lead assembly fabrication facility. From the fabrication facility, the MOX fuel lead assemblies would be transported overland to the McGuire reactor. After irradiation in the reactor, the MOX spent fuel lead assemblies would be transported to a DOE site (either ANL–W or Oak Ridge National Laboratory) for postirradiation examination. Figure L–4 shows the transportation requirements for the proposed lead assembly activities.

Table L–1 shows the container type, vehicle type, and number of shipments required for each material form. This table can be used along with Figures L–2 through L–4 to determine which shipments and how many shipments are required for each alternative. The container type and vehicle type are based on currently available containers, and current practices, regulations, and DOE Orders. If a MOX production alternative is selected, DOE would have to design and construct a container to transport MOX fuel to the commercial, domestic reactor. The estimated number of shipments is based on the best available information and could change slightly as material is prepared for transportation.

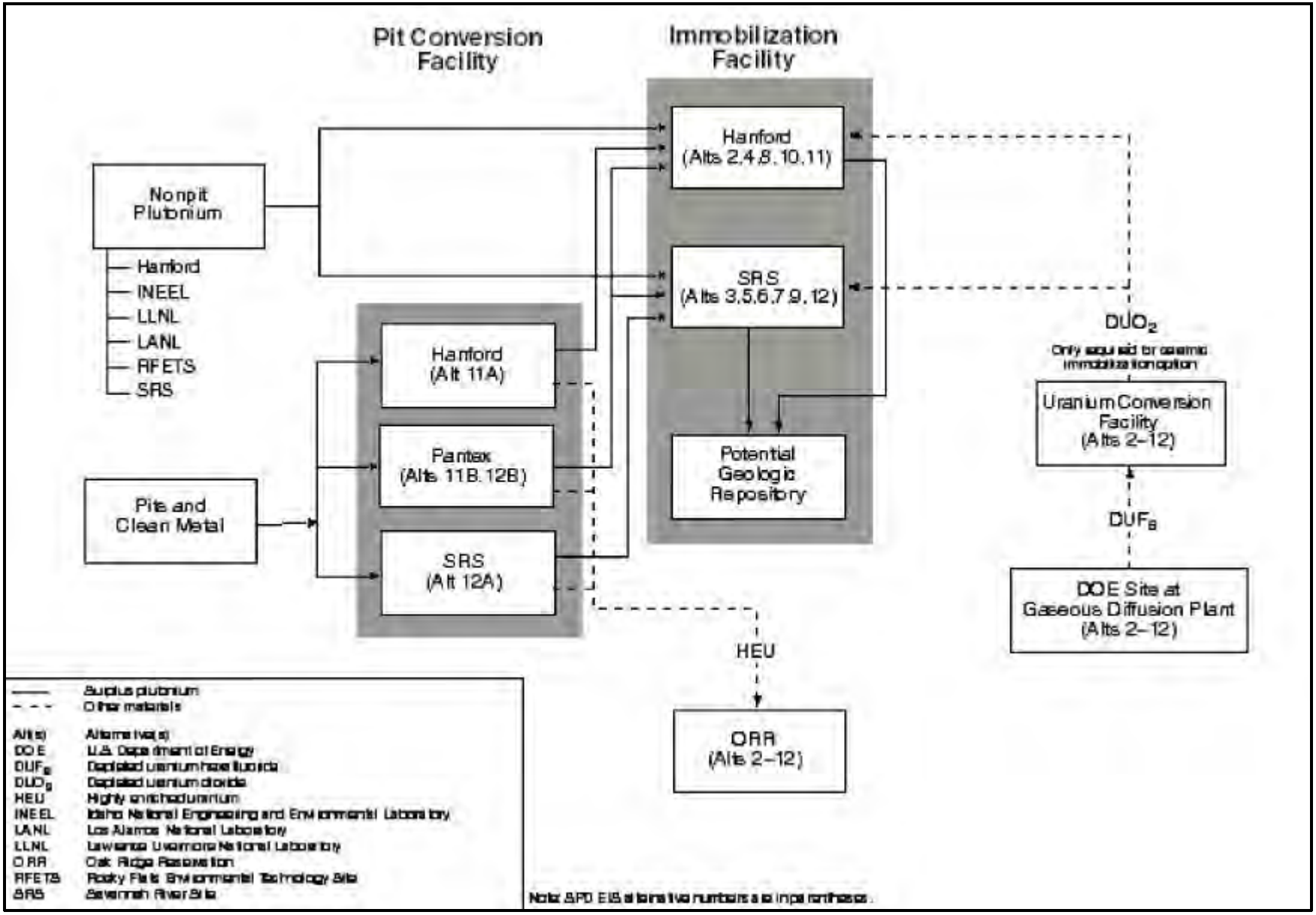

Figure L–2. Transportation Requirements for Plutonium Conversion and Immobilization

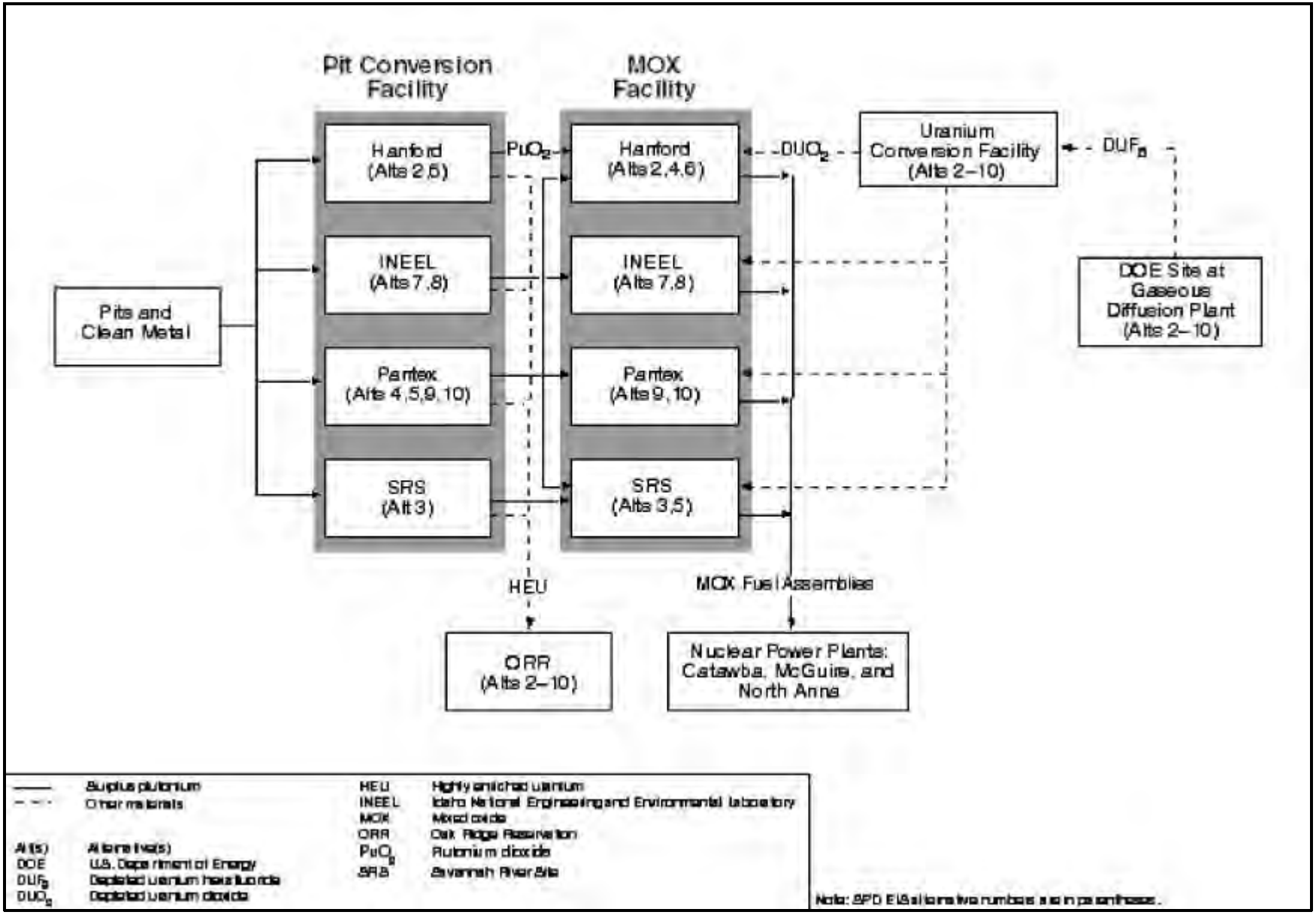

Figure L–3. Transportation Requirements for MOX Fuel Fabrication

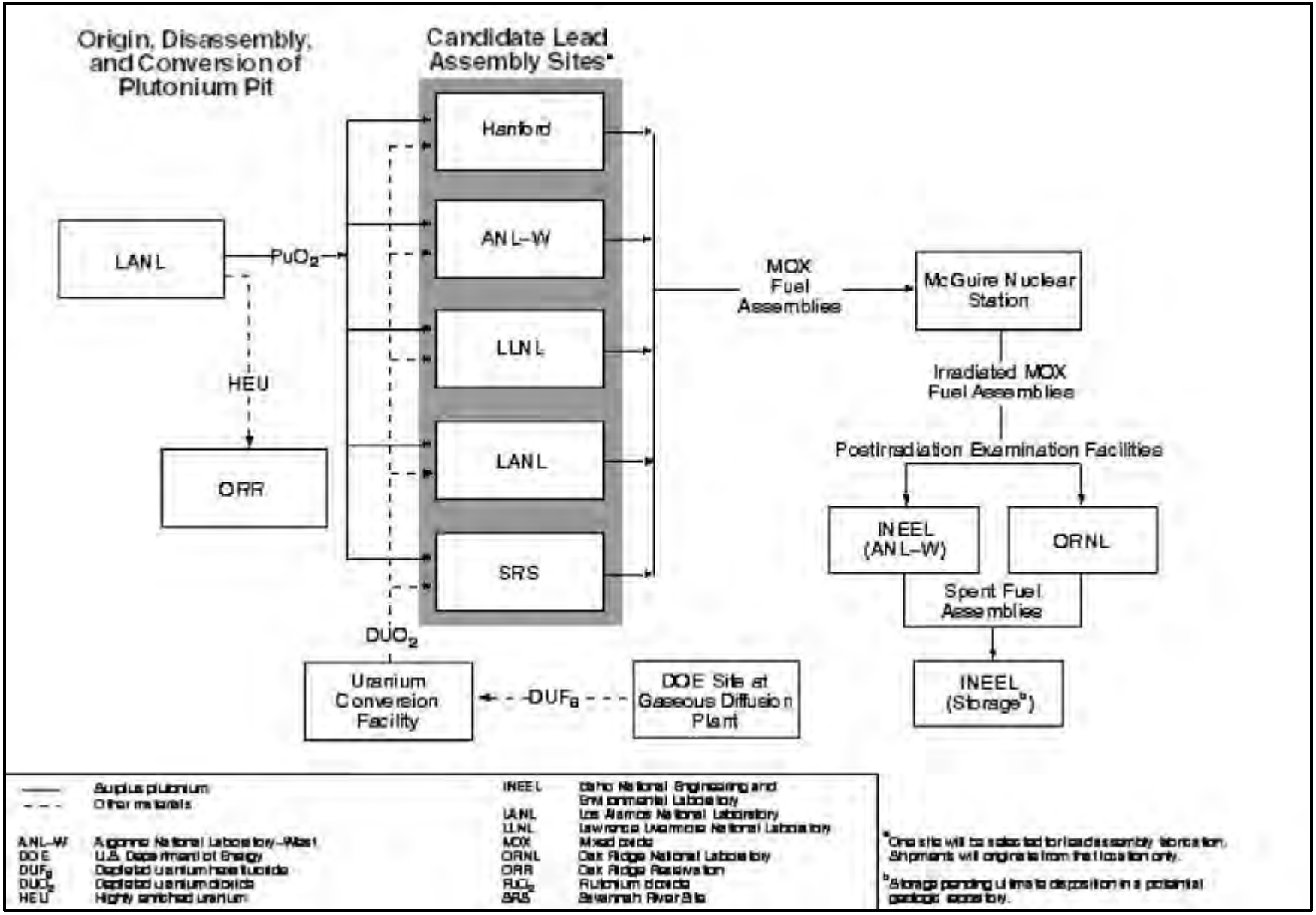

Figure L–4. Transportation Requirements for Lead Assembly Fabrication

Table L–1. Summary of Material Shipments

Origin	Destination	Material Form	Container	Vehicle	No. of Shipments
Surplus plutonium [a,b]					
Pantex	PDCF	Pits	To be designed	SST/SGT	530
Hanford	Immobilization	Oxide	9975	SST/SGT	104
		FFTF pins	M60	SST/SGT	13
		FFTF assemblies	RRSC	SST/SGT	14
ANL–W	Immobilization	ZPPR plates	9975	SST/SGT	116
		ZPPR pins	9975	SST/SGT	40
SRS	Immobilization	SRS material	9975	SST/SGT	48
LANL	Immobilization	Oxide	SAFEKEG	SST/SGT	7
		Metal	SAFEKEG	SST/SGT	4
LLNL	Immobilization	Various	9975	SST/SGT	8
RFETS	Immobilization	Oxide	9975	SST/SGT	104
Pit conversion facility [a,b]					
PDCF	Y–12	HEU	DT-22	SST/SGT	160
PDCF	LANL	Piece parts	UC-609	SST/SGT	20
PDCF	LANL	Piece parts	9968	SST/SGT	10
PDCF	Immobilization or MOX facility	Oxide	SAFEKEG	SST/SGT	254
Immobilization facility					
GDP	UO_2 facility	UF_6 [c]	30B cylinder	Commercial	2/2 [d]
UO_2 facility	Immobilization	UO_2 [c]	55-gal drum	Commercial	2/5 [d]
Immobilization	Potential geologic repository	Vitrified HLW [b]	TRUPACT	Commercial	145/395 [d]
MOX facility [e]					
GDP	UO_2 facility	UF_6 [c]	30B	Commercial	80
UO_2 facility	MOX facility	UO_2 [c]	55-gal drum	Commercial	60
MOX facility	Reactors	MOX fuel bundles [a,b]	To be designed	SST/SGT	830
Lead assembly fabrication facility [f]					
LANL	Lead assembly	Pu oxide	SAFEKEG	SST/SGT	12
GDP	UO_2 facility	UF_6	30B cylinder	Commercial	1
UO_2 facility	MOX facility	UO_2	55-gal drum	Commercial	2
MOX facility	Reactors	MOX fuel bundles	MO-1	SST/SGT	4
Reactor	Examination site	Irradiated fuel	Type -B	Commercial	8

[a] From Didlake 1998.
[b] From UC 1998a–h, 1999a–d.
[c] From White 1997.
[d] 17-ton cases/50-ton cases.
[e] Some equipment for the MOX facility may be manufactured in Europe and shipped to the United States. No nuclear or radiologically contaminated materials would be transported. Any such shipments would be made by commercial vessel, and no impacts other than those occurring from routine commercial shipping would be expected.
[f] From O'Connor et al. 1998a–e.

Key: ANL–W, Argonne National Laboratory–W; FFTF, Fast Flux Test Facility; GDP, Gaseous Diffusion Plant; HEU, highly enriched uranium; HLW, high-level waste; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; PDCF, pit disassembly and conversion facility; Pu, plutonium; RFETS, Rocky Flats Environmental Technology Site; SST/SGT, safe, secure trailer/SafeGuards Transport; UF_6, uranium hexafluoride; UO_2, uranium dioxide; ZPPR, Zero Power Physics Reactor.

L.5.2 Representative Routes and Populations

Representative overland truck routes were selected for the origin and destination points identified in Figures L–2, L–3, and L–4 are shown in Table L–2. The routes (which were determined for risk assessment purposes) were

selected consistent with current routing practices and all applicable routing regulations and guidelines. They do not necessarily represent the actual routes that would be used to transport plutonium and other hazardous materials in the future. Details about a planned shipment cannot be identified in advance, as explained in Appendix L.3.3.

Route characteristics that are important to the radiological risk assessment include the total shipment distance and the population distribution along the route. The specific route selected determines both the total potentially exposed population and the expected frequency of transportation-related accidents. Route characteristics are summarized in Table L–2. The population densities along each route are derived from 1990 U.S. Bureau of the Census data and projected forward to the year 2010 using State-specific projections. Rural, suburban, and urban areas are characterized according to the following breakdown: rural population densities range from 0 to 54 persons per square kilometer (0 to 139 person per square mile); the suburban range is from 55 to 1,284 persons per square kilometer (140 to 3,326 persons per square mile); and the urban includes all population densities greater than 1,284 persons per square kilometer (3,326 persons per square mile). The exposed population includes all persons living within 800 m (0.5 mi) of each side of the road.

L.5.3 Distance Traveled by Alternative

Table L–3 shows the number of shipments, the total mileage traveled by the trucks carrying nuclear materials, and the affected populations. The affected population is designed to show the number of people potentially exposed to nuclear material shipments. The measure is calculated by multiplying the number of shipments by the number of people living within 800 m (0.5 mi) of the route used to transport the material. The highest possible lead test assembly mileages and populations from Table L–3 are used in the alternative totals. The number of trips in Table L–3 comes from the SPD EIS data reports (UC 1998a–h, 1999a–d).

[Text deleted.]

L.5.4 Shipment External Dose Rates

The dose and corresponding risk to populations and maximally exposed individuals during incident-free transportation conditions are directly proportional to the assumed shipment external dose rate. The Federal regulations for maximum allowable dose rates for exclusive-use shipments were presented in Appendix L.3.1.

The actual shipment dose rate is a complex function of the composition and configuration of shielding and containment used in the cask, the geometry of the loaded shipments, and characteristics of the material shipped. DOE has years of experience handling the materials that would be required to be shipped under the alternatives assessed in the SPD EIS, and has regularly conducted radiation level measurements while handling these materials. The maximum predicted dose from individual packages, based on experience at DOE facilities, would yield a dose rate less than the Federal regulatory limit in every case. Spent nuclear fuel and nonpit plutonium were conservatively assumed to have dose rates equal to the regulatory limit of 10 mrem/hr at 2 m (6.6 ft) from the vehicle. This DOE experience was used in the preparation of the dose rates given in the data reports (UC 1998a–h, 1999a–d) and used in the analysis.

Table L–2. Potential Shipping Legs Evaluated in the SPD EIS

From	To	Distance (km)	Percentage in Zones			Population Density (person/km^2)			Affected Population
			Rural	Suburban	Urban	Rural	Suburban	Urban	
ANL–W	INEEL	34	100	0	0	2	0	0	84
ANL–W	Hanford	1,035	91.7	7.6	0.6	9	570	2,883	113,482
ANL–W	Pantex	2,395	90.1	8.3	1.6	6	561	2,963	380,038
ANL–W	SRS	3,756	82.8	15.4	1.8	9	453	2,787	767,529
Hanford	INEEL	967	91.6	7.9	0.6	8	559	2,898	107,214
Hanford	ORR	3,981	87.6	11.1	1.3	8	461	2,830	604,916
Hanford	Pantex	3,032	90.6	8.0	1.4	6	574	2,979	450,511
Hanford	Onsite	24	100	0	0	10	0	0	538
Hanford	Geologic repository[a]	1,907	87.8	10.3	1.9	4	485	2,098	397,534
Hanford	LANL	2,511	90.2	8.6	1.2	6	569	2,952	361,442
INEEL	SRS	3,719	82.7	15.4	1.8	9	450	2,788	757,940
INEEL	ORR	3,312	86.7	11.9	1.4	8	437	2,778	518,875
INEEL	LANL	1,841	89.6	9.1	1.4	6	553	2,962	286,387
LANL	Pantex	647	90.7	6.8	2.5	6	676	3,061	132,446
LANL	LLNL	1,218	88.8	7.8	3.4	5	634	3,634	346,679
LANL	INEEL	1,841	89.6	9.1	1.4	6	553	2,962	286,387
LANL	Hanford	2,511	90.2	8.6	1.2	6	569	2,952	361,442
LANL	SRS	2,787	80.8	16.9	2.4	12	455	2,786	684,441
LANL	ORR	2,390	85.8	12.3	1.9	10	435	2,764	439,696
LANL	ANL–W	1,873	89.1	9.5	1.4	4.5	386	2,085	296,222
LLNL	Hanford	1,429	76.0	20.5	3.5	12	487	2,868	478,115
LLNL	INEEL	1,566	85.7	10.3	4.0	6	713	3,546	552,834
LLNL	Pantex	2,327	89.8	6.7	3.5	5	674	3,525	643,591
LLNL	SRS	4,416	80.6	16.4	3.0	10	482	3,165	1,284,987
LLNL	NTS	1,143	85.8	8.6	5.6	5	716	3,771	506,575
Pantex	ORR	1,762	84.4	14.0	1.6	12	392	2,657	302,418
Pantex	SRS	2,169	78.1	19.6	2.3	14	426	2,706	543,092
Pantex	INEEL	2,363	90.2	8.2	1.6	6	561	2,988	373,420
Pantex	WIPP	713	93.1	6.0	0.8	4	697	2,631	75,392
Pantex	NTS	1,997	94.0	4.8	1.2	4	634	3,086	228,159
Pantex	LANL	647	90.7	6.8	2.5	6	676	3,061	132,446
Portsmouth, OH	Fuel fabrication[b]	1,014	63.5	34.6	1.7	20	380	2,446	301,445
RFETS	INEEL	1,178	91.4	7.4	1.2	6	505	3,329	156,394
RFETS	Pantex	1,255	87.2	10.0	2.9	5	634	3,143	319,338
RFETS	Hanford	1,848	91.6	7.4	1.0	6	547	3,228	232,380
RFETS	SRS	2,609	78.1	19.3	2.5	11	439	2,741	674,965
SRS	ORR	575	68.7	30.5	0.8	18	374	2,306	132,959
SRS	Hanford	4,389	84.2	14.2	1.6	9	467	2,823	835,727
SRS	Onsite	6	100	0	0	10	0	0	134
SRS	Geologic repository[a]	3,936	83.2	19.9	1.9	9	510	3,069	893,080
SRS	LANL	2,787	80.8	16.9	2.4	12	455	2,786	684,441
Fuel fabrication[b]	SRS	581	72.8	26.8	0.3	23	301	2,202	97,034
Fuel fabrication[b]	Pantex	2,577	76.2	22.4	1.4	14	392	2,690	651,769
Fuel fabrication[b]	Hanford	4,796	82.6	16.1	1.2	10	435	2,806	856,223

Table L–2. Potential Shipping Legs Evaluated in the SPD EIS (Continued)

From	To	Distance (km)	Percentage in Zones			Population Density (person/km^2)			Affected Population
			Rural	Suburban	Urban	Rural	Suburban	Urban	
Fuel fabrication[b]	ANL–W	4,165	81.0	17.7	1.3	10	418	2,769	787,474
Fuel fabrication[b]	LLNL	4,880	82.5	15.1	2.4	10	457	3,192	1,199,169
Fuel fabrication[b]	LANL	3,201	78.0	19.8	1.6	13	413	2,766	696,023
Generic 4,000 km		4,000	84.0	15.0	1.0	6	719	3,861	969,600
Generic 5,000 km		5,000	84.0	15.0	1.0	6	719	3,861	1,212,000
Hanford	Catawba	4,498	84.5	14.1	1.3	9	447	2,776	765,850
INEEL/ANL	Catawba	3,793	83.0	15.5	1.5	9	429	2,737	697,959
SRS	Catawba	251	69.0	29.8	1.2	17	418	2,373	66,154
LANL	Catawba	2,844	81.1	17.0	1.8	11	428	2,722	595,856
LLNL	Catawba	4,539	84.3	13.1	2.6	9	477	3,167	1,105,526
Pantex	Catawba	2,243	78.6	19.7	1.7	13	397	2,626	477,319
Catawba	ORR	497	58.3	39.8	2.0	20	405	2,546	177,922
Hanford	McGuire	4,458	84.8	13.9	1.2	9	428	2,802	716,024
INEEL/ANL–W	McGuire	3,753	83.4	15.3	1.3	9	409	2,767	636,712
SRS	McGuire	296	66.4	31.6	2.1	15	441	2,438	94,828
LANL	McGuire	2,821	81.5	16.9	1.7	11	401	2,753	559,307
LLNL	McGuire	4,500	84.6	12.9	2.5	9	458	3,207	1,055,765
Pantex	McGuire	2,203	79.3	19.3	1.4	13	370	2,661	419,295
McGuire	ORR	457	59.5	39.9	0.5	21	343	2,504	118,268
Hanford	N. Anna	4,575	86.1	12.4	1.4	9	449	2,717	744,228
INEEL/ANL–W	N. Anna	3,870	85.0	13.4	1.6	10	429	2,666	671,048
SRS	N. Anna	837	72.7	26.8	0.5	21	306	2,167	145,069
LANL	N. Anna	3,117	83.6	14.7	1.7	13	397	2,711	574,877
LLNL	N. Anna	4,797	84.7	12.7	2.7	9	492	2,886	1,134,405
Pantex	N. Anna	2,499	82.0	16.6	1.4	14	364	2,619	435,744
N. Anna	ORR	753	76.3	22.7	1.0	22	317	2,503	137,224

[a] Potential geologic repository assumed to be located at Yucca Mountain, Nevada, for the purposes of analysis.
[b] Assumed to be located at Wilmington, North Carolina, for the purposes of analysis.

Key: ANL–W, Argonne National Laboratory–W; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; NTS, Nevada Test Site; ORR, Oak Ridge Reservation; RFETS, Rocky Flats Environmental Technology Site; WIPP, Waste Isolation Pilot Plant.

Table L–3. Summary of SPD EIS Transportation Requirements

Alternative	Number of Trips	Cumulative Distance (km)	Affected Population (millions)
2	2,447	7.5 M	5.4
3	2,530	4.3 M	7.0
4	2,171	6.3 M	4.9
5	2,254	3.8 M	6.7
6	2,530	8.7 M	8.5
7	2,530	7.6 M	8.1
8	2,447	6.4 M	5.3
9	2,000	4.8 M	6.4
10	1,917	3.6 M	4.2
11A	2,153	3.7 M	4.7
11B	1,877	2.5 M	4.1
12A	2,236	4.4 M	6.8
12B	1,960	3.9 M	6.4
Lead assembly			
ANL–W	27	77 K	2.5
Hanford	27	89 K	2.7
LLNL	27	73 K	3.4
LANL	15	49 K	2.1
SRS	27	67 K	1.7

Key: ANL–W, Argonne National Laboratory–W; K, thousands; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; M, million.

L.5.5 Health Risk Conversion Factors

The health risk conversion factors used to estimate expected cancer fatalities were taken from the *1990 Recommendations of the International Commission on Radiological Protection* (ICRP 1991): 0.0005 and 0.0004 fatal cancer cases per person-rem for members of the public and workers, respectively. Cancer fatalities occur during the lifetimes of the exposed populations and, thus, are called LCFs.

L.5.6 Accident Involvement Rates

For the calculation of accident risks, vehicle accident and fatality rates are taken from data provided in other reports (Saricks and Kvitek 1994). Accident rates are generically defined as the number of accident involvements (or fatalities) in a given year per unit of travel in that same year. Therefore, the rate is a fractional value, with the accident-involvement count as the numerator of the fraction and vehicular activity (total travel distance) as its denominator. Accident rates are generally determined for a multiyear period. For assessment purposes, the total number of expected accidents or fatalities is calculated by multiplying the total shipment distance for a specific case by the appropriate accident or fatality rate.

For truck transportation, the rates presented are specifically for heavy combination trucks involved in interstate commerce (Saricks and Kvitek 1994). Heavy combination trucks are rigs composed of a separable tractor unit containing the engine and one to three freight trailers connected to each other. Heavy combination trucks are typically used for radioactive waste shipments. The truck accident rates are computed for each State based on statistics compiled by the DOT Office of Motor Carriers for 1986 to 1988. Saricks and Kvitek present accident involvement and fatality counts; estimated kilometers of travel by State; and the corresponding average accident involvement, fatality, and injury rates for the 3 years investigated. Fatalities are deaths (including crew members)

attributable to the accident or that occurred at any time within 30 days thereafter. SST/SGT accident rates are based on operational experience (Claus and Shyr 1999) and influence factors (Phillips et al. 1994).

L.5.7 Container Accident Response Characteristics and Release Fractions

The transportation accident model assigns accident probabilities to a set of accident categories. Eight accident-severity categories defined in the NRC's *Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes*, NUREG-0170 (NRC 1977), were used. The least severe categories (Categories I and II) represent low magnitudes of crush force, accident-impact velocity, fire duration, and puncture-impact speed. The most severe category (Category VIII) represents a large crush force, high accident-impact velocity, long fire duration, and a high puncture-impact speed. The fraction of material released and material aerosolized, and the fraction of that material that is respirable (particles smaller than 10 microns), was assigned based on the accident categories and container types. Because all plutonium shipments will use the previously described Type B containers and the SST/SGT system, even severe accidents release, at the most, a portion of the material being transported. The risks associated with other materials are significantly lower.

L.6 RISK ANALYSIS RESULTS

L.6.1 Per-Shipment Risk Factors

Per-shipment risk factors have been calculated for the collective populations of exposed persons and the crew for all anticipated routes and shipment configurations. The radiological risks are presented in doses per shipment for each unique route, material, and container combination. Doses are calculated for the crew, off-link public (i.e., people living along the route), on-link public (i.e., pedestrians and drivers along the route), and public at rest and fueling stops (i.e., stopped cars, buses, and trucks, workers, and other bystanders). The accident risk factors are called "dose risk" because the values incorporate the spectrum of accident severity probabilities and associated consequences. Separate risk factors are provided for fatalities resulting from hydrocarbon emissions (known to contain carcinogens) and transportation accidents (fatalities resulting from impact).

L.6.2 Evaluation of Shipment Risks

Tables L–4 and L–5 show the human health risks and maximum human health risks, respectively, of transporting materials for the lead assembly alternatives. As shown, the risks include the risk of transporting uranium dioxide, uranium hexafluoride, plutonium dioxide, fuel assemblies, and spent fuel. Table L–6 shows the results of similar calculations that give the risks for each alternative. The risk estimates in Table L–6 include the maximum risk for the lead assembly transportation (Alternatives 2 through 10), plutonium pit shipments, pit material shipments (HEU and nonplutonium bearing pit parts), uranium hexafluoride, uranium dioxide, fuel assemblies, and nonpit plutonium. The risks are calculated by multiplying the per-shipment factors by the number of shipments and, in the case of the radiological doses, by the health risk conversion factors.

Table L–4. Human Health Risks of Transport to Lead Assembly Facilities

	DUO_2 and LEU Fuel Assemblies From FFF					PuO_2 From LANL				
	Routine Transport Impacts					Routine Transport Impacts				
	Radiological			Accident Risks		Radiological			Accident Risks	
Site	Crew	Public	Nonrad[a]	Rad	Nonrad	Crew	Public	Nonrad[a]	Rad	Nonrad
LANL	5.6E-6	4.5E-5	2.0E-5	3.8E-4	2.5E-4	–	–	–	–	–
ANL–W	7.3E-6	5.8E-5	2.2E-5	1.6E-4	3.2E-4	2.1E-6	2.2E-6	8.2E-5	2.3E-4	1.6E-4
SRS	9.8E-7	7.9E-6	1.3E-6	1.2E-5	4.3E-5	3.2E-6	4.2E-6	2.1E-4	5.3E-4	2.3E-4
Hanford	8.4E-6	6.7E-5	2.3E-5	1.7E-4	3.7E-4	2.8E-6	2.9E-6	9.4E-5	2.8E-4	2.1E-4
LLNL	8.5E-6	6.8E-5	4.7E-5	3.4E-4	3.8E-4	1.4E-6	1.4E-6	1.3E-4	2.9E-4	1.0E-4

[a] Toxic emissions.

Key: ANL–W, Argonne National Laboratory–West; DUO_2, depleted uranium dioxide; FFF, Uranium Fuel Fabrication Facility; LANL, Los Alamos National Laboratory; LEU, low-enriched uranium; LLNL, Lawrence Livermore National Laboratory; Rad, radiological; Nonrad, nonradiological; PuO_2, plutonium dioxide; UO_2, uranium dioxide.

Note: All risks are expressed in latent cancer fatalities during the implementation of the proposed action, except for the Nonrad Accident Risks column, which is the number of fatalities.

Table L–5. Maximum Human Health Risks of Transport to Lead Assembly Facilities

	Routine Transport Impacts			Accident Risks	
	Radiological				
Shipment	Crew	Public	Nonradiological[a]	Radiological	Nonradiological
Depleted UO_2 and LEU fuel assemblies from FFF and PuO_2 from LANL	1.1E-5	7.0E-5	2.1E-4	6.3E-4	5.8E-4
Depleted UF_6 from gaseous diffusion plant to FFF	2.5E-8	2.0E-7	3.4E-6	5.2E-5	4.0E-5
Lead assemblies to reactor site	3.7E-7	2.2E-7	1.2E-4	2.1E-6	1.3E-4
Spent fuel to postirradiation examination site	5.5E-4	4.8E-3	7.8E-5	2.3E-3	1.2E-3

[a] Toxic emissions.

Key: FFF, Uranium Fuel Fabrication Facility; LANL, Los Alamos National Laboratory; LEU, low-enriched uranium; PuO_2, plutonium dioxide; UF_6, uranium hexafluoride; UO_2, uranium dioxide.

Note: All risks are expressed in latent cancer fatalities during the implementation of the proposed action, except for the Nonradiological Accident Risks column, which is the number of fatalities.

L.6.3 Maximally Exposed Individuals

The risks to maximally exposed individuals under incident-free transportation conditions were estimated for hypothetical exposure scenarios. The estimated dose to inspectors and the public is presented in Table L–7 on a per-event basis (person-rem per event). Note that the potential exists for individual exposures if multiple exposure events occur. For instance, the dose to a person stuck in traffic next to a shipment for 30 minutes is calculated to be 11 mrem. (This conservatively assumes the person in a car is 1.2 m [4 ft] from the edge of the truck.) If the exposure duration was longer, the dose would rise proportionally. In addition, a person working at a truck service station could receive a significant dose if trucks were to use the same stops repeatedly. The dose to a person fueling a truck could be as much as 1 mrem. Administrative controls could be instituted to control the location and duration of truck stops if multiple exposures were to occur routinely. However, it is DOE's normal practice to have SST/SGT guard force members (trained, monitored radiation workers) perform fueling and routine on-road maintenance checks (i.e., check oil or windshield wiper fluid).

Table L–6. Total Risks for All SPD EIS Alternatives

Alter-native	Pit Conversion	MOX	Immobilization	Routine Transport Impacts: Radiological: Crew	Routine Transport Impacts: Radiological: Public	Routine Transport Impacts: Nonradiological: Emission	Routine Transport Impacts: Nonradiological: Traffic	Accident Risks: Radiological: Accident
2	Hanford	Hanford	Hanford	0.012	0.020	0.025	0.074	0.004
3	SRS	SRS	SRS	0.024	0.034	0.019	0.053	0.004
4	Pantex	Hanford	Hanford	0.012	0.020	0.021	0.065	0.004
5	Pantex	SRS	SRS	0.024	0.033	0.016	0.050	0.004
6	Hanford	Hanford	SRS	0.024	0.035	0.033	0.091	0.004
7	INEEL	INEEL	SRS	0.024	0.035	0.032	0.083	0.004
8	INEEL	INEEL	Hanford	0.012	0.020	0.024	0.065	0.003
9	Pantex	Pantex	SRS	0.024	0.034	0.019	0.052	0.004
10	Pantex	Pantex	Hanford	0.012	0.019	0.012	0.043	0.003
11A	Hanford	NA	Hanford	0.027	0.036	0.011	0.054	0.0003
11B	Pantex	NA	Hanford	0.027	0.036	0.007	0.045	0.0007
12A	SRS	NA	SRS	0.057	0.074	0.021	0.081	0.0006
12B	Pantex	NA	SRS	0.057	0.073	0.018	0.078	0.0012

Key: NA, not applicable.
Note: All risks are expressed in latent cancer fatalities during the implementation of the proposed action, except for the Nonradiological Accident Risks column, which is the number of fatalities.

Table L–7. Estimated Dose to Maximally Exposed Individuals During Incident-Free Transportation Conditions[a,b]

Receptor	Dose to Maximally Exposed Individual
Workers	
Crew member	0.1 rem/yr[c]
Inspector	0.0029 rem/event
Public	
Resident	4.0×10^{-7} rem/event
Person in traffic construction	0.011 rem/event
Person at service station	0.001 rem/event

[a] The exposure scenario assumptions are described in Appendix L.6.3.
[b] Doses are calculated assuming that the shipment external dose rate is equal to the maximum expected dose 10 mrem/hr at 2 m (6.6 ft) from the package.
[c] Dose to truck drivers could exceed the legal limit of 100 mrem/yr in the absence of administrative controls.

The cumulative dose to a resident was calculated assuming all shipments passed his or her home. The cumulative doses assume that the resident is present for every shipment and is unshielded at a distance of 30 m (98 ft) from the route. Therefore, the cumulative dose is only a function of the number of shipments passing a particular point and is independent of the actual route being considered. The maximum dose to this resident, would be about 1 mrem. The annual individual dose can be estimated by assuming that shipments would occur uniformly over a 15-year time period.

The accident consequence assessment is intended to provide an estimate of the maximum potential impacts posed by the most severe potential transportation accidents involving a shipment. The accident consequence results are presented in Table L–8 for the maximum severity accidents involving plutonium dioxide shipments,

Table L–8. Estimated Dose to the Population and to Maximally Exposed Individuals During the Most Severe Accident Conditions (Plutonium Dioxide)[a, b]

	Neutral Conditions[c]				Stable Conditions[f]			
	Population[d]		Maximally Exposed Individual[e]		Population[d]		Maximally Exposed Individual[e]	
Mode and Accident Location	Dose (person-rem)	Consequences (Cancer Fatalities)	Dose (rem)	Consequences (Probability of Cancer Fatality)	Dose (person-rem)	Consequences (Cancer Fatalities)	Dose (rem)	Consequences (Probability of Cancer Fatality)
Truck								
Urban	228,760	114	684	0.68	40,420	20.2	23.2	0.023
Suburban	49,880	25	684	0.68	8,815	4.4	23.2	0.023
Rural	624	0.31	684	0.68	581	0.29	23.2	0.023

[a] The most severe accidents correspond to the NUREG-0170 accident severity Category VIII (NRC 1977).

[b] Buoyant plume rise resulting from fire for a severe accident was included in the exposure model.

[c] Neutral weather conditions result in moderate dispersion and dilution of the release plume. Neutral conditions were taken to be Pasquill stability Class D with a wind speed of 4 m/sec (9 mph). Neutral conditions occur approximately 50 percent of the time in the United States.

[d] Populations extend at a uniform density to a radius of 80 km (50 mi) from the accident site. Population exposure pathways include acute inhalation, acute cloudshine, groundshine, resuspended inhalation, resuspended cloudshine, and ingestion of food, including initially contaminated food (RISKIND assumes that all food is grown in rural areas) (Yuan et al. 1995). It is assumed that decontamination or mitigative actions are taken.

[e] The maximally exposed individual is assumed to be at the location of maximum exposure. The locations of maximum exposure would be 100 m (330 ft) and 500 m (1,650 ft) from the accident site under neutral and stable atmospheric conditions, respectively. Individual exposure pathways include acute inhalation, acute cloudshine, and groundshine during passage of the plume. No ingested dose is considered. Note that the maximally exposed individual receives more dose than the population in a rural location. This analytic phenomena is caused by probabilistic calculations. It is very unlikely that an individual will be nearby in a rural population zone.

[f] Stable weather conditions result in minimal dispersion and dilution of the release plume and are thus unfavorable. Stable conditions were taken to be Pasquill stability Class F with a wind speed of 1 m/sec (2.2 mph). Stable conditions occur approximately one-third of the time in the United States.

and Table L–9 for maximum severity accidents involving plutonium pits. Table L–8 applies to alternatives in which the pit conversion facility is located at Pantex, and large amounts of plutonium dioxides are shipped to a MOX or conversion facility. Table L–9 applies to alternatives in which plutonium pits and metals are shipped to a pit conversion facility at a site other than Pantex. In either table, the accident frequency in rural locations is about 1×10^{-7}per year (once in 10 million years). The frequency of accidents in urban and suburban zones was evaluated. Accidents are much less likely to occur in urban and suburban zones because the total distance traveled is much lower than in rural zones. The impacts represent the most severe accidents hypothesized.

The hypothetical accidents described in Tables L–8 and L–9 involve either a long-term fire or tremendous impact or crushing forces. In the case of crushing forces, a fire would have to be burning in order to spread the plutonium as modeled. These accidents are assumed to cause a ground-level release of 10 percent of the radioactive material in the truck. These accidents are more likely on rural interstates where speeds are higher and where the vehicles spend most of their travel time. NUREG-0170 (NRC 1977) describes the analytic approach in more detail.

The population doses are for a uniform population density within an 80-km (50-mi) radius (Neuhauser and Kanipe 1995). The location of the maximally exposed individual is determined based on atmospheric conditions

at the time of the accident and the buoyant characteristics of the released plume. The locations of maximum exposure would be 100 m (330 ft) and 500 m (1,650 ft) from the accident site for neutral (average)

Table L–9. Estimated Dose to the Population and to Maximally Exposed Individuals During the Most Severe Accident Conditions (Plutonium Pits)[a, b]

	Neutral Conditions [c]				Stable Conditions[f]			
	Population[d]		Maximally Exposed Individual[e]		Population[d]		Maximally Exposed Individual[e]	
Mode and Accident Location	Dose (person-rem)	Consequences (Cancer Fatalities)	Dose (rem)	Consequences (Probability of Cancer Fatality)	Dose (person-rem)	Consequences (Cancer Fatalities)	Dose (rem)	Consequences (Probability of Cancer Fatality)
Truck								
Urban	31,920	16	96	0.096	5,640	2.8	3.3	0.0016
Suburban	6,960	3.5	96	0.096	1,230	0.62	3.3	0.0016
Rural	87	0.044	96	0.096	81	0.041	3.3	0.0016

[a] The most severe accidents correspond to the NUREG-0170 accident severity Category VIII (NRC 1977).

[b] Buoyant plume rise resulting from fire for a severe accident was included in the exposure model.

[c] Neutral weather conditions result in moderate dispersion and dilution of the release plume. Neutral conditions were taken to be Pasquill stability Class D with a wind speed of 4 m/sec (9 mph). Neutral conditions occur approximately 50 percent of the time in the United States.

[d] Populations extend at a uniform density to a radius of 80 km (50 mi) from the accident site. Population exposure pathways include acute inhalation, acute cloudshine, groundshine, resuspended inhalation, resuspended cloudshine, and ingestion of food, including initially contaminated food (RISKIND assumes that all food is grown in rural areas) (Yuan et al. 1995). It is assumed that decontamination or mitigative actions are taken.

[e] The maximally exposed individual is assumed to be at the location of maximum exposure. The locations of maximum exposure would be 100 m (330 ft) and 500 m (1,650 ft) from the accident site under neutral and stable atmospheric conditions, respectively. Individual exposure pathways include acute inhalation, acute cloudshine, and groundshine during passage of the plume. No ingested dose is considered. Note that the maximally exposed individual receives more dose than the population in a rural location. This analytic phenomena is caused by probabilistic calculations. It is very unlikely that an individual will be nearby in a rural population zone.

[f] Stable weather conditions result in minimal dispersion and dilution of the release plume and are thus unfavorable. Stable conditions were taken to be Pasquill stability Class F with a wind speed of 1 m/sec (2.2 mph). Stable conditions occur approximately one-third of the time in the United States.

and stable conditions, respectively. The dose to the maximally exposed individual is independent of the location of the accident. No acute or early fatalities would be expected from radiological causes.

L.6.4 Waste Transportation

Under all of the alternatives being considered in the SPD EIS, some transportation would be required to support routine shipments of wastes from the proposed surplus plutonium disposition facilities to treatment, storage, or disposal facilities located on the sites. All DOE sites have plans and procedures for handling and transporting waste. This transportation would be handled in the same manner as other site waste shipments and would not represent a large increase in the amount of wastes generated at these sites. The shipments would not represent any additional risks beyond the ordinary waste shipments at these sites, as analyzed in the WM PEIS (DOE 1997a).

However, in four specific cases, waste would be generated that is not covered in the WM PEIS (DOE 1997a): (1) transuranic (TRU) waste generated at Pantex from the pit conversion facility; (2) low-level waste (LLW) generated at Pantex from the pit conversion facility; (3) LLW generated at Pantex from the MOX facility, and (4) LLW generated at LLNL during lead assembly fabrication.

TRU waste generated at Pantex was not covered by the WM PEIS Record of Decision (ROD) because there was no TRU waste at Pantex at the time the ROD was issued, and none was anticipated to be generated by ongoing

site operations. Location of the pit conversion and MOX facilities at Pantex would result in the generation of TRU waste as described in Section 4.17.2.2 of the SPD EIS. Shipment of TRU waste to WIPP was analyzed using the methodology and parameters found in Appendix E of the Waste Isolation Pilot Plant *Disposal Phase Final Supplemental Environmental Impact Statement* (DOE 1997b). In order to support the transportation of TRU waste from Pantex to WIPP, 76 additional shipments were analyzed in the SPD EIS.

A fairly large increase in the amount of LLW (i.e., 25 percent of the site's current storage capacity) would be expected if the pit conversion facility were located at Pantex. Currently, this type of waste is shipped to the Nevada Test Site (NTS) for disposal. In order to support the transportation of pit conversion facility LLW from Pantex to NTS, 21 additional shipments were analyzed in the SPD EIS. The impacts were calculated from LLW transportation impacts presented in the WM PEIS (DOE 1997a).

An additional increase in the amount of LLW (i.e., 14 percent, for a total of 39 percent of the site's current storage capacity) would be expected if the pit conversion and MOX facilities are located at Pantex. Currently, this type of waste is shipped to NTS for disposal. In order to support the transportation of MOX LLW from Pantex to NTS, 38 additional shipments have been analyzed in the SPD EIS. The impacts were calculated from LLW transportation impacts presented in the WM PEIS (DOE 1997a).

Further, an increase in the LLW at LLNL would be expected if the lead assembly were done at LLNL. Currently, this type of waste is shipped to NTS for disposal. In order to support transportation of lead assembly LLW from LLNL to NTS, 44 additional shipments were analyzed in the SPD EIS. The impacts were calculated from LLW transportation impacts presented in the WM PEIS (DOE 1997a). Table L–10 shows the impacts of transporting LLW and TRU waste. The radiological risks to the public are larger for TRU than for LLW because of the larger amount of radioactive material in TRU. The dose to the crew are about the same, because the truck carrying TRU would require some shielding or spacing to ensure that the dose rate to the truck crew is less than 2 mrem/hr.

Table L–10. Impacts of Transporting LLW and Transuranic Waste

					Routine Transport Impacts				Accidental Risks
					Radiological		Nonradiological		Radiological
Waste Type	Origin	Destination	Trips	Kilometers Traveled	Crew	Public	Emission	Traffic	
LLW	Pantex, pit conversion facility	NTS	38	76,000	0.0011	0.0015	0.00018	0.0029	5.8×10^{-7}
LLW	Pantex, MOX	NTS	21	42,000	0.0006	0.0008	0.00010	0.0016	3.2×10^{-7}
LLW	LLNL	NTS	44	50,000	0.0007	0.0010	0.00056	0.0020	3.8×10^{-7}
TRU	Pantex, pit conversion facility	WIPP	76	54,000	0.0008	0.0025	0.00013	0.0015	1.1×10^{-6}

Key: LLNL, Lawrence Livermore National Laboratory; LLW, low-level waste; NTS, Nevada Test Site; TRU, transuranic; WIPP, Waste Isolation Pilot Plant.

Note: All risks are expressed in latent cancer fatalities during the implementation of the proposed actions except for the Nonradiological Accidental Traffic column, which is the number of fatalities.

L.6.5 Consequences of Sabotage or Terrorist Attack During Transportation

This section provides an evaluation of impacts that could potentially result from a malicious act on a shipment of hazardous or radioactive material during transportation. In no instance, even in severe cases such as those discussed below, could a nuclear explosion or permanent contamination of the environment leading to condemnation of land occur. Because of the Transportation Safeguards System described in Appendix L.3.2,

DOE considers sabotage or terrorist attack on an SST/SGT to be unlikely enough such that no further risk analysis is required.

DOE analyzed the nonproliferation aspects (DOE 1997c) of the transportation associated with the alternatives in the SPD EIS. In this study, DOE realized that all plutonium disposition alternatives under consideration would involve processing and transport of plutonium, which will involve more risk of theft in the short term than if the material had remained in heavily guarded storage, in return for the long-term benefit of converting the material to more proliferation-resistant forms. DOE intends to use the same SST/SGTs for these shipments that are used for shipment of intact nuclear weapons, with similar security forces and other measures. The level of assurance against possible attack during transportation can be increased to essentially any desired level by applying more resources such as money, security forces, or technology. DOE concluded that transport of plutonium is the point in the disposition process when the material is most vulnerable to overt, armed attacks designed to steal plutonium. With sufficient resources devoted to security, high levels of protection against such overt attacks can be provided. International, and particularly overseas, shipments would involve greater transportation concerns than domestic shipments (DOE 1997c).

The *Final Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel* (DOE 1996d) analyzed the spectrum of attacks on spent nuclear fuel casks. They fall into three categories or scenarios: (1) exploding a bomb near a shipping cask, (2) attacking a cask with a shaped charge or an armor-piercing weapon (i.e., an antitank weapon), and (3) hijacking (stealing) a shipping cask. None of the scenarios considered would lead to a criticality accident. DOE determined that, due to the security measures that would be in place for any spent nuclear fuel shipments, such attacks would be unlikely to occur. At a minimum, the extent or effects of any such attacks would be mitigated by the security measures. Additionally, the SPD EIS considered a comparatively few shipments (if the lead assembly program is implemented) of spent nuclear fuel. Other materials, including uranium hexaflouride, uranium dioxide, TRU waste, and LLW, are commonly shipped and do not represent particularly attractive targets for sabotage or terrorist attacks.

L.7 CUMULATIVE IMPACTS OF TRANSPORTATION

L.7.1 Radiological Impacts

The cumulative impacts of the transportation of radioactive material consist of impacts from (a) historical shipments of radioactive waste and spent nuclear fuel, (b) reasonably foreseeable actions that include transportation of radioactive material, (c) general radioactive materials transportation that is not related to a particular action, and (d) the alternatives evaluated in the SPD EIS. The assessment of cumulative transportation impacts concentrates on the cumulative impacts of offsite transportation because offsite transportation yields potential radiation doses to a greater portion of the general population than does onsite transportation. The collective dose to the general population and workers was the measure used to quantify cumulative transportation impacts. This measure of impact was chosen because it may be directly related to LCFs using a cancer risk coefficient and because of the difficulty in identifying a maximally exposed individual for shipments throughout the United States spanning the period 1943 through 2048 (106 years). The year 1943 corresponds to the start of operations at Hanford and the Oak Ridge Reservation.

Collective doses from historical shipments of spent nuclear fuel to NTS were summarized in *Summary of Doses and Health Effects* (Jones and Maheras 1994). Data for these shipments were available for 1971 through 1993 and were linearly extrapolated back to 1951, the start of operations at NTS, because data before 1971 were not available. The results of this analysis are summarized in Table L–11. Collective doses from historical shipments of low-level waste, mixed low-level waste, and TRU waste were also estimated (DOE 1996e). Over the time period 1974 through 1994, there were about 8,400 of these shipments. These

Table L–11. Cumulative Transportation-Related Radiological Collective Doses and Latent Cancer Fatalities (1943 to 2048) (person-rem)

Category	Collective Dose	
	Occupational Dose	General Population Dose
Historical shipments (DOE 1995a)	250	130
Radioactive waste to Nevada Test Site (DOE 1996e)	82	100
Reasonably foreseeable actions		
Nevada Test Site expanded use (DOE 1996e)	–	150[a]
Spent nuclear fuel management (DOE 1995a, 1996d)	360	810
Waste Management PEIS (DOE 1997a)[b]	16,000	20,000
Waste Isolation Pilot Plant (DOE 1997b)	790	5,900
Molybdenum-99 production (DOE 1996f)	240	520
Tritium supply and recycling (DOE 1995b)	–	–
Surplus highly enriched uranium disposition (DOE 1996g)	400	520
Storage and Disposition PEIS (DOE 1996a)	–	2,400[a]
Stockpile Stewardship (DOE 1996h)	–	38[a]
Pantex (DOE 1996c)	250[c]	490[c]
West Valley (DOE 1996i)	1,400	12,000
S3G and D1G prototype reactor plant disposal (DOE 1997d)	2.9–6.8	2.2–5.4
S1C prototype reactor plant disposal (DOE 1996j)	6.7	1.9
Container system for naval spent nuclear fuel (USN 1996a)	11	15
Cruiser and submarine reactor plant disposal (USN 1996b)	5.8	5.8
Submarine reactor compartment disposal (USN 1984)	–	0.053
Return of cesium 137 capsules (DOE 1994)	0.42	5.7
Uranium billets (DOE 1992)	0.50	0.014
Nitric acid (DOE 1995c)	0.43	3.1
General transportation		
1943 to 1982 (NRC 1977)	220,000	170,000
1983 to 2048 (Weiner, LaPlante, and Hageman 1991a:661–666; 1991b:655–660)	110,000	120,000
Shipments for alternatives evaluated in the SPD EIS	10	50
Summary		
Historical	330	230
Reasonably foreseeable actions	19,000	43,000
General transportation (1943 to 2048)	330,000	290,000
Shipments for alternatives evaluated in the SPD EIS	10	50
Total collective dose (rounded to nearest thousand)	349,000	333,000
Total latent cancer fatalities	140	170

[a] Includes public and occupational collective doses.
[b] Includes mixed low-level waste and low-level waste; transuranic waste included in DOE 1997b.
[c] Includes all highly enriched uranium shipped to Y–12.

shipments were estimated to result in a collective occupational dose of 82 person-rem and a collective dose for the general population of 100 person-rem.

Collective doses from other historical shipments of radioactive material were evaluated in the *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE 1995a). These include historical shipments associated with Hanford, INEEL, Oak Ridge, SRS, and Naval spent nuclear fuel and test specimens.

There are considerable uncertainties in these historical estimates of collective dose. For example, the population densities and transportation routes used in the dose assessments were based on census data for 1990 and the U.S. highway and rail system as it existed in the 1990s. Using census data for 1990 tends to overestimate historical collective doses because the U.S. population has continuously increased over the time covered in these assessments. Basing collective dose estimates on the U.S. highway and rail system as it existed in the 1990s may slightly underestimate doses for shipments that occurred in the 1940s, 1950s, and 1960s, because a larger portion of the transport routes would have been on non-interstate highways where the population may have been closer to the road. Data were not available that correlated transportation routes and population densities for the 1940s, 1950s, 1960s, and 1970s; therefore, it was necessary to use more recent data to make dose estimates. By the 1970s, the structure of the interstate highway system was largely fixed and most shipments would have been made on interstates.

Shipment data were linearly extrapolated for years when data were unavailable, which also results in uncertainty. However, this technique was validated by linearly extrapolating the data in the *Historical Overview of Domestic Spent Fuel Shipments–Update* (SAIC 1991) for 1973 through 1989 to estimate the number of shipments that took place during the time period 1964 through 1972 (also contained in SAIC 1991). The data in the historical overview could not be used directly because only shipment counts are presented for 1964 through 1982, and no origins or destinations were listed for years before 1983. Based on the data in the historical overview, linearly extrapolating the data for 1973 through 1989 overestimates the shipments for 1964 through 1972 by 20 percent when compared to the actual shipment counts for 1964 through 1972.

Transportation impacts may also result from reasonably foreseeable projects, such as the transportation impacts contained in other DOE National Environmental Policy Act analyses. The results of these analyses are summarized in Table L–11. For some of these analyses, a preferred alternative was not identified nor a ROD issued. In those cases, the alternative that was estimated to result in the largest transportation impact was included in Table L–11.

There are also reasonably foreseeable projects that involve limited transportation of radioactive material: (a) shipment of submarine reactor compartments from the Puget Sound Naval Shipyard to Hanford for burial, (b) return of cesium 137 isotope capsules to Hanford, (c) shipment of uranium billets from Hanford to the United Kingdom, and (d) shipment of low-specific-activity nitric acid from Hanford to the United Kingdom. While this is not an exhaustive list of projects that may involve limited transportation of radioactive material, it does illustrate that the transportation impacts associated with these types of projects are extremely low when compared to major projects or general transportation.

There are also general transportation activities that take place that are unrelated to the alternatives evaluated in the SPD EIS or to reasonably foreseeable actions. Examples of these activities are shipments of radiopharmaceuticals to nuclear medicine laboratories and shipments of commercial low-level radioactive waste to commercial disposal facilities. The NRC evaluated these types of shipments based on a survey of radioactive materials transportation published in NUREG-0170 (NRC 1977). Categories of radioactive material evaluated in NUREG-0170 included: (a) limited quantity shipments, (b) medical, (c) industrial, (d) fuel cycle, and (e) waste.

The NRC estimated that the annual collective worker dose for these shipments was 5,600 person-rem. The annual collective general population dose for these shipments was estimated to be 4,200 person-rem. Because comprehensive transportation doses were not available, these collective dose estimates were used to estimate

transportation collective doses for 1943 through 1982 (40 years). These dose estimates included spent nuclear fuel and radioactive waste shipments made by truck and rail.

Based on the transportation dose assessments in NUREG-0170, the cumulative transportation collective doses for 1943 through 1982 were estimated to be 220,000 person-rem for workers and 170,000 person-rem for the general population.

In 1983, another survey of radioactive materials transportation in the United States was conducted (Javitz et al. 1985). This survey included NRC and Agreement State licensees. Both spent nuclear fuel and radioactive waste shipments were included in the survey. Weiner, LaPlante, and Hageman (1991a:661–666, 1991b:665–660) used the survey by Javitz et al. (1985) to estimate collective doses from general transportation. The transportation dose assessments in Weiner, LaPlante, and Hageman (1991a:661–666, 1991b:665–660) were used to estimate transportation doses for 1983 through 2048 (66 years). Weiner, LaPlante, and Hageman (1991a:661–666) evaluated eight categories of radioactive material shipments by truck: (a) industrial, (b) radiography, (c) medical, (d) fuel cycle, (e) research and development, (f) unknown, (g) waste, and (h) other. Based on a median external exposure rate, an annual collective worker dose of 1,400 person-rem and an annual collective general population dose of 1,400 person-rem were estimated. Over the 66-year time period from 1983 through 2048, both the collective worker and general population doses were estimated to be 92,000 person-rem.

Weiner, LaPlante, and Hageman (1991b:655–660) also evaluated six categories of radioactive material shipments by plane: (a) industrial, (b) radiography, (c) medical, (d) research and development, (e) unknown, and (f) waste. Based on a median external exposure rate, an annual collective worker dose of 290 person-rem and an annual collective general population dose of 450 person-rem were estimated. Over the 66-year time period from 1983 through 2048, the collective worker dose was estimated to be 19,000 person-rem and the general population collective dose was estimated to be 30,000 person-rem.

Like the historical transportation dose assessments, the estimates of collective doses from general transportation also exhibit considerable uncertainty. For example, data for 1975 were applied to general transportation activities from 1943 through 1982. This approach probably overestimates doses because the amount of radioactive material that was transported in the 1950s and 1960s was less than the amount shipped in the 1970s. For example, in 1968, the shipping rate for radioactive material packages was estimated to be 300,000 packages per year (Patterson 1968:199–209); in 1975, this rate was estimated to be 2,000,000 packages per year (NRC 1977). However, because comprehensive data that would enable a more realistic transportation dose assessment are not available, the dose estimates developed by NRC were used.

Total collective worker doses from all types of shipments (historical, reasonably foreseeable actions, and general transportation) were estimated to be approximately 350,000 person-rem (140 LCFs), for the period of time 1943 through 2048 (106 years). Total general population collective doses were also estimated to be 330,000 person-rem (170 LCFs). The majority of the collective dose for workers and the general population was because of general transportation of radioactive material. The total number of LCFs over the time period 1943 through 2048 was estimated to be 310. Over this same period of time (106 years), about 54,060,000 people would die from cancer, based on 510,000 LCFs per year (DOC 1993). It should be noted that the estimated number of transportation-related LCFs would be indistinguishable from other LCFs, and the transportation-related LCFs would be 0.0000057 percent of the total number of expected LCFs during this timeframe.

L.7.2 Accident Impacts

For transportation accidents involving radioactive material, the dominant risk is from accidents that are unrelated to the cargo (i.e., traffic or vehicular accidents). Fatalities involving the shipment of radioactive materials were surveyed for 1971 through 1993 using the Radioactive Material Incident Report database. For 1971 through 1993, 21 vehicular accidents involving 36 fatalities occurred. These fatalities resulted from vehicular accidents

and were not associated with the radioactive nature of the cargo; no radiological fatalities because of transportation accidents have ever occurred in the United States. During the same period of time, over 1,100,000 persons were killed in vehicular accidents in the United States (National Safety Council 1994). About 100 additional vehicular accident fatalities were estimated to result from the transportation of radioactive material (i.e., the transportation associated with reasonably foreseeable actions and general radioactive materials transportation). During the 39-year time period from 2010 through 2048, approximately 1,600,000 people would be expected to be killed in vehicular accidents in the United States. The vehicular accident fatalities associated with radioactive materials transportation would be expected to be 0.006 percent of the total number of vehicular accident fatalities.

L.8 UNCERTAINTY AND CONSERVATISM IN ESTIMATED IMPACTS

The sequence of analyses performed to generate the estimates of radiological risk for the transportation includes: (1) determination of the inventory and characteristics, (2) estimation of shipment requirements, (3) determination of route characteristics, (4) calculation of radiation doses to exposed individuals (including estimation of environmental transport and uptake of radionuclides), and (5) estimation of health effects. Uncertainties are associated with each of these steps. Uncertainties exist in the way that the physical systems being analyzed are represented by the computational models, in the data required to exercise the models (due to measurement errors, sampling errors, natural variability, or unknowns simply caused by the future nature of the actions being analyzed), and in the calculations themselves (e.g., approximate algorithms used by the computers).

In principle, the uncertainty associated with each input or computational source can be estimated and the resultant uncertainty in each set of calculations can be predicted. Thus, the uncertainties from one set of calculations to the next can be propagated and the uncertainty in the final or absolute result can be estimated; however, conducting such a full-scale quantitative uncertainty analysis is often impractical and sometimes impossible, especially for actions to be initiated at an unspecified time in the future. Instead, the risk analysis is designed to ensure, through uniform and judicious selection of scenarios, models, and input parameters, that relative comparisons of risk among the various alternatives are meaningful. In the transportation risk assessment, this design is accomplished by uniformly applying common input parameters and assumptions to each alternative. Therefore, although considerable uncertainty is inherent in the absolute magnitude of the transportation risk for each alternative, much less uncertainty is associated with the relative differences among the alternatives in a given measure of risk.

In the following sections, areas of uncertainty are discussed for the assessment steps enumerated above. Special emphasis is placed on identifying whether the uncertainties affect relative or absolute measures of risk. The degree of conservatism of the assumption is addressed. Where practical, the parameters that most significantly affect the risk assessment results are identified.

L.8.1 Uncertainties in Material Inventory and Characterization

The inventories and the physical and radiological characteristics are important input parameters to the transportation risk assessment. The potential amount of transportation for any alternative is determined primarily by the projected nuclear material inventory and assumptions concerning shipment capacities. The physical and radiological characteristics are important in determining the amount of material released during accidents and the subsequent doses to exposed individuals through multiple environmental exposure pathways.

Uncertainties in the inventory and characterization will be reflected to some degree in the transportation risk results. If the inventory is overestimated (or underestimated), the resulting transportation risk estimates also will be overestimated (or underestimated) by roughly the same factor. However, the same inventory estimates are used to analyze the transportation impacts of each of the SPD EIS alternatives. Therefore, for comparative

purposes, the observed differences in transportation risks among alternatives are believed to represent unbiased, reasonably accurate estimates from current information in terms of relative risk comparisons.

No detailed characterization of surplus nonpit plutonium was included in the evaluation of each shipment of this material. Such information typically would not be compiled until actual shipments were being planned. Only global, conservative assumptions were used in the impact analysis. For the purpose of analysis, DOE assumed a maximum of 4.5 kg (9.9 lb) of plutonium per package, and 40 packages per SST/SGT. Actual SST/SGT shipments could handle more material. This leads to a conservative estimate of radiological accident risks for shipment of surplus nonpit plutonium for each alternative. However, since such shipments have been shown to have lower radiological accident risks than shipments of either plutonium dioxides from pits or lead assembly spent fuel, the overall effect would be very small.

L.8.2 Uncertainties in Containers, Shipment Capacities, and Number of Shipments

The amount of transportation required for each alternative is based, in part, on assumptions concerning the packaging characteristics and shipment capacities for commercial trucks and safe, secure transports. Changes in loading, tiedown, or packaging practices could affect estimates. Representative shipment capacities were defined for assessment purposes based on probable future shipment capacities. In reality, the actual shipment capacities may differ from the predicted capacities, so the projected number of shipments, and consequently the total transportation risk, would change. However, although the predicted transportation risks would increase or decrease accordingly, the relative differences in risks among alternatives would remain about the same. The maximum amount of material allowed in Type B containers is set by conservative safety analyses.

L.8.3 Uncertainties in Route Determination

Representative routes were determined between all origin and destination sites considered in the SPD EIS. The routes were determined consistent with current guidelines, regulations, and practices, but may not be the actual routes that would be used in the future. In reality, the actual routes could differ from the representative ones in terms of distances and total population along the routes. Moreover, since radioactive materials could be transported over an extended period of time starting at some time in the future, the highway infrastructures and the demographics along routes could change. These effects were not accounted for in the transportation assessment; however, it is not anticipated that these changes would significantly affect relative comparisons of risk among the alternatives considered in the SPD EIS. The dates and times that specific transportation routes would be used are classified.

L.8.4 Uncertainties in the Calculation of Radiation Doses

The models used to calculate radiation doses from transportation activities introduce a further uncertainty in the risk assessment process. It is generally difficult to estimate the accuracy or absolute uncertainty of the risk assessment results. The accuracy of the calculated results is closely related to the limitations of the computational models and the uncertainties in each of the input parameters that the model requires. The single greatest limitation facing users of RADTRAN, or any computer code of this type, is the scarcity of data for certain input parameters.

Uncertainties associated with the computational models are minimized by using state-of-the-art computer codes that have undergone extensive review. Because there are numerous uncertainties that are recognized but difficult to quantify, assumptions are made at each step of the risk assessment process that are intended to produce conservative results (i.e., overestimate the calculated dose and radiological risk). Because parameters and assumptions are applied to all alternatives, this model bias is not expected to affect the meaningfulness of relative comparisons of risk; however, the results may not represent risks in an absolute sense.

The single largest contributor to the collective population doses calculated with RADTRAN was found to be the dose to members of the public at truck stops. Currently, RADTRAN uses a simple point-source approximation for truck-stop exposures and assumes that the total stop time for a shipment is proportional to the shipment distance. The parameters used in the stop model were based on a survey of a very limited number of radioactive material shipments that examined a variety of shipment types in different areas of the country. It was assumed that stops occur as a function of distance, with a stop rate of 0.011 hr/km (0.018 hr/mi). For non-SST/SGT shipments, it was further assumed that an average of 50 people at each stop are exposed at a distance of 20 m (66 ft). In RADTRAN, the population dose is directly proportional to the external shipment dose rate and the number of people exposed, and inversely proportional to the square of the distance. For this assessment, it was assumed that many shipments (nonpit plutonium and spent nuclear fuel) would have external dose rates at the regulatory limit of 10 mrem/hr at 2 m (6.6 ft). In practice, the external dose rates would vary from shipment to shipment. The stop rate assumed results in an hour of stop time per 100 km (62 mi) of travel.

Based on the qualitative discussion with shippers, the parameter values used in the assessment appear to be conservative. However, data do not exist to quantitatively assess the degree of control, location, frequency, and duration of truck stops. However, based on the regulatory requirements of 10 CFR 73 for continuous escort of the material and the requirement for two drivers, it is clear that the trucks would be on the move much of the time until arrival at the destination. Therefore, the calculated impacts are extremely conservative. By using these conservative parameters, the calculations in the SPD EIS are consistent with the RADTRAN published values.

Shielding exposed populations is not considered. For all incident-free exposure scenarios, no credit has been taken for shielding exposed individuals. In reality, shielding would be afforded by trucks and cars sharing the transport routes, rural topography, and the houses and buildings in which people reside. Incident-free exposure to external radiation could be reduced significantly depending on the type of shielding present. For residential houses, shielding factors (i.e., the ratio of shielded to unshielded exposure rates) were estimated to range from 0.02 to 0.7, with a recommended value of 0.33. If shielding were to be considered for the maximally exposed resident living near a transport route, the calculated doses and risks would be reduced by approximately 70 percent. Similar levels of shielding may be provided to individuals exposed in vehicles.

Postaccident mitigative actions were not considered for dispersal accidents. For severe accidents involving the release and dispersal of radioactive materials in the environment, no postaccident mitigative actions, such as interdiction of crops or evacuation of the accident vicinity, were considered in this risk assessment. Postaccident mitigative measures to reduce groundshine doses (evacuation and/or decontamination) are assumed to occur 24 hours after the accident in RADTRAN analyses. Additionally, RADTRAN assumes that highly contaminated crops are not ingested (Neuhauser and Knipe 1995). Since RISKIND is modeling the worst credible accident, these measures were not considered. In reality, mitigative actions would take place following an accident in accordance with U.S. Environmental Protection Agency radiation protection guides for nuclear incidents (EPA 1992). The effects of mitigative actions on population accident doses are highly dependent on the severity, location, and timing of the accident. For this risk assessment, ingestion doses were only calculated for accidents occurring in rural areas (the calculated ingestion doses; however, it assumed, all food grown on contaminated ground is consumed and is not limited to the rural population). Interdiction of foodstuffs would act to reduce, but not eliminate, this contribution.

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Table M–1. Racial and Ethnic Composition of Minority Populations Residing Within 80 km of Candidate DOE Sites in 1990

Candidate Site	Total Pop.	Minority Pop.	Percent Minority Pop.	Asian or Pacific Islander Pop.	Percent Asian or Pacific Islander Pop.	Black Pop.	Percent Black Pop.	Hispanic Pop.	Percent Hispanic Pop.	Native American Pop.	Percent Native American Pop.	Other Race	Percent Other Race Pop.	White Pop.	Percent White Pop.
Hanford 400 Area	277,515	70,493	25.4	3,989	1.4	2,788	1.0	59,736	21.5	3,981	1.4	372	0.1	206,651	74.5
Hanford 200 East	346,031	90,526	26.2	4,852	1.4	4,144	1.2	74,490	21.5	7,040	2.0	556	0.2	254,949	73.7
INEEL	119,138	11,757	9.9	1,166	1.0	385	0.3	7,154	6.0	3,052	2.6	135	0.1	107,246	90.0
Pantex	266,004	50,778	19.1	3,450	1.3	11,130	4.2	33,977	12.8	2,220	0.8	363	0.1	214,864	80.7
[Text deleted.]															
SRS APSF, if built	614,095	232,781	37.9	5,888	1.0	219,136	35.7	6,456	1.1	1,300	0.2	175	0.0	381,139	62.1
SRS DWPF	626,317	241,168	38.5	5,951	1.0	227,378	36.3	6,521	1.0	1,319	0.2	175	0.0	384,974	61.5

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility.

Table M–2. Projected Racial and Ethnic Composition of Minority Populations Residing Within 80 km of Candidate DOE Sites in 1997

Candidate Site	Total Pop.	Minority Pop.	Percent Minority Pop.	Asian or Pacific Islander Pop.	Percent Asian or Pacific Islander Pop.	Black Pop.	Percent Black Pop.	Hispanic Pop.	Percent Hispanic Pop.	Native American Pop.	Percent Native American Pop.	Other Race	Percent Other Race Pop.	White Pop.	Percent White Pop.
Hanford 400 Area	324,640	98,586	30.4	5,640	1.7	3,153	1.0	85,642	26.4	4,151	1.3	418	0.1	225,636	69.5
Hanford 200 East	396,420	126,166	31.8	6,885	1.7	4,666	1.2	106,551	26.9	8,064	2.0	631	0.2	269,623	68.0
INEEL	145,117	16,785	11.6	1,627	1.1	590	0.4	10,793	7.4	3,775	2.6	166	0.1	128,166	88.3
Pantex	292,004	62,845	21.5	5,107	1.7	12,801	4.4	42,490	14.6	2,447	0.8	414	0.1	228,745	78.3
[Text deleted.]															
SRS APSF, if built	694,891	274,985	39.6	9,276	1.3	254,807	36.7	9,456	1.4	1,447	0.2	201	0.0	419,704	60.4
SRS DWPF	688,352	275,654	40.0	9,332	1.4	255,459	37.1	9,422	1.4	1,441	0.2	201	0.0	412,497	59.9

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility.

Table M–3. Projected Racial and Ethnic Composition of Minority Populations Residing Within 80 km of Candidate DOE Sites in 2010

Candidate Site	Total Pop.	Minority Pop.	Percent Minority Pop.	Asian or Pacific Islander Pop.	Percent Asian or Pacific Islander Pop.	Black Pop.	Percent Black Pop.	Hispanic Pop.	Percent Hispanic Pop.	Native American Pop.	Percent Native American Pop.	Other Race	Percent Other Race Pop.	White Pop.	Percent White Pop.
Hanford 400 Area	426,473	163,767	38.4	9,287	2.2	3,907	0.9	144,750	33.9	5,824	1.4	508	0.1	262,198	61.5
Hanford 200 East	532,179	207,732	39.0	11,341	2.1	5,763	1.1	180,345	33.9	10,283	1.9	761	0.1	323,686	60.8
INEEL	185,748	27,887	15.0	2,426	1.3	960	0.5	18,887	10.2	5,615	3.0	210	0.1	157,651	84.9
Pantex	332,001	84,418	25.4	7,626	2.3	15,916	4.8	58,101	17.5	2,775	0.8	490	0.1	247,093	74.4
[Text deleted.]															
SRS APSF, if built	802,140	336,549	42.0	13,974	1.7	306,706	38.2	14,271	1.8	1,598	0.2	235	0.0	465,356	58.0
SRS DWPF	815,380	345,527	42.4	14,093	1.7	315,444	38.7	14,374	1.8	1,617	0.2	235	0.0	469,617	57.6

Key: APSF, Actinide Packaging and Storage Facility; DWPF, Defense Waste Processing Facility.

Table M–4. Uncertainties in Estimates of Total and Minority Populations for the Year 2010

Candidate Site	No. of Partially Included Block Groups	No. of Fully Included Block Groups	T/P	Upper Bound for Total Population	Estimate of Total Population	Lower Bound for Total Population	Upper Bound for Minority Population	Estimate of Minority Population	Lower Bound for Minority Population
Hanford									
400 Area	8(OR) 39(WA)	31(OR) 233(WA)	5.6	422,872	415,828	397,570	161,697	159,713	153,854
200 East	13(OR) 42(WA)	6(OR) 365(WA)	6.7	519,364	509,136	482,861	205,420	202,832	196,212
INEEL	39	91	2.3	215,134	183,565	155,726	32,443	27,650	23,498
Pantex	22	483	22.0	338,218	330,300	321,477	85,566	83,963	82,332
SRS									
[Text deleted.]									
APSF, if built	27(GA) 55(SC)	245(GA) 277(SC)	6.4	865,698	807,583	753,569	365,148	339,708	318,908
DWPF	31(GA) 57(SC)	232(GA) 291(SC)	5.9	815,864	800,530	758,866	347,365	340,704	324,062

Key: APSF, Actinide Packaging and Reprocessing Facility; DWPF, Defense Waste Processing Facility; GA, Georgia; OR, Oregon; SC, South Carolina; WA, Washington.

block groups that are partly within the circle of 80-km (50-mi) radius centered at the various facilities. Column 3 shows the number of block groups that lie completely within the circle. Potentially affected areas surrounding Hanford and SRS include two States. Columns 2 and 3 show the number of partial or total inclusions for the affected States. Column 4 of the table, denoted as "T/P," shows the number of totally included block groups divided by the number of partially included block groups. In order to minimize the uncertainties in the population estimate, it is desirable that this ratio be as large as possible. Column 5 shows upper bounds for the estimates of the total population listed in column 6. As discussed above, upper bounds were obtained by including the total population of all block groups that lie at least partially within the affected area. Lower bounds for the estimate of total population shown in column 7 were obtained by including only the populations of totally included block groups. Analogous statements apply to columns 8 through 10.

As would be expected from the value of T/P shown in column 4, uncertainties in the total population estimate for Pantex were the smallest among the four sites (+2.4 percent and −2.7 percent), as were the uncertainties in the estimate of the minority population at risk near Pantex (+1.9 percent and −1.9 percent). Uncertainties in the population estimates for INEEL were the largest among the four sites (+17.2 percent and −15.2 percent for total population; +17.3 percent and −15.0 percent for minority population). None of the uncertainties shown in Table M–4 are large enough to noticeably affect the conclusions regarding radiological health effects or environmental justice.

M.5.2 Geographical Dispersion of Minority and Low-Income Populations

Figures M–2 through M–9 show the geographical distributions of minority and low-income populations at risk in the vicinity of the candidate DOE sites. Distributions shown in these figures are based on baseline population data for 1990. Even-numbered figures show the geographical distribution of minority populations in potentially affected areas within a distance of 80 km (50 mi) of candidate facilities. Block groups are shaded to indicate the percentage of the total population comprised of minorities. According to the decennial census of 1990, minorities comprised 24.2 percent of the total population of the contiguous United States. Block groups unshaded in the even-numbered figures are those for which the percentage of minority residents is less than the national percentage minority population. Areas shaded in gray show block groups for which the percentage of minority residents exceeds the national minority percentage by less than a factor of two. Diagonally hatched block groups shown in the even-numbered figures are those for which the percentage of minority residents exceeds the national minority percentage by a factor of two or more.

Odd-numbered figures show the geographical distribution of low-income populations potentially at risk from implementation of the proposed action or alternatives. According to the decennial census of 1990, 13.4 percent of the population of the contiguous United States reported incomes less than the poverty threshold. Block groups unshaded in Figures M–1, M–5, M–7, and M–9 are those for which the percentage of low-income residents is less than the national percentage of persons reporting an income less than the poverty threshold. Areas shaded in gray show block groups for which the percentage of low-income residents exceeds the national low-income percentage by less than a factor of two. Diagonally hatched block groups shown in the odd-numbered figures are those for which the percentage of low-income residents exceeds the national low-income percentage by a factor of two or more.

M.5.3 Environmental Effects on Minority and Low-Income Populations Residing Near Candidate DOE Sites

The analysis of environmental effects on populations residing within 80 km (50 mi) of proposed facilities is presented in Chapter 4 of the SPD EIS. This analysis shows that no radiological fatalities are likely to result from implementation of the proposed action or alternatives. Radiological risks to the public are small regardless of the racial and ethnic composition of the population, and regardless of the economic status of

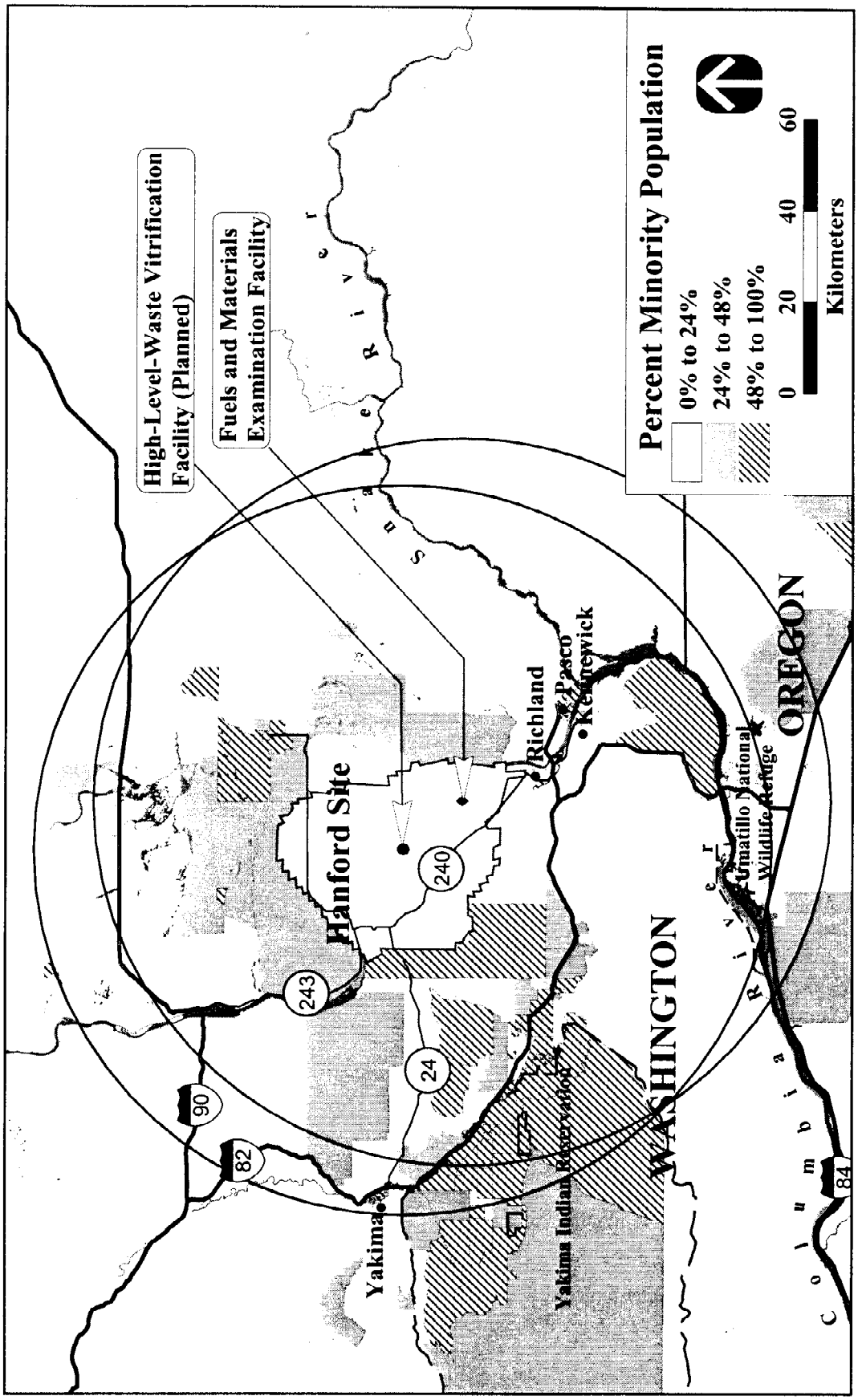

Figure M–2. Geographical Distribution of the Minority Population Residing Within 80 km (50 mi) of Proposed Facilities at Hanford

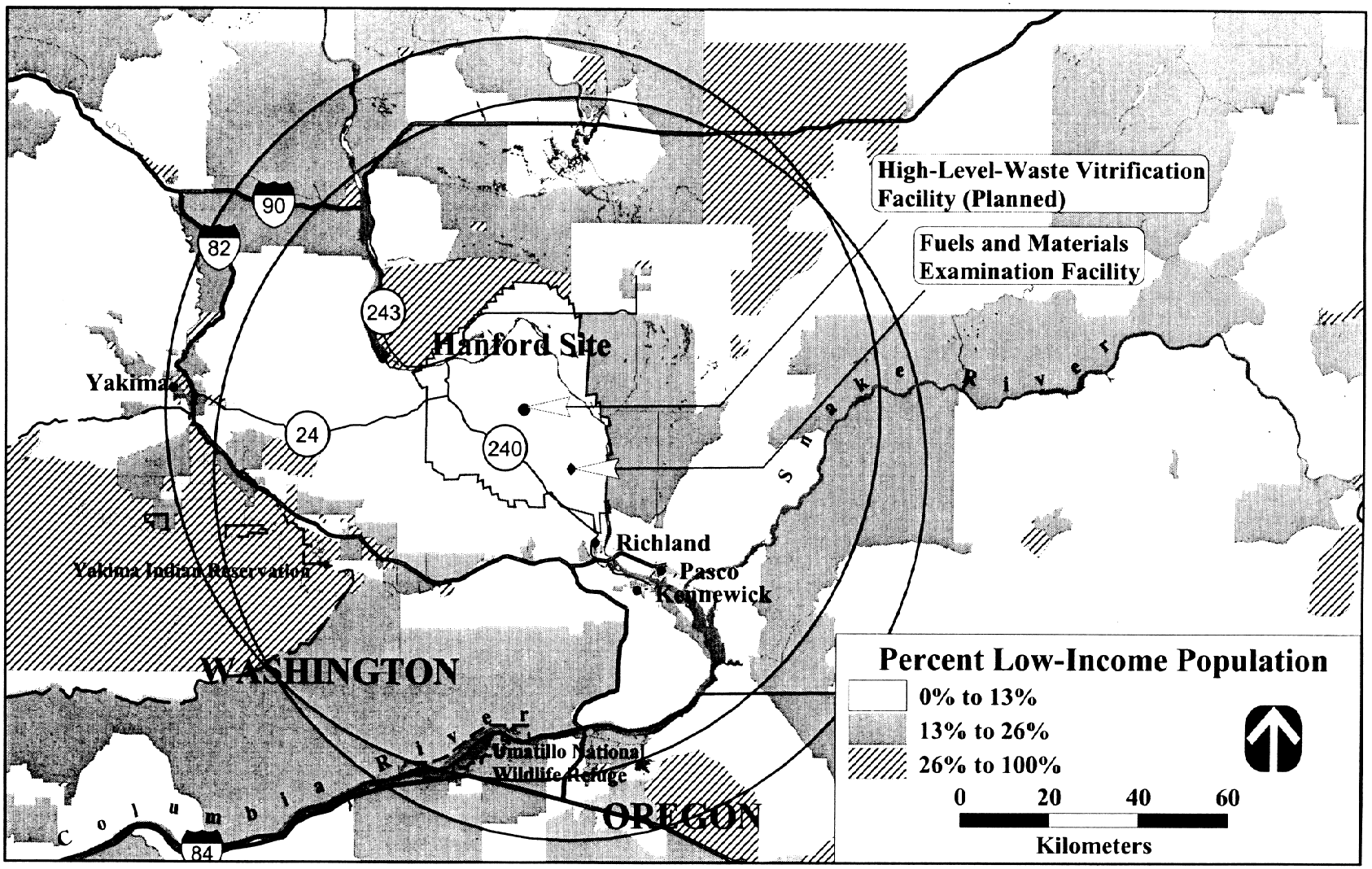

Figure M–3. Geographical Distribution of the Low-Income Population Residing Within 80 km (50 mi) of Proposed Facilities at Hanford

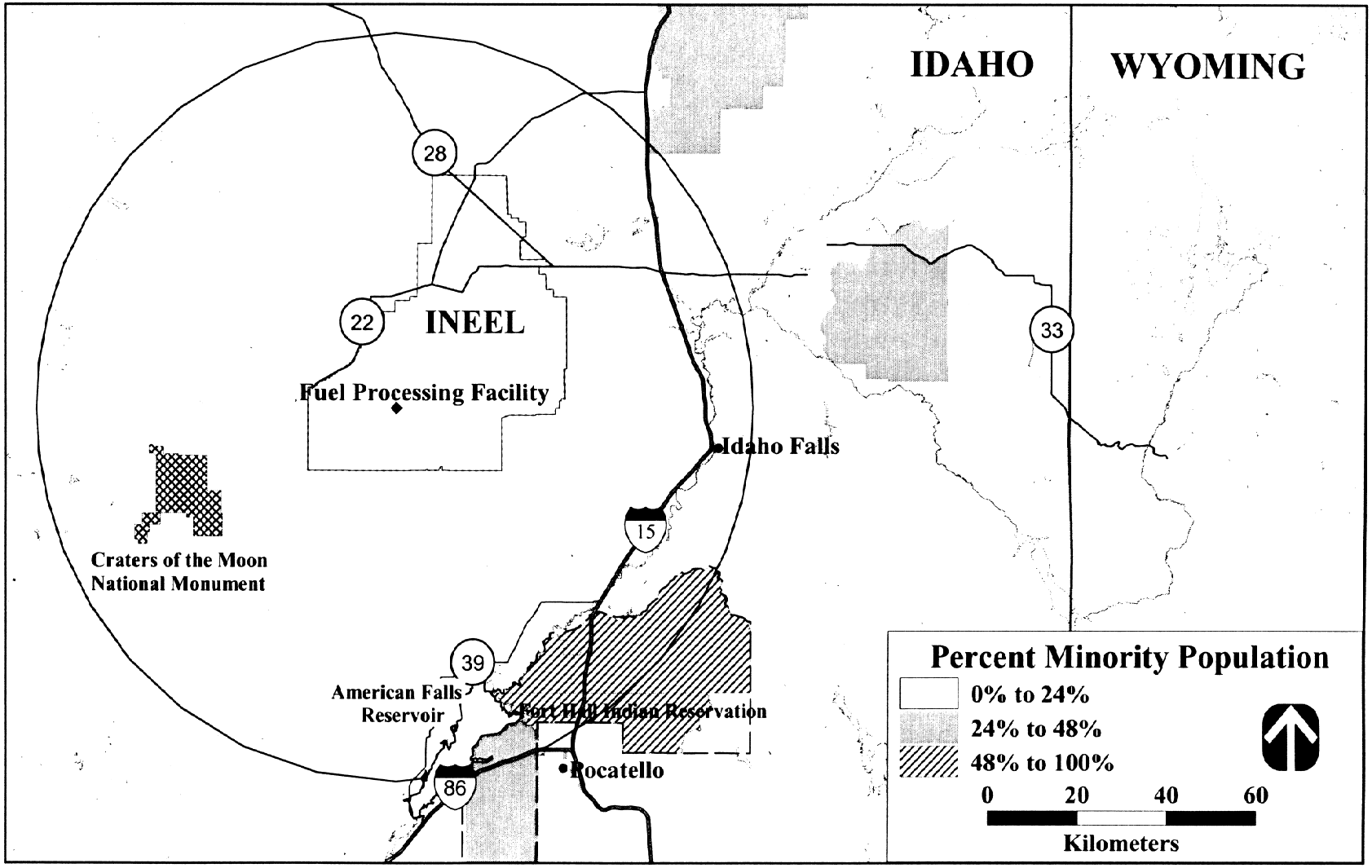

Figure M–4. Geographical Distribution of the Minority Population Residing Within 80 km (50 mi) of Fuel Processing Facility at INEEL

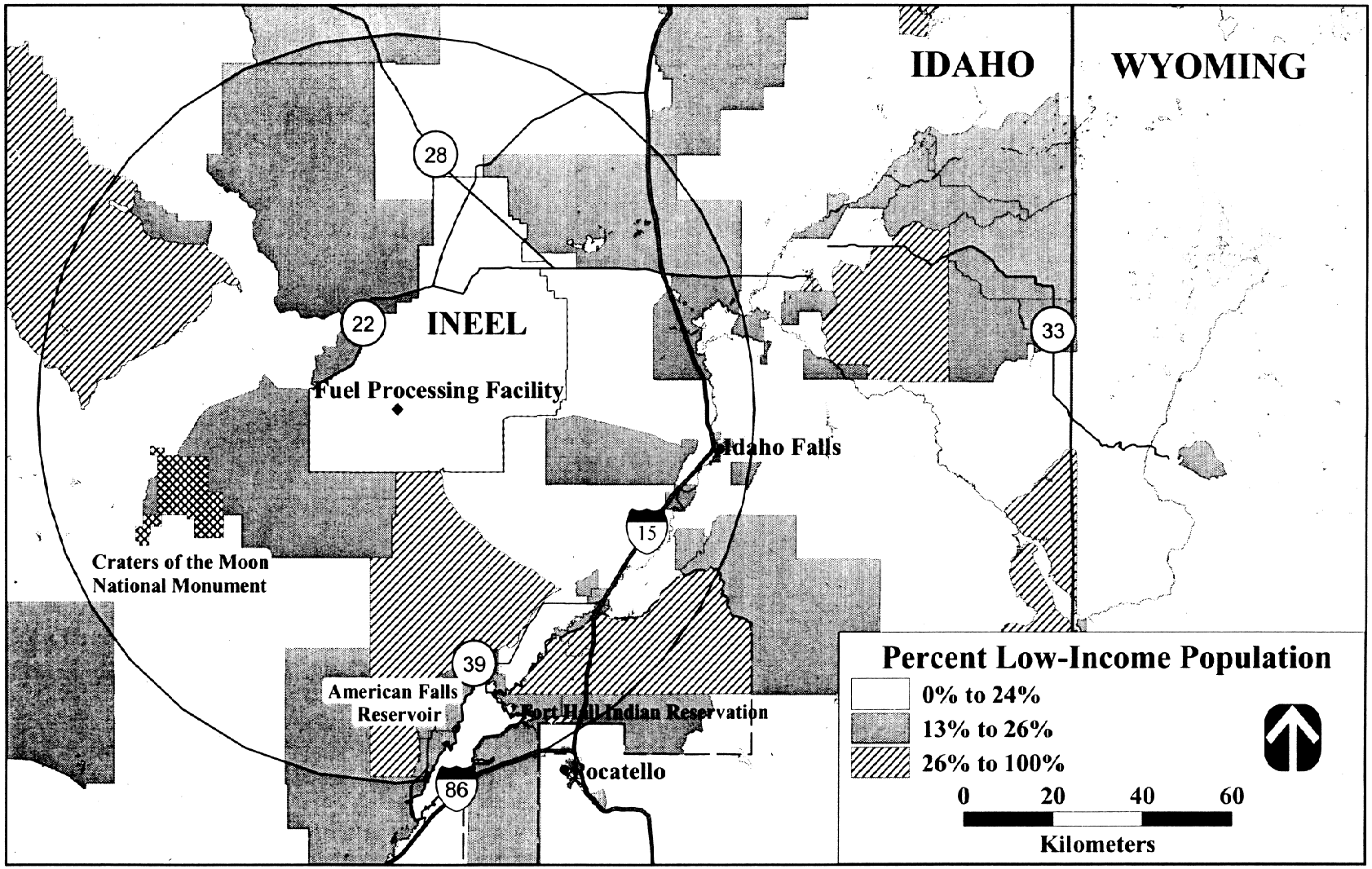

Figure M–5. Geographical Distribution of the Low-Income Population Residing Within 80 km (50 mi) of Fuel Processing Facility at INEEL

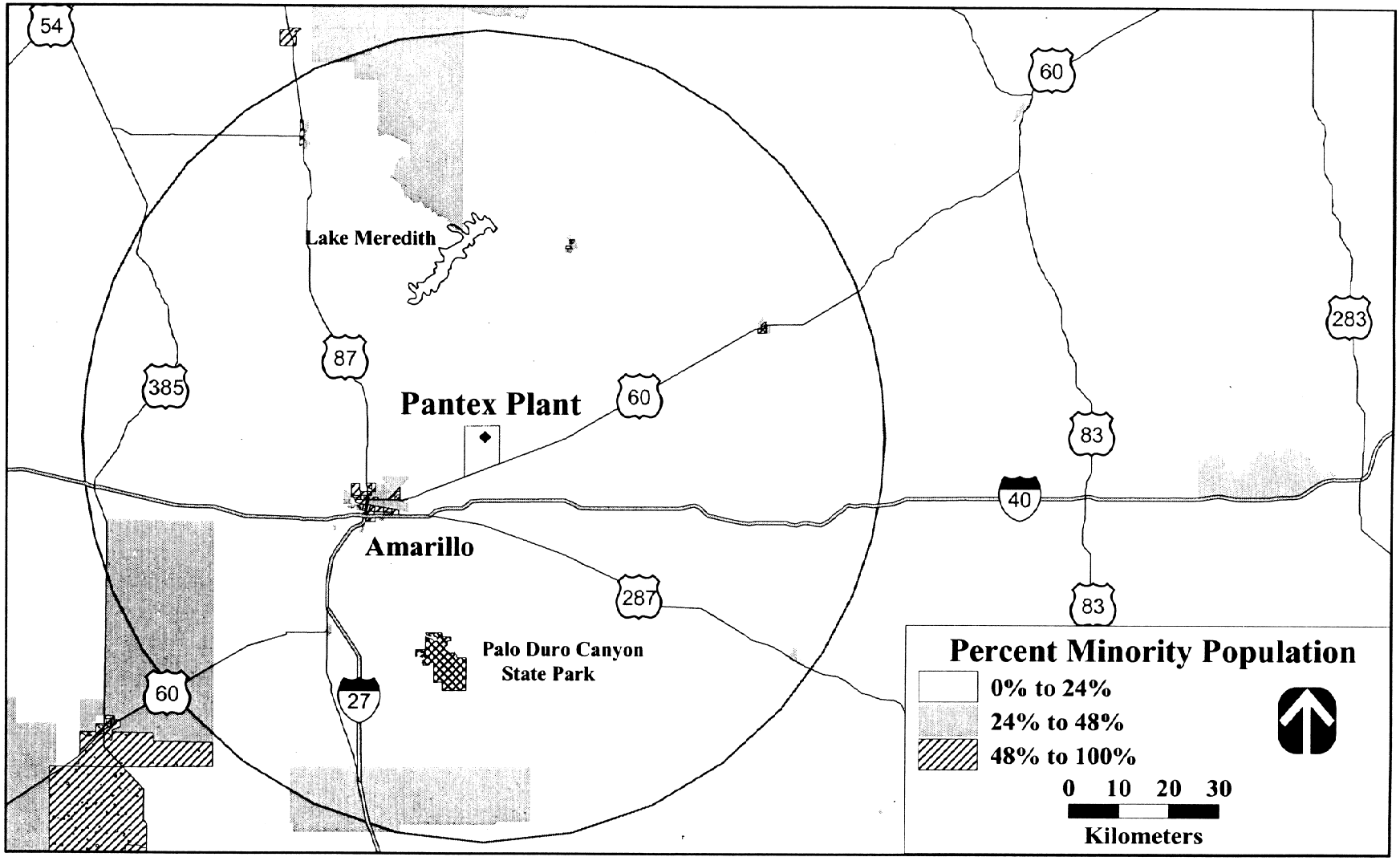

Figure M–6. Geographical Distribution of the Minority Population Residing Within 80 km (50 mi) of Potentially Affected Area at Pantex

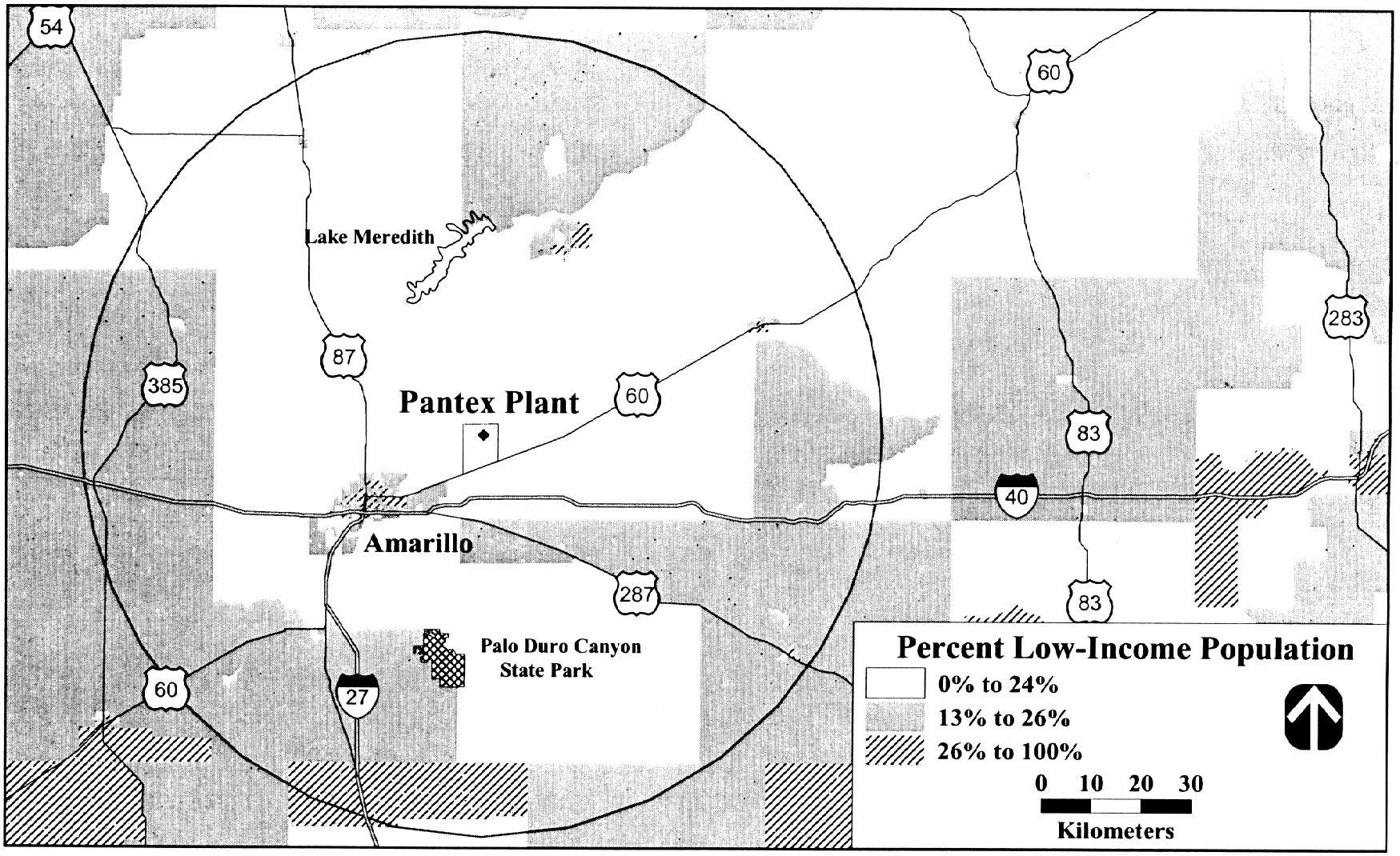

Figure M–7. Geographical Distribution of the Low-Income Population Residing Within 80 km (50 mi) of Potentially Affected Area at Pantex

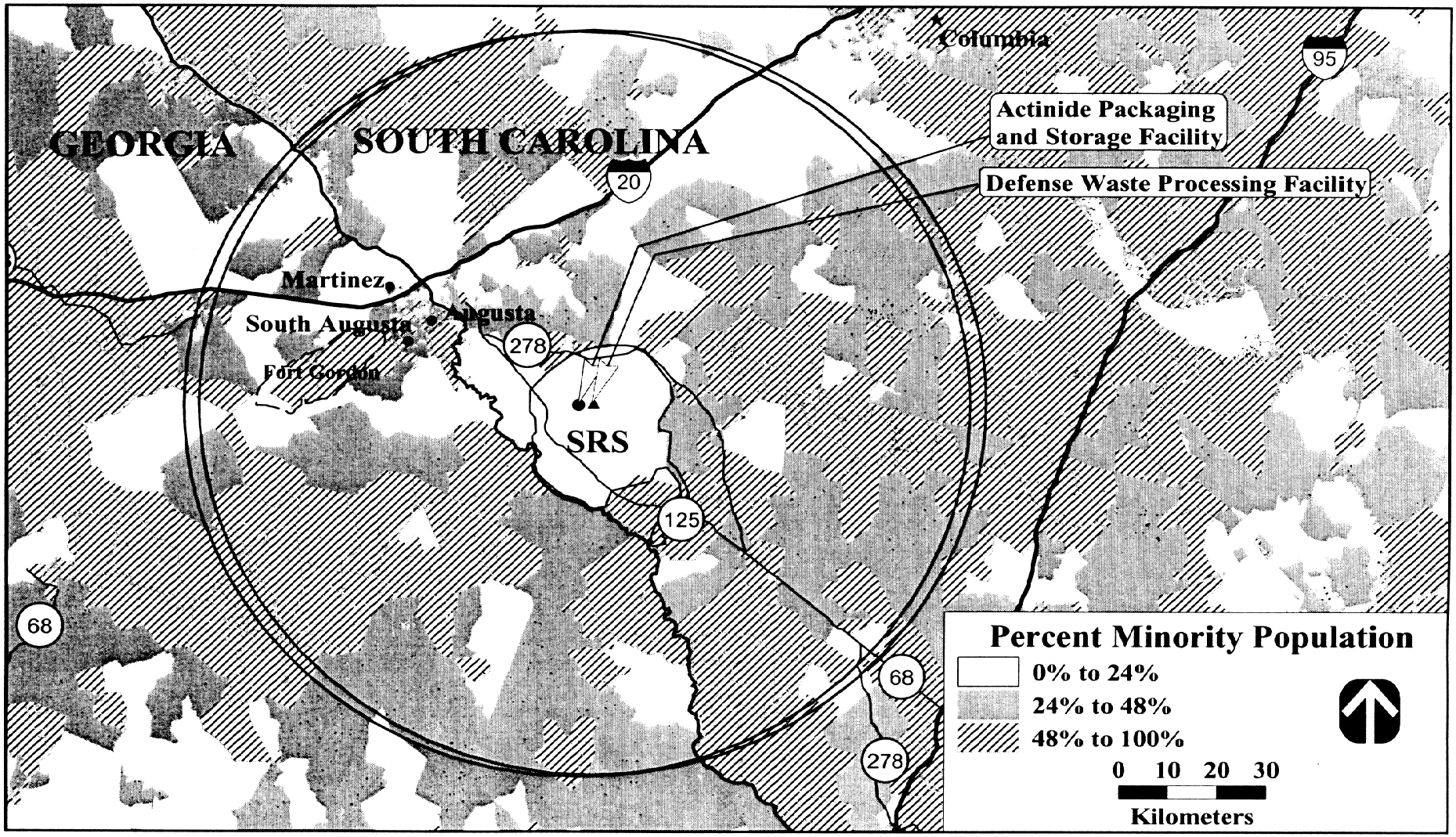

Figure M–8. Geographical Distribution of the Minority Population Residing Within 80 km (50 mi) of Proposed Facilities at SRS

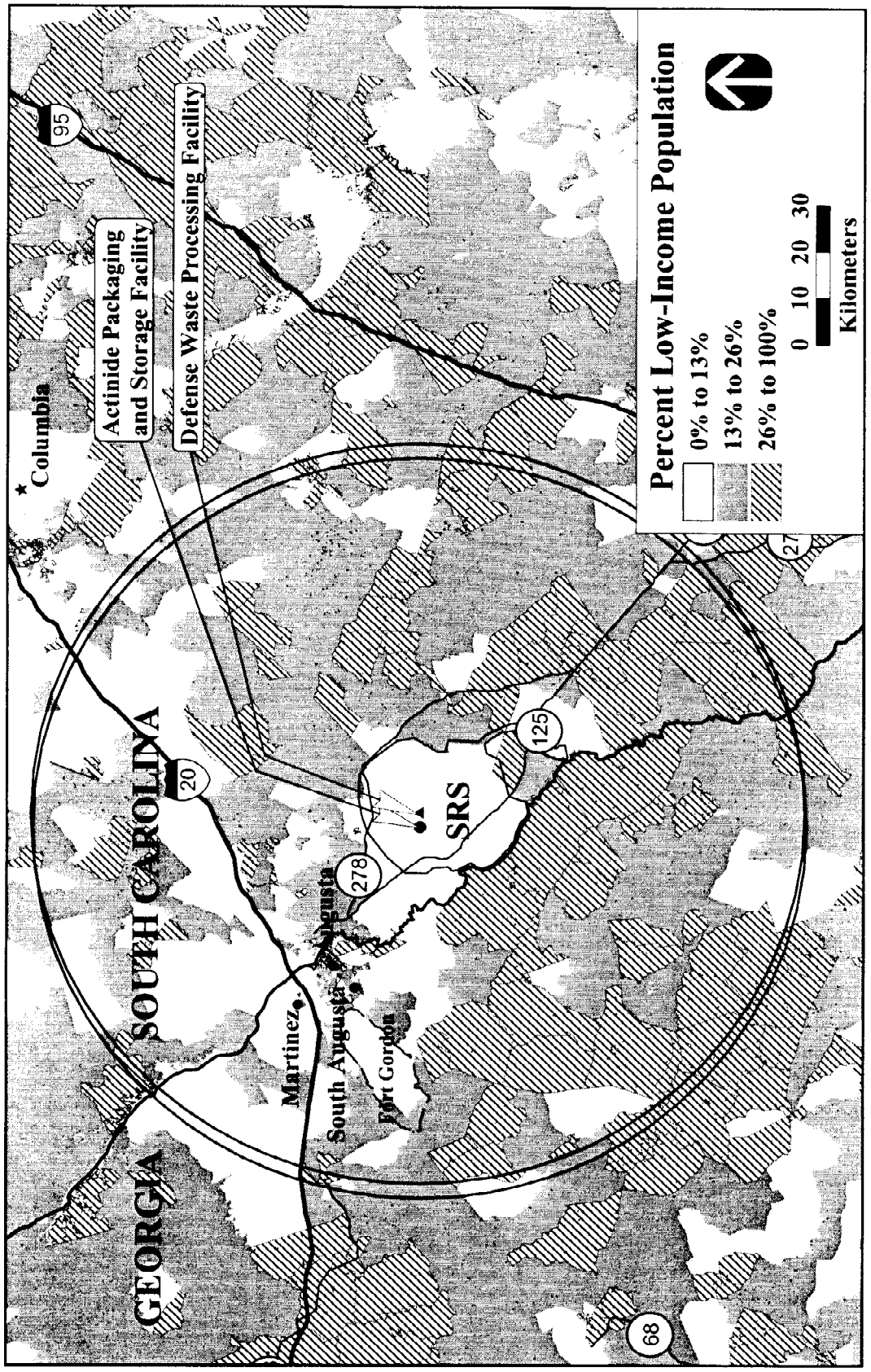

Figure M–9. Geographical Distribution of the Low-Income Population Residing Within 80 km (50 mi) of Proposed Facilities at SRS

individuals comprising the population. Nonradiological risks to the general population are also small regardless of the racial and ethnic composition or economic status of the population. Thus, disproportionately high and adverse impacts on minority and low-income populations residing near the various facilities are not likely to result from implementation of the proposed action or alternatives.

M.6 RESULTS FOR TRANSPORTATION ROUTES

Table M–5 shows minority populations residing along 1.6-km (1-mi) corridors centered on routes that are representative of those that could be used for the transportation of nuclear materials under the proposed action or alternatives. Table M–6 shows similar data for low-income populations. Population data for Tables M–5 and M–6 were extracted from Tables P–12 and P–121 of the STF–3A files (DOC 1992). Distances from a given origin to a given destination are similar but not identical to corresponding distances shown in Appendix L. This is because distances listed in Appendix L were calculated with the HIGHWAY computer code, while distances shown in Tables M–5 and M–6 were obtained from a Geographical Information System analysis using TigerLine data and STF3A files prepared by the Census Bureau. Both techniques use block group spatial resolution, and the differences are generally less than 5 percent.

Total and minority populations residing in the highway corridors are listed in Columns 4 and 5, respectively, of Table M–5. Column 6 shows minority populations residing within highway corridors as a percentage of the total population. Although total and minority populations residing within the corridors generally tend to increase with increasing distance, the relationship is clearly route dependent.

As discussed in Appendix L of the SPD EIS, implementation of the proposed action or alternatives would not result in significant radiological or nonradiological risks to populations residing along highway transportation routes. Although the percentage minority or low-income populations residing along highway routes can vary by as much as a factor of four, results of the analysis presented in Chapter 4 are independent of the racial and ethnic composition of populations within the corridors, as well as the economic status of populations at risk within the corridors. Implementation of the proposed action or alternatives is not likely to result in disproportionately high and adverse effects on minority or low-income populations residing within representative transportation corridors.

Table M–5. Minority Populations Residing Along Transportation Routes for Surplus Plutonium

Origin	Destination	Distance (km)	Total Population Along Route	Minority Population Along Route	Percentage Minority Population Along Route
ANL–W	Hanford	1,035	82,418	9,356	11.4
ANL–W	Pantex	2,395	281,386	82,566	29.3
ANL–W	SRS	3,756	580,985	122,415	21.1
Fuel fabrication	Hanford	4,760	601,233	95,417	15.9
Fuel fabrication	INEEL	4,092	556,388	88,331	15.9
Fuel fabrication	LANL	3,201	506,962	126,460	24.9
Fuel fabrication	Pantex	2,563	430,359	87,635	20.4
Fuel fabrication	SRS	578	75,050	30,702	40.9
Hanford	Geological repository	1,888	248,006	31,424	12.7
Hanford	INEEL	949	74,624	8,927	12.0
Hanford	LANL	2,515	276,768	71,860	26.0
Hanford	ORR	3,993	434,235	62,000	14.3
Hanford	Pantex	3,040	342,903	92,151	26.9
INEEL	ORR	3,316	389,496	59,174	15.2
INEEL	SRS	3,702	574,433	123,656	21.5
LANL	ANL–W	1,868	230,510	60,265	26.1
LANL	INEEL	1,840	227,759	65,563	28.8
LANL	LLNL	1,218	454,603	224,303	49.3
LANL	Pantex	647	85,252	35,326	41.4
LANL	SRS	2,779	521,907	163,376	31.3
LLNL	Fuel fabrication	4,838	771,701	257,880	33.4
LLNL	Geological repository	1,140	414,432	192,001	46.3
LLNL	Hanford	1,428	380,755	50,764	13.3
LLNL	INEEL	1,559	373,040	72,575	19.5
LLNL	Pantex	2,302	476,701	226,661	47.5
LLNL	SRS	4,395	856,464	403,622	47.1
Pantex	Geological repository	1,986	186,981	66,118	35.4
Pantex	INEEL	2,365	293,805	85,783	29.2
Pantex	ORR	1,753	245,038	59,671	24.4
Pantex	SRS	2,165	441,441	126,441	28.6
Pantex	WIPP	538	121,377	37,477	30.9
Portsmouth, OH	Fuel fabrication	977	239,221	40,636	17.0
RFETS	Hanford	1,848	141,585	23,178	16.4
RFETS	INEEL	1,170	104,960	17,791	17.0
RFETS	Pantex	1,252	252,177	81,450	32.3
RFETS	SRS	2,954	540,944	123,248	22.8
SRS	Hanford	4,377	615,204	126,016	20.5
SRS	ORR	568	109,074	15,614	14.3

Key: ANL–W, Argonne National Laboratory–West; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; ORR, Oak Ridge Reservation; RFETS, Rocky Flats Environmental Technology Site; WIPP, Waste Isolation Pilot Plant.

Table M–6. Low-Income Populations Residing Along Transportation Routes for Surplus Plutonium

Origin	Destination	Distance (km)	Total Population Along Route	Low-Income Population Along Route	Percentage Low-Income Population Along Route
ANL–W	Hanford	1,035	82,418	10,016	12.2
ANL–W	Pantex	2,395	281,386	44,102	15.7
ANL–W	SRS	3,756	580,985	60,473	10.4
Fuel fabrication	Hanford	4,760	601,233	61,518	10.2
Fuel fabrication	INEEL	4,092	556,388	55,229	9.9
Fuel fabrication	LANL	3,201	506,962	73,801	14.6
Fuel fabrication	Pantex	2,563	430,359	64,909	15.1
Fuel fabrication	SRS	578	75,050	10,673	14.2
Hanford	Geological repository	1,888	248,006	28,699	11.6
Hanford	INEEL	949	74,624	9,468	12.7
Hanford	LANL	2,515	276,768	42,384	15.3
Hanford	ORR	3,993	434,235	42,696	9.8
Hanford	Pantex	3,040	342,903	53,293	15.5
INEEL	ORR	3,316	389,496	39,171	10.1
INEEL	SRS	3,702	574,433	61,713	10.7
LANL	ANL–W	1,868	230,510	35,476	15.4
LANL	INEEL	1,840	227,759	35,984	15.8
LANL	LLNL	1,218	454,603	59,814	13.2
LANL	Pantex	647	85,252	12,635	14.8
LANL	SRS	2,779	521,907	80,398	15.4
LLNL	Fuel fabrication	4,838	771,701	103,519	13.4
LLNL	Geological repository	1,140	414,732	48,663	11.7
LLNL	Hanford	1,428	380,755	38,761	10.2
LLNL	INEEL	1,559	373,040	34,078	9.1
LLNL	Pantex	2,302	476,701	62,602	13.1
LLNL	SRS	4,395	856,464	136,322	15.9
Pantex	Geological repository	1,986	186,981	30,207	16.2
Pantex	INEEL	2,365	293,805	46,898	16.0
Pantex	ORR	1,753	245,038	44,137	18.0
Pantex	SRS	2,165	441,441	68,339	15.5
Pantex	WIPP	538	121,377	26,269	21.6
Portsmouth, OH	Fuel fabrication	977	239,221	33,268	13.9
RFETS	Hanford	1,848	141,585	15,985	11.3
RFETS	INEEL	1,170	104,960	10,424	9.9
RFETS	Pantex	1,252	252,177	41,478	16.4
RFETS	SRS	2,954	540,944	58,752	10.9
SRS	Hanford	4,377	615,204	65,311	10.6
SRS	ORR	568	109,074	13,061	12.0

Key: ANL–W, Argonne National Laboratory–West; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; ORR, Oak Ridge Reservation; RFETS, Rocky Flats Environmental Technology Site; WIPP, Waste Isolation Pilot Plant.

M.7 RESULTS FOR THE REACTOR SITES

M.7.1 Minority and Low-Income Population Estimates

Table M–7 shows total populations, minority populations, and percentage minority populations that resided within 80 km (50 mi) of the various sites at the time of the 1990 census. The 80-km (50-mi) distance defines the radius of potential radiological effects for calculations of radiation dose to the general population. Table M–8 shows similar data for projected populations in 2015. As discussed in Appendix M.4, minority populations residing in potentially affected areas in 1990 were adopted as a baseline. Populations in 2015 were then projected from the baseline data under the assumption that percentage changes in the majority and minority populations residing in the affected areas will be identical to those projected for State populations. The Census Bureau estimates that the national minority percentage will increase from approximately 24 percent in 1990 to nearly 34 percent by 2015 (Census 1996). [Text deleted.] In Tables M–7 and M–8, the sum of percentages of the different populations may total slightly more or less than 100 percent due to roundoff.

Table M–9 illustrates the uncertainties in the population estimates for the year 2015 due to the partial inclusion of block groups within the boundaries of potentially affected areas. Column 2 of the table lists the number of block groups that are partly within the circle of 80-km (50-mi) radius centered at the various facilities. Column 3 shows the number of block groups that lie completely within the circle. Potentially affected areas surrounding all three of the proposed reactor sites include two States. Columns 2 and 3 show the number of partial or total inclusions for the affected States. Column 4 of the table, denoted as "T/P," shows the number of totally included block groups divided by the number of partially included block groups. In order to minimize the uncertainties in the population estimate, it is desirable that this ratio be as large as possible. Column 5 shows upper bounds for the estimates of the total population listed in column 6. As discussed above, upper bounds were obtained by including the total population of all block groups that lie at least partially within the affected area. Lower bounds for the estimate of total population shown in column 7 were obtained by including only the populations of totally included block groups. Analogous statements apply to columns 8 through 10.

As would be expected from the value of T/P shown in column 4, uncertainties in the total population estimate for McGuire were the smallest among the three proposed reactor sites (+3.7 percent and −2.4 percent), as were the uncertainties in the estimate of the minority population at risk near Catawba (+5.7 percent and −3.3 percent). Uncertainties in the population estimates for North Anna were the largest among the three sites (+6.5 percent and −4.5 percent for total population; +5.9 percent and −4.2 percent for minority population). None of the uncertainties shown in Table M–9 are large enough to noticeably affect the conclusions regarding radiological health effects or environmental justice.

An estimate of the percentage of low-income persons living within 80 km (50 mi) of the proposed reactor sites in 2015 was obtained using a linear projection of low-income data from the 1980 census and the 1990 census. In 1990, the percentage of low-income persons (i.e., those with reported incomes below the poverty threshold) residing in the contiguous United States was 13.1 percent. The percentage of low-income persons living within 80 km (50 mi) of the proposed reactor sites was lower than the national average in every case. Around Catawba, the percentage of low-income persons living within 80 km (50 mi), in 1990, was 10.5 percent. At McGuire, the percentage was 9.8 percent, and around North Anna, the percentage was 6.9 percent.

The estimated number of low-income persons living within 80 km (50 mi) of Catawba in 2015 is 157,477 or 7.0 percent of the projected population. The estimated number of low-income persons living within 80 km (50 mi) of McGuire in 2015 is 171,182 or 6.6 percent of the projected population. The estimated number of

Table M–7. Racial and Ethnic Composition of Minority Populations Residing Within 80 km of Proposed Reactor Sites in 1990

Reactor Site	Total Pop.	Minority Pop.	Percent Minority Pop.	Asian or Pacific Islander Pop.	Percent Asian or Pacific Islander Pop.	Black Pop.	Percent Black Pop	Hispanic Pop.	Percent Hispanic Pop.	Native American Pop.	Percent Native American Pop.	Other Race	Percent Other Race Pop.	White Pop.	Percent White Pop.
Catawba	1,519,392	315,089	20.7	10,942	0.7	288,382	19.0	10,666	0.7	5,098	0.3	442	0.0	1,203,861	79.2
McGuire	1,738,966	305,717	17.6	12,007	0.7	275,789	15.9	12,094	0.7	5,828	0.3	479	0.0	1,432,770	82.4
North Anna	1,286,156	281,652	21.9	18,783	1.5	241,619	18.8	17,550	1.4	3,686	0.3	947	0.1	1,003,557	78.0

Table M–8. Projected Racial and Ethnic Composition of Minority Populations Residing Within 80 km of Proposed Reactor Sites in 2015

Reactor Site	Total Pop.	Minority Pop.	Percent Minority Pop.	Asian or Pacific Islander Pop.	Percent Asian or Pacific Islander Pop.	Black Pop.	Percent Black Pop	Hispanic Pop.	Percent Hispanic Pop.	Native American Pop.	Percent Native American Pop.	Other Race	Percent Other Race Pop.	White Pop.	Percent White Pop.
Catawba	2,265,495	597,376	26.4	37,756	1.7	507,810	22.4	40,504	1.8	10,700	0.5	606	0.0	1,668,119	73.6
McGuire	2,575,369	620,701	24.1	43,333	1.7	517,577	20.1	46,486	1.8	12,635	0.5	670	0.0	1,954,668	75.9
North Anna	2,042,200	731,773	35.8	106,086	5.2	508,719	24.9	111,992	5.5	4,976	0.2	1,165	0.1	1,309,262	64.1

Table M–9. Uncertainties in Estimates of Total and Minority Populations for the Year 2015

Reactor Site	No. of Partially Included Block Groups	No. of Fully Included Block Groups	T/P	Upper Bound for Total Population	Estimate of Total Population	Lower Bound for Total Population	Upper Bound for Minority Population	Estimate of Minority Population	Lower Bound for Minority Population
Catawba	54 (NC) 52 (SC)	851 (NC) 314 (SC)	11.0	2,395,224	2,265,495	2,191,319	627,435	597,376	579,620
McGuire	64 (NC) 24 (SC)	1,190 (NC) 129 (SC)	15.0	2,672,795	2,575,369	2,513,292	636,842	620,701	611,521
North Anna	84 (VA) 10 (MD)	710 (VA) 5 (MD)	7.6	2,175,504	2,042,200	1,949,928	775,277	731,773	700,983

low-income persons living within 80 km (50 mi) of North Anna in 2015 is 110,531 or 5.4 percent of the projected population. [Text deleted.] Figures M–10 through M–15 show geographical distributions of minority and low-income populations residing with 80 km (50 mi) of the proposed reactor sites.

M.7.2 Environmental Effects on Minority and Low-Income Populations Residing Near Proposed Reactor Sites

The analysis of environmental effects on populations residing within 80 km (50 mi) of the proposed reactor sites is presented in Chapter 4 of the SPD EIS. This analysis shows that no radiological fatalities are likely to result from implementation of the proposed action or alternatives. Radiological risks to the public are small regardless of the racial and ethnic composition of the population, and regardless of the economic status of individuals comprising the population. Nonradiological risks to the general population are also small regardless of the racial and ethnic composition or economic status of the population. Thus, disproportionately high and adverse impacts on minority and low-income populations residing near the various facilities are not likely to result from implementation of the proposed action or alternatives.

M.8 REFERENCES

Campbell, P., 1996, *Population Projections: 1995–2025*, U.S. Department of Commerce, Bureau of the Census, Washington, DC, October.

CEQ (Council on Environmental Quality), 1997, *Environmental Justice, Guidance Under the National Environmental Policy Act*, Executive Office of the President, Washington, DC, December 10.

DOC (U.S. Department of Commerce), 1992, *Census of Population and Housing, 1990: Summary Tape File 3 on CD-ROM*, Bureau of the Census, Washington, DC, May.

DOC (U.S. Department of Commerce), 1996, *Resident Population of the United States: Middle Series Projections, 2015–2030, by Sex, Race, and Hispanic Origin, with Median Age*, Bureau of the Census, Washington, DC, March.

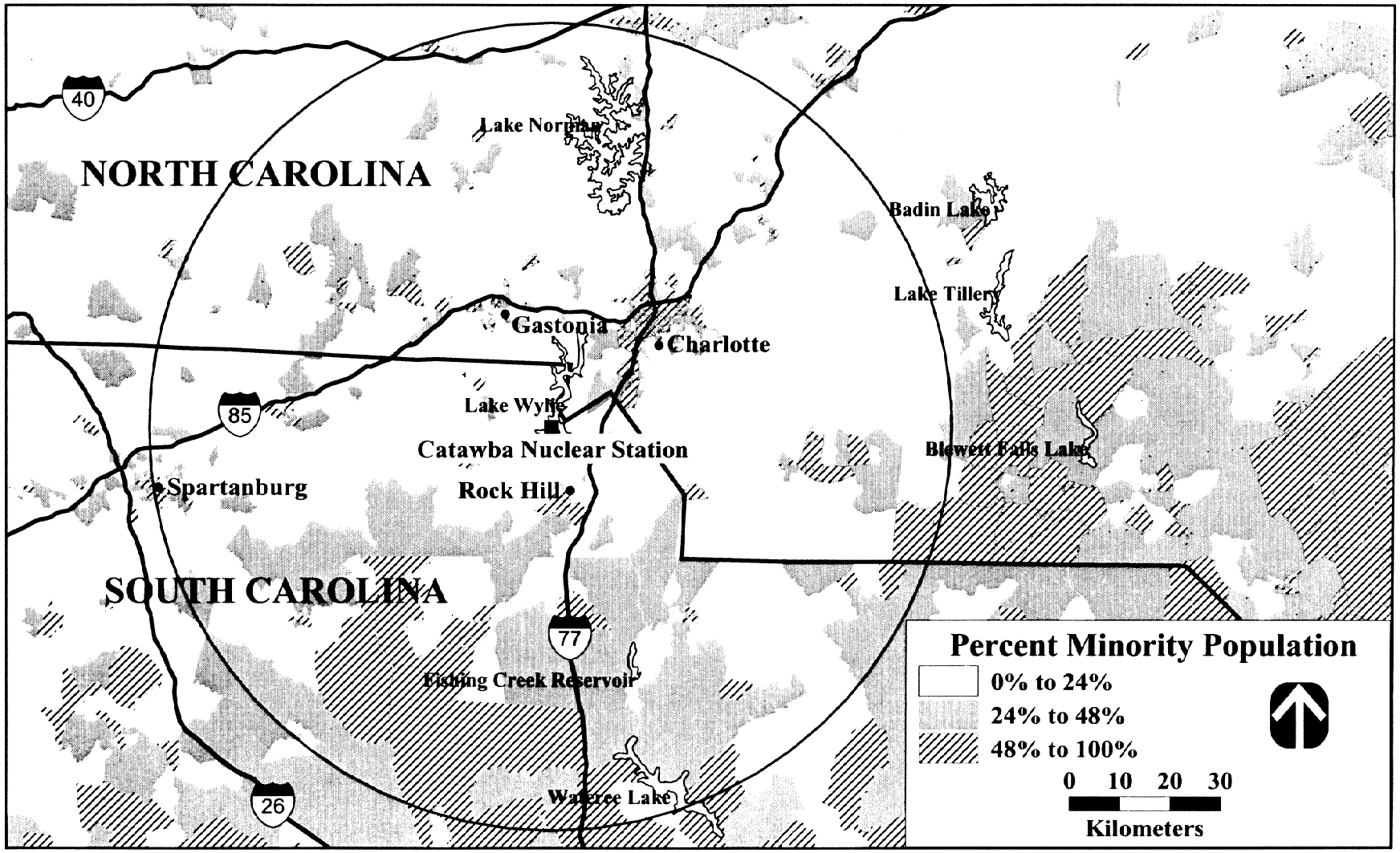

Figure M–10. Geographical Distribution of the Minority Population Residing Within 80 km (50 mi) of Catawba Nuclear Station

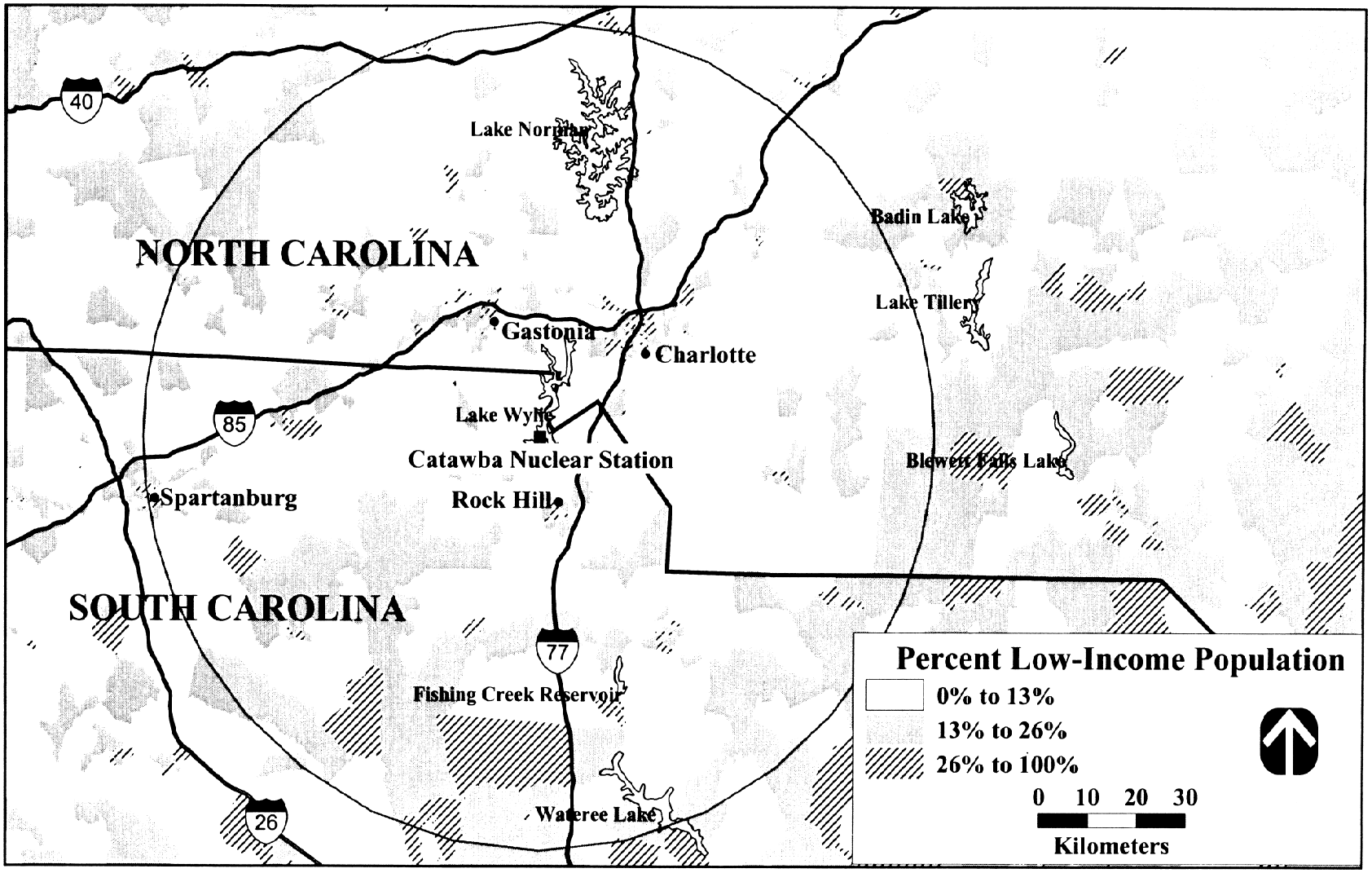

Figure M–11. Geographical Distribution of the Low-Income Population Residing Within 80 km (50 mi) of Catawba Nuclear Station

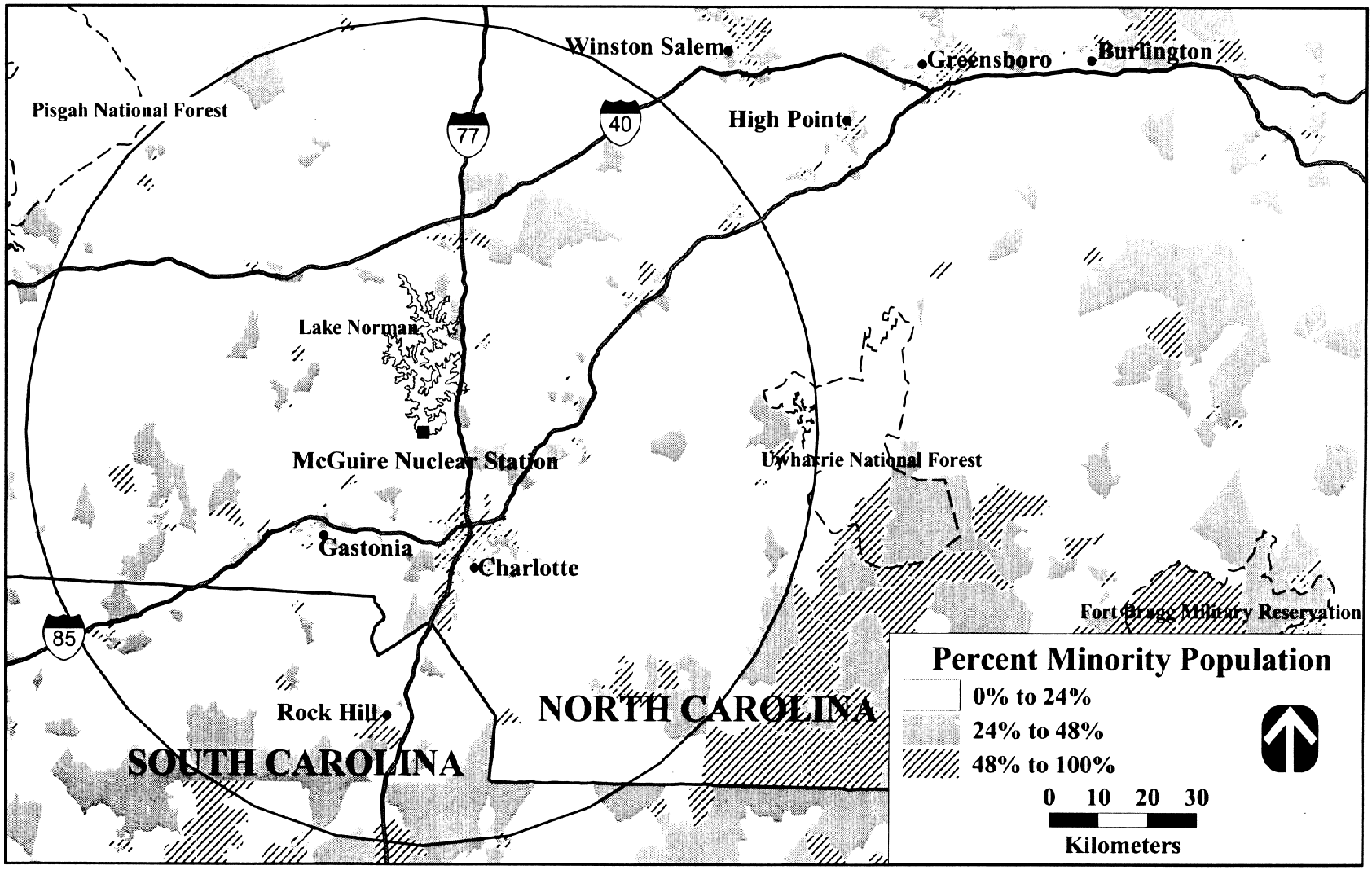

Figure M–12. Geographical Distribution of the Minority Population Residing Within 80 km (50 mi) of McGuire Nuclear Station

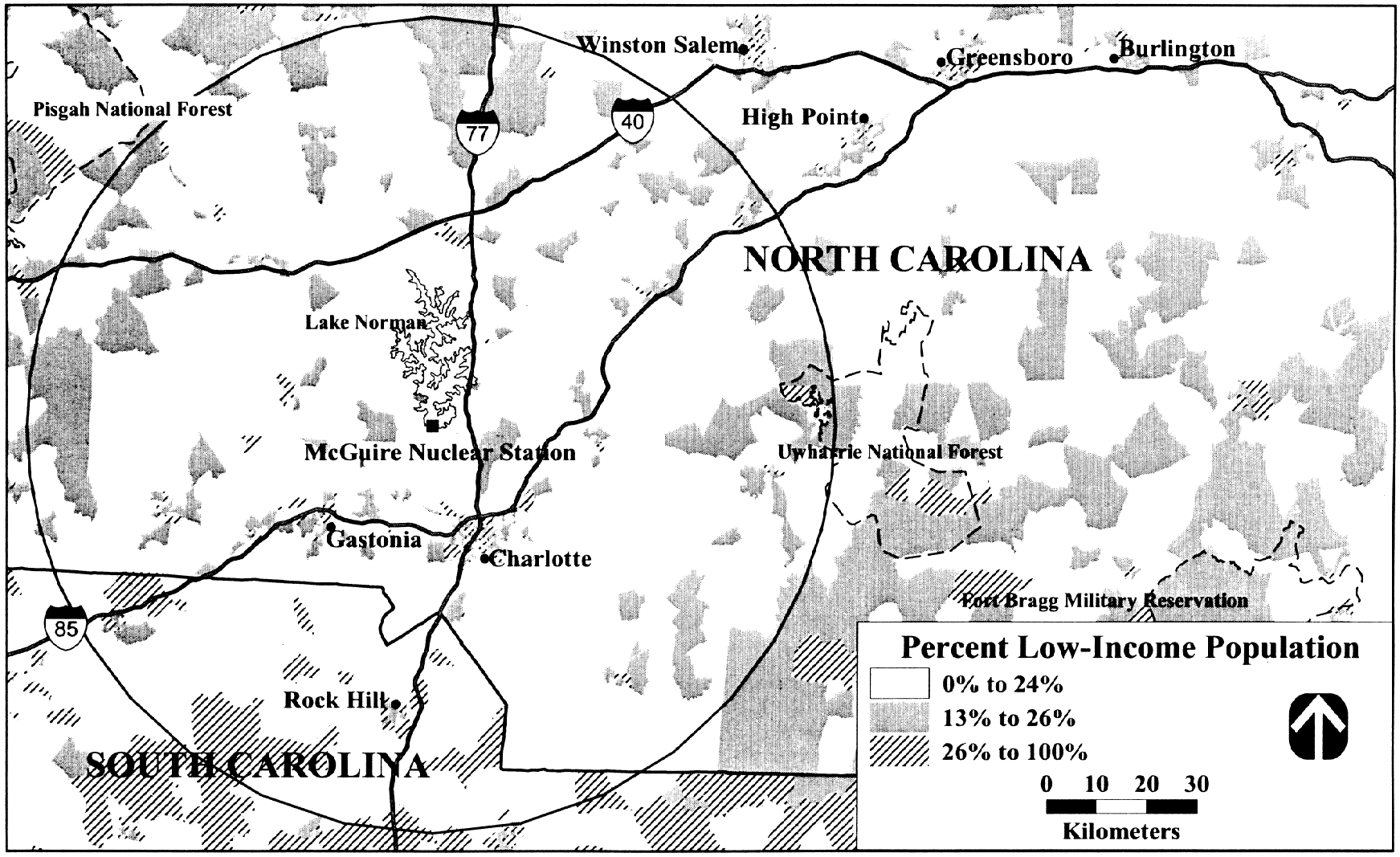

Figure M–13. Geographical Distribution of the Low-Income Population Residing Within 80 km (50 mi) of McGuire Nuclear Station

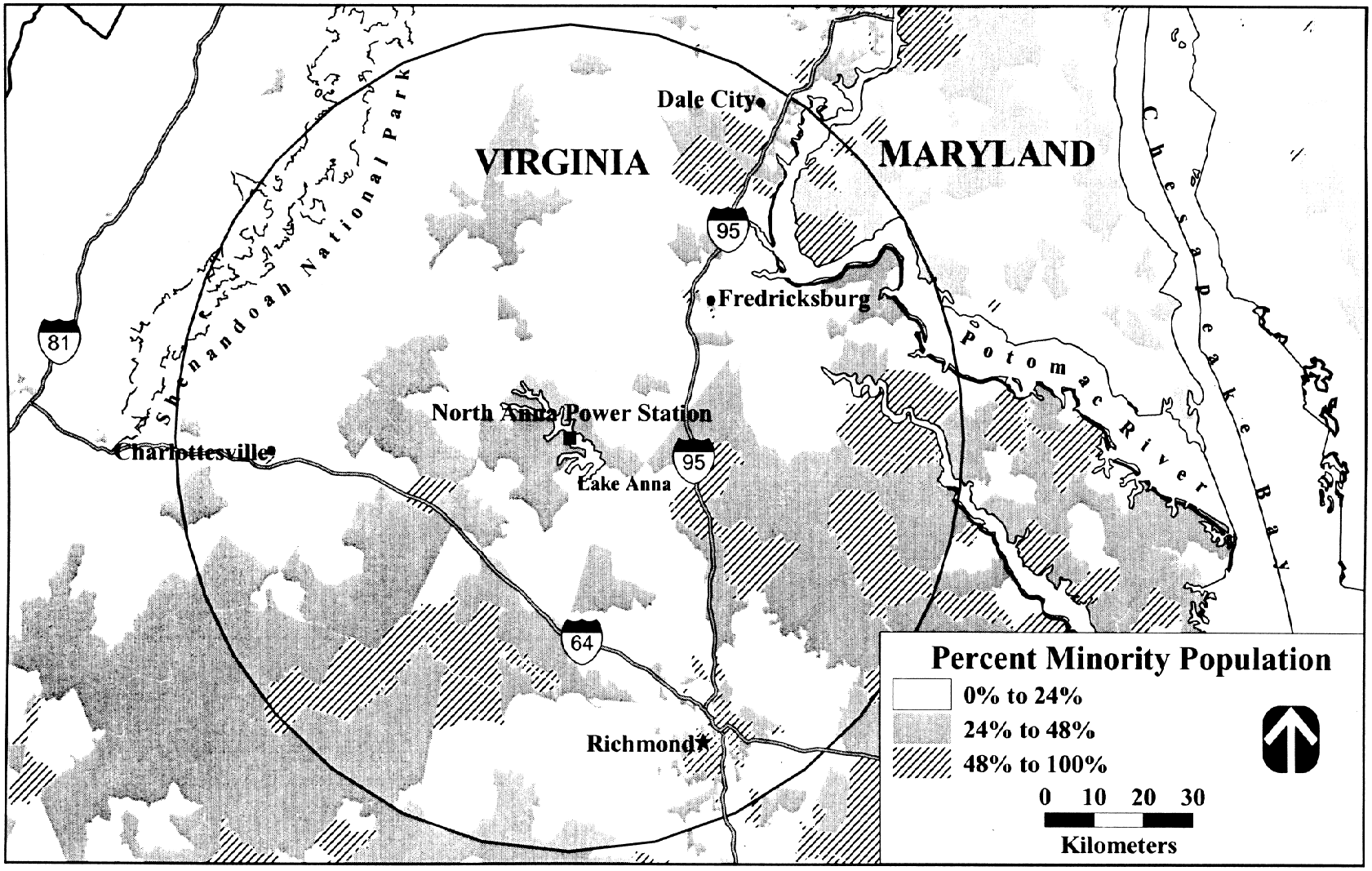

Figure M–14. Geographical Distribution of the Minority Population Residing Within 80 km (50 mi) of North Anna Power Station

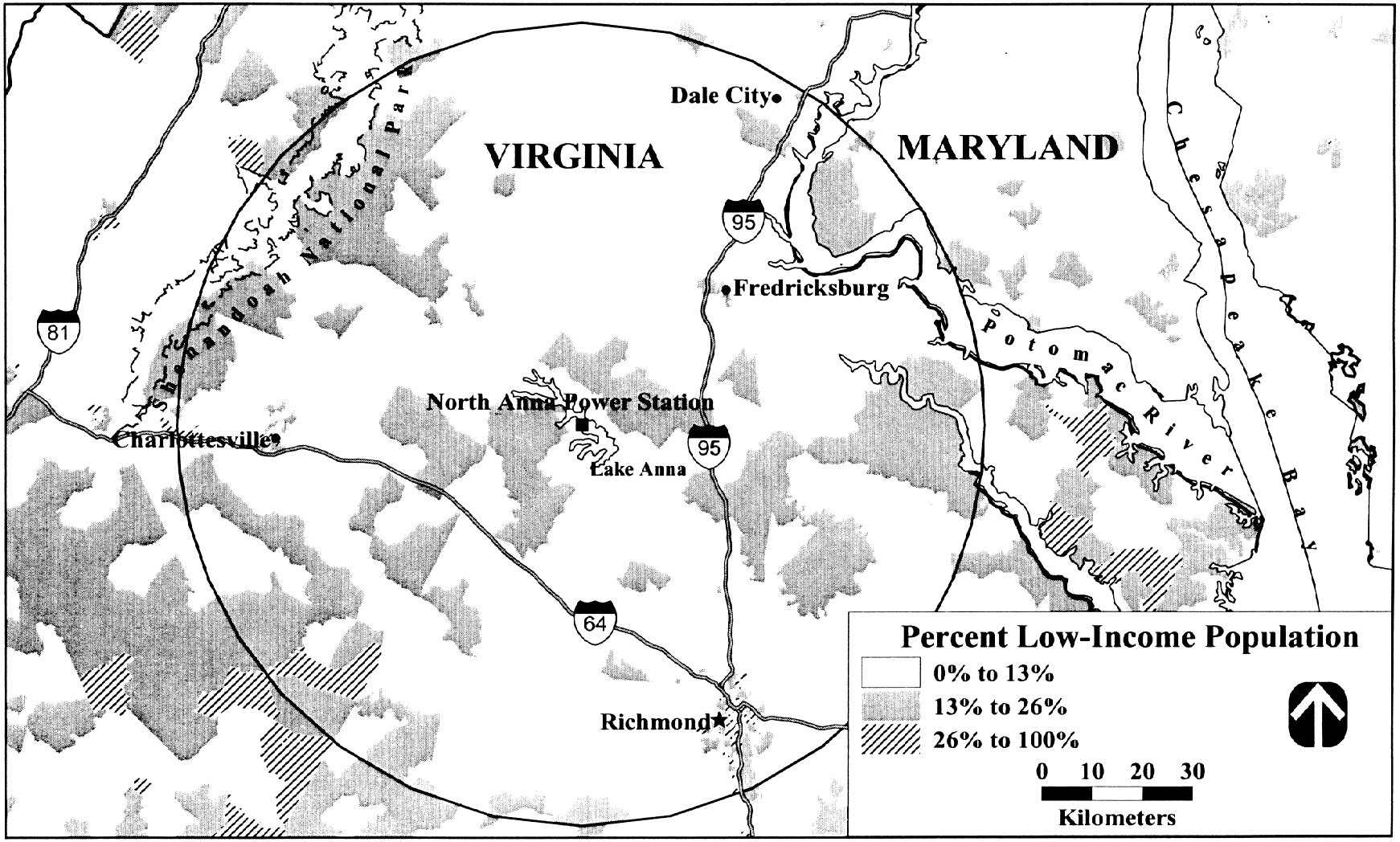

Figure M–15. Geographical Distribution of the Low-Income Population Residing Within 80 km (50 mi) of North Anna Power Station

Appendix O
Consultations

Certain statutes and regulations require the U.S. Department of Energy (DOE) to consider consultations with Federal, State, and local agencies and federally recognized Native American groups regarding the potential for alternatives for surplus plutonium disposition to disturb sensitive resources. These consultations are related to biotic, cultural, and Native American resources. DOE has initiated applicable consultations with Federal and State agencies and federally recognized Native American groups. Appendix O contains copies of the consultation letters sent by DOE to agencies and Native American groups, and any written responses provided by those agencies or groups. Attachments to responses are not included in Appendix O but are, nevertheless, part of the public record.

Department of Energy
Washington, DC 20585

October 30, 1998

David Hansen
State Historic Preservation Officer
Office of Archaeology & Historical Preservation
420 Golf Club Road SE, Suite 201
Lacey, Washington 98503

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process, Under Executive Memorandum Concerning Government-to-Government Relations*

Dear Mr. Hansen:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Office of Archaeology and Historical Preservation may have about the proposal. This consultation is in accordance with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act.

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Hanford site (e.g., Alternative 2), a maximum of about 15 hectares

David Hansen, Washington SHPO
10/30/98
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(37 acres) of land in the 400 Area would be impacted. No prehistoric or historic archaeological resources have been identified within the proposed construction areas, and no architectural resources in the 200 East of 400 Area. Preconstruction surveys (as required) and construction monitoring for previously unknown resources would be conducted within the framework of the *Hanford Cultural Resources Management Plan* (Battelle 1989; revised draft edition 1998).

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Dee Lloyd, Hanford Cultural Resources Program Manager, at (509) 372-2299.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Dee Lloyd, Cultural Resource Manager, Hanford
Lois Thompson, Federal Preservation Officer, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585

October 30, 1998

Mr. Russell Jim, Manager
Environmental Restoration/Waste Management Program
Confederated Tribes and Bands of the Yakama Indian Nation
2808 Main Street
Union Gap, Washington 98903

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process, Under Executive Memorandum Concerning Government-to-Government Relations*

Dear Mr. Jim:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Confederated Tribes and Bands of the Yakama Indian Nation may have about the proposal. This consultation is in accordance with the Executive Memorandum (29 April 1994) entitled, "Government-to-Government Relations with Native American Tribal Governments", and DOE Order 1230.2. It also follows prior consultation initiated for compliance with the American Indian Religious Freedom Act (AIRFA) (PL 95-341) and the Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601).

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

Mr. Russell Jim, Manager, Confederated Tribes and Bands of the Yakama Indian Nation
10/30/98
Page 2

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Hanford site (e.g., Alternative 2), a maximum of 15 hectares (37 acres) of land in previously disturbed portions of the 400 Area would be impacted. Based on previous investigations, no traditional cultural properties have been identified in the 400 Area or immediately adjacent areas.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Kevin Clark, Hanford Indian Nation Program Manager, at (509) 376-6332.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Tom Woods, YIN
Nanci Peters, YIN
Kevin V. Clark, Indian Nation Program Manager, Hanford
Brandt Petrasek, EM-20, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585

October 30, 1998

Ms. Donna L. Powaukee, Director
Environmental Restoration/Waste Management Program
Nez Perce Tribe
P.O. Box 365
Lapwai, Idaho 83540

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process, Under Executive Memorandum Concerning Government-to-Government Relations*

Dear Ms. Powaukee:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Nez Perce Tribe may have about the proposal. This consultation is in accordance with the Executive Memorandum (29 April 1994) entitled, "Government-to-Government Relations with Native American Tribal Governments", and DOE Order 1230.2. It also follows prior consultation initiated for compliance with the American Indian Religious Freedom Act (AIRFA) (PL 95-341) and the Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601).

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

Ms. Donna L. Powaukee, Nez Perce Tribe
10/30/98
Page 2

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Hanford site (e.g., Alternative 2), a maximum of 15 hectares (37 acres) of land in previously disturbed portions of the 400 Area would be impacted. Based on previous investigations, no traditional cultural properties have been identified in the 400 Area or immediately adjacent areas.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Kevin Clark, Hanford Indian Nation Program Manager, at (509) 376-6332.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Stan Sobczyk, NPT
Pat Sobotta, NPT
Kevin Clark, Indian Nations Program Manager, Hanford
Brandt Petrasek, EM-20, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585

October 30, 1998

Ms. Lenora Seelatsee
Wanapum Band
Grant County P.U.D
30 "C" Street, S.W.
P.O. Box 878
Ephrata, Washington 98823

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process, Under Executive Memorandum Concerning Government-to-Government Relations*

Dear Ms. Seelatsee:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Wanapum Band may have about the proposal. This consultation is in accordance with the Executive Memorandum (29 April 1994) entitled, "Government-to-Government Relations with Native American Tribal Governments", and DOE Order 1230.2. It also follows prior consultation initiated for compliance with the American Indian Religious Freedom Act (AIRFA) (PL 95-341) and the Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601).

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of

Ms. Lenora Seelatsee, Wanapum Band
10/30/98
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facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Hanford site (e.g., Alternative 2), a maximum of 15 hectares (37 acres) of land in previously disturbed portions of the 400 Area would be impacted. Based on previous investigations, no traditional cultural properties have been identified in the 400 Area or immediately adjacent areas.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Kevin Clark, Hanford Indian Nation Program Manager, at (509) 376-6332.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Rex Buck, Jr., Wanapum
Robert Tomanawash, Wanapum
Kevin V. Clark, Indian Nation Program Manager, Hanford
Brandt Petrasek, EM-20, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585

October 30, 1998

Mr. J. R. Wilkinson, Manager
Special Sciences and Resources Program
Confederated Tribes of the Umatilla Indian Reservation
P.O. Box 638
Pendleton, Oregon 97801

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process, Under Executive Memorandum Concerning Government-to-Government Relations*

Dear Mr. Wilkinson:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Confederated Tribes of the Umatilla Indian Reservation may have about the proposal. This consultation is in accordance with the Executive Memorandum (29 April 1994) entitled, "Government-to-Government Relations with Native American Tribal Governments", and DOE Order 1230.2. It also follows prior consultation initiated for compliance with the American Indian Religious Freedom Act (AIRFA) (PL 95-341) and the Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601).

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

Mr. J. R. Wilkinson, Manager, Confederated Tribes of the Umatilla Reservation
10/30/98
Page 2

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Hanford site (e.g., Alternative 2), a maximum of 15 hectares (37 acres) of land in previously disturbed portions of the 400 Area would be impacted. Based on previous investigations, no traditional cultural properties have been identified in the 400 Area or immediately adjacent areas.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Kevin Clark, Hanford Indian Nation Program Manager, at (509) 376-6332.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Jo Marie Tessman, CTUIR
Kevin V. Clark, Indian Nation Program Manager, Hanford
Brandt Petrasek, EM-20, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585
July 28, 1998

Mr. Richard Roy
U.S. Department of Interior
Fish and Wildlife Service
Post Office Box 1157
Moses Lake, WA 98837

Dear Mr. Roy:

INFORMAL CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR SURPLUS PLUTONIUM DISPOSITION

The Department of Energy (DOE) published its Notice of Intent to prepare the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) in the Federal Register (Vol. 92, No. 99) on May 22, 1997. This SPD EIS is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. To summarize, the purpose of the proposed action is to reduce the threat of nuclear weapons proliferation worldwide in an environmentally safe and timely manner by conducting disposition of surplus plutonium in the United States, thus setting a nonproliferation example for other nations.

The SPD Draft EIS, a copy of which is attached for your review, examines twenty-four alternatives and analyzes the potential environmental impacts for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion, mixed oxide (MOX) fuel fabrication, and plutonium conversion and immobilization. The Hanford Site near Richland, Washington is a candidate site for all three facilities. The candidate sites and alternatives are shown in Table 2-1 of the SPD Draft EIS. Please note that where practical, the modification of existing buildings is being considered.

Alternative 2 proposes locating pit disassembly and conversion, and plutonium conversion and immobilization facilities in the Fuels and Materials Examination Facility (FMEF) and the MOX fuel fabrication facility in new construction adjacent to FMEF in the 400 Area. In addition, the planned high-level waste vitrification facility in the 200 East Area would be used to process the canisters from the plutonium conversion and immobilization facility. Although several alternatives include locating facilities at Hanford, Alternative 2 has the greatest potential for impacts on ecological resources.

Preliminary analyses suggest that overall impacts on ecological resources from constructing and operating the proposed surplus plutonium disposition facilities would be limited because the land area required (15 hectares [37 acres]) is relatively small in comparison to regionally available habitat; habitat disturbance would be minimized because construction would take place in previously disturbed or developed areas; and operational impacts would be minimized because

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facility releases of airborne and aqueous effluents would be controlled and permitted. Section 4.26.1.3 of the SPD Draft EIS presents the ecological resources analysis for the Hanford Site.

Although sources indicate that no critical habitat for any threatened and endangered species exists near the proposed construction area, there may be Washington State-classified special status species associated with shrub-steppe habitat that could be affected due to land disturbance and noise. Animal species include burrowing owl, ferruginous hawk, golden eagle, long-billed curlew, sage thrasher, Swainson's hawk, pygmy rabbit, desert night snake, and striped whipsnake. It is doubtful the loggerhead shrike and sage sparrow would be affected because a fire in the 400 Area previously destroyed most of their habitat. Plant species include crouching milkvetch, piper's daisy, squill onion, and stalked-pod milkvetch.

Consistent with the Endangered Species Act, DOE requests that the Fish and Wildlife Service provide any additional information on the presence of threatened and endangered animal and plant species, both listed and proposed, in the vicinity of the 200 East and 400 Areas at Hanford. Information on the habitats of these species would also be appreciated. DOE also requests information on any other species of concern that are known to occur or potentially occur in the vicinity of the 200 East and 400 Areas.

As part of DOE's National Environmental Policy Act process, DOE encourages the Fish and Wildlife Service to identify any concerns or issues that it believes should be addressed in the SPD EIS. To facilitate incorporation of your input into the SPD Final EIS, please provide a written response by September 16, 1998.

Please mail your response to:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
1000 Independence Avenue, SW
Washington, DC 20585

If you have any questions, please contact me at (202) 586-0149.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Charles A. Brandt, PNNL
Dana Ward, DOE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

517 South Buchanan
Moses Lake, Washington 98837
Phone: 509-765-6125 FAX: 509-765-9043

December 3, 1998

Department of Energy
Office of Fissile Materials Disposition
Attn: Marcus Jones
SPD EIS Document Manager
1000 Independence Avenue, SW
Washington, DC 20585

RE: Surplus Plutonium Disposition Environmental Impact Statement
FWS Reference: 1-9-99-SP-052

Dear Mr. Jones:

Thank you for your request of December 3, 1998. Enclosed is a list of threatened and endangered species, candidate species and species of concern (Enclosure A), that may be present at the Hanford Reservation. We are enclosing a list of the whole site, due to the limited site-specific information provided in your December 3, 1998 letter. This list fulfills the requirements of the U. S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act of 1973, as amended (Act).

The Service has included aquatic species due to the possibilities of groundwater transmission of radioactive materials. Thus, we are giving you the opportunity to make an initial evaluation of possible effects to each species, as provided in the Federal Register (Vol. 51, No. 106, pg. 19946) on June 3, 1986. We are enclosing a copy of the requirements for federal agency compliance under the Act (Enclosure B).

Should the biological assessment for the proposed project determine that a listed species is likely to be affected (adversely or beneficially) by the project, the federal agency should request Section 7 consultation through this office. If the biological assessment determines that the proposed action is "not likely to adversely affect" a listed species, the federal agency should request Service concurrence with that determination through the informal consultation process. If the biological assessment determines the project to have "no effect," we would appreciate receiving a copy for our information.

Candidate species and species of concern are included simply as advance notice to federal agencies of species which may be proposed and listed in the future. Protection provided to these species now may preclude possible listing in the future. If early evaluation of your project indicates that it is likely to adversely impact a candidate species, or species of concern, the federal agency may wish to request technical assistance from this office.

There are other species, including anadromous fishes that have been federally listed by the National Marine Fisheries Service (NMFS). Some of these species may occur in the vicinity of your project. Please contact NMFS in Lacy, WA at (360) 753-5828, or in Portland, OR at (503) 231-2319, to request a species list.

Thank you for your efforts to protect our nation's species and their habitats. If you have additional questions regarding your responsibilities under the Act, please contact Richard Smith of this office at (509) 765-6125.

Sincerely,

Donald C. Haley

Richard Roy
Acting Assistant Field Supervisor

ENCLOSURES

Department of Energy
Washington, DC 20585
July 28, 1998

Mr. Jay McConnaughey
Washington Department of Fish and Wildlife
1315 West 4th
Kennewick, WA 99336

Dear Mr. McConnaughey:

The Department of Energy (DOE) published its Notice of Intent to prepare the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) in the Federal Register (Vol. 92, No. 99) on May 22, 1997. This SPD EIS is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. To summarize, the purpose of the proposed action is to reduce the threat of nuclear weapons proliferation worldwide in an environmentally safe and timely manner by conducting disposition of surplus plutonium in the United States, thus setting a nonproliferation example for other nations.

The SPD Draft EIS, a copy of which is attached for your review, examines twenty-four alternatives and analyzes the potential environmental impacts for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion, mixed oxide (MOX) fuel fabrication, and plutonium conversion and immobilization. The Hanford Site near Richland, Washington is a candidate site for all three facilities. The candidate sites and alternatives are shown in Table 2-1 of the SPD Draft EIS. Please note that where practical, the modification of existing buildings is being considered.

Alternative 2 proposes locating pit disassembly and conversion, and plutonium conversion and immobilization facilities in the Fuels and Materials Examination Facility (FMEF) and the MOX fuel fabrication facility in new construction adjacent to FMEF in the 400 Area. In addition, the planned high-level waste vitrification facility in the 200 East Area would be used to process the canisters from the plutonium conversion and immobilization facility. Although several alternatives include locating facilities at Hanford, Alternative 2 has the greatest potential for impacts on ecological resources.

Preliminary analyses suggest that overall impacts on ecological resources from constructing and operating the proposed surplus plutonium disposition facilities would be limited because the land area required (15 hectares [37 acres]) is relatively small in comparison to regionally available habitat; habitat disturbance would be minimized because construction would take place in previously disturbed or developed areas; and operational impacts would be minimized because

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facility releases of airborne and aqueous effluents would be controlled and permitted. Section 4.26.1.3 of the SPD Draft EIS presents the ecological resources analysis for the Hanford Site.

Although sources indicate that no critical habitat for any threatened and endangered species exists near the proposed construction area, there may be Washington State-classified special status species associated with shrub-steppe habitat that could be affected due to land disturbance and noise. Animal species include burrowing owl, ferruginous hawk, golden eagle, long-billed curlew, sage thrasher, Swainson's hawk, pygmy rabbit, desert night snake, and striped whipsnake. It is doubtful the loggerhead shrike and sage sparrow would be affected because a fire in the 400 Area previously destroyed most of their habitat. Plant species include crouching milkvetch, piper's daisy, squill onion, and stalked-pod milkvetch.

As part of DOE's National Environmental Policy Act process, DOE encourages the Washington Department of Fish and Wildlife to identify any concerns or issues that it believes should be addressed in the SPD EIS. To facilitate incorporation of your input into the SPD Final EIS, please provide a written response by September 16, 1998.

Please mail your response to:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
1000 Independence Avenue, SW
Washington, DC 20585

If you have any questions, please contact me at (202) 586-0149.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Charles A. Brandt, PNNL
Dana Ward, DOE

STATE OF WASHINGTON
DEPARTMENT OF FISH AND WILDLIFE
1701 S 24th Avenue • Yakima, Washington 98902-5720 • (509) 575-2740 FAX (509) 575-2474
c/o Department of Ecology
1315 W 4th Ave, Kennewick, WA 99336

7 December, 1998

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
1000 Independence Ave. SW
Washington, DC 20585

Dear Mr. Jones:

Subject: Comments on the *Surplus Plutonium Disposition Draft Environmental Impact Statement, July 1998*, DOE/EIS-0283-D.

Upon a recent request for comments on the aforementioned document by U.S. Department of Energy (USDOE) Washington DC staff, the Washington Department of Fish and Wildlife (WDFW) is providing comments and greatly appreciates the invitation to submit comments even after the official closing of the comment period.

The WDFW supports the identified preferred alternatives in the draft EIS for siting plutonium disposition facilities (i.e. Immobilization at SRS, MOX Fuel Fabrication at SRS and Pit Disassembly and Conversion at SRS or Pantex). We concur with USDOE's determination as stated in the *Summary* "that Hanford's cleanup mission is critical, therefore ... prefers that the cleanup mission remain the site's top priority..." It is important that cleanup continue to remain the focus of the Hanford Site to be protective of the Columbia River ecosystem.

The Hanford Site ecosystem contains biological resources of regional, national, and international significance. The Hanford Reach supports a healthy stock of upriver bright fall chinook salmon (*Oncorhynchus tshawytscha*) and provides essential habitat for the federally listed Upper Columbia River steelhead (*Oncorhynchus mykiss*) which has been listed as endangered. The Nature Conservancy of Washington findings from a multi-year biodiversity inventory confirm the importance of the Hanford Site, and the 1997 annual report states "Findings from the biodiversity inventory to date show that the Hanford Site,

Mr. Jones
7 December, 1998
Page 2 of 3

including the Hanford Reach, is home to an irreplaceable natural legacy[1]." Over the duration of the inventory, TNC scientists discovered 40 species new to science. Other biological studies support the significance of these resources as well. The significance of shrub steppe is accurately reflected in the *draft Hanford Site Biological Resource Management Plan* by the following: "...the percentage that Hanford contributes to the existence of shrub steppe within the ecoregion has increased by about 250% since European settlement". The WDFW has designated nearly 80% of the site as Priority Shrub Steppe Habitat including the post-fire habitat. Finally, the National Biological Service (currently known as the National Biological Division of the U.S. Geological Service) has listed native shrub and grassland steppe in Washington and Oregon as an endangered ecosystem[2].

The Hanford Site has been identified in several alternatives with alternative 2 having the greatest potential for impacts on ecological resources. Impacts would include the loss of 37 acres of habitat and effluent discharge to the Columbia River. The WDFW provides the following comments in the event that the facilities are actually sited at the Hanford Site.

The draft EIS mentions that effluent discharges would occur to the Columbia River. Given this information, the USDOE should enter into consultation with the National Marine Fisheries Service under Section 7 of the Endangered Species Act to ensure that the action is not likely to jeopardize the continued existence of any listed species (16 U.S.C. Sec.1536 (a)(2)) (i.e. Upper Columbia River steelhead). Consultation requirements of Section 7 are nondiscretionary and are effective at the time of species' listing regardless of whether critical habitat is designated. Our concerns are with the release of contaminants and thermal discharge that may adversely affect anadromous fish. Again, as in our comments on DOE/EA-1259, we would expect an aquatic biological review to occur given the evidence that suggest Upper Columbia River steelhead spawn where fall chinook salmon have been previously observed spawning in the Hanford Reach.

We commend USDOE for first looking at the modification of existing buildings before constructing new ones. This action is consistent with the mitigation hierarchy as defined in 40CFR§1508.20. As stated earlier, WDFW designated post-fire shrub steppe habitat located in the southeast portion of the Hanford Site as Priority Shrub Steppe Habitat. Our concerns with this habitat are captured in a letter dated 1 July, 1998 to Mr. Dana Ward,

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[1] The Nature Conservancy of Washington. Biodiversity Inventory and analysis of the Hanford Site, 1997 Annual report, May 1998.
[2] Noss, Reed F., E.T. Laroe III, and J.M. Scott. Endangered ecosystems of the United States: A preliminary assessment of loss and degradation. Biological Report 28, Feb. 1995, National Biological Service, U.S. Department of the Interior.

Mr. Jones
7 December, 1998
Page 3 of 3

USDOE-RL. We believe every effort should be made to protect this habitat from further fragmentation and degradation which would occur from habitat disturbances, and that any adverse impacts that could not be mitigated through minimization and rectification should be compensated for at a 3:1 ratio. This would be consistent with USDOE's steward role of sustaining the natural ecosystems as stated in the Land and Facility Use Policy. Also, a commitment to fully mitigate adverse impacts to Priority Shrub Steppe Habitat would be consistent with past actions, such as, the Safe Interim Storage EIS, Tank Waste Remediation System EIS, and Solid Waste Retrieval Complex, Enhanced Radioactive and Mixed Waste Storage Facility, Infrastructure Upgrades, and Central Waste, Support Complex EA where adverse impacts were compensated.

We would request language be included in the final EIS that states "The project will be reviewed with the Washington Department of Fish and Wildlife and a mitigation action plan be developed and implemented to compensate for the destruction of Priority Shrub Steppe habitat from this project".

Again, thank you for the opportunity to comment. If you have any questions on these comments, please contact me at (509) 736-3095.

Sincerely,

Jay McConnaughey
Habitat Biologist, Hanford Site

Enclosures (2)

cc w/o enc:
USDOE
Paul Dunigan. Jr.
Washington Department of Ecology
Rebecca Inman
Ron Skinnarland
WDFW
Ted Clausing
Neil Rikard

Department of Energy
Washington, DC 20585

October 30, 1998

Robert Yohe
State Historic Preservation Officer
100 Main
Boise, Idaho 83702

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process*

Dear Mr Yohe:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Idaho State Historic Preservation Office may have about the proposal. This consultation is in accordance with National Environmental Policy Act and Section 106 of the National Historic Preservation Act.

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Idaho National Environmental and Engineering Laboratory (INEEL) site (e.g., Alternative 7A), a maximum of about 13 hectares (32 acres) of land inside the Idaho Nuclear Technology and Engineering Center (INTEC) protected area adjacent to

Robert Yohe, State Historic Preservation Officer
10/30/98
Page 2

the Fuel Processing Facility (FPF) would be impacted. Six prehistoric resources within the vicinity of the proposed construction area have been identified, but none are eligible for nomination to the National Register. A homestead and a trash dump may be eligible for the National Register, and a historic building survey being conducted within INTEC is likely to identify structures potentially eligible for the National Register based on their Cold War associations. Direct impact of the proposed construction would be unlikely; however, consistent with the *INEL Management Plan for Cultural Resources*, surveys and monitoring would be conducted to ensure against impact to National Register-eligible resources.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Bob Stark, the INEEL Technical Lead for Cultural Resources, at (208) 526-1122.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Bob Stark, Technical Lead for Cultural Resources, INEEL
Lois Thompson, Federal Preservation Officer, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585

October 30, 1998

Mr. Keith Tinno, Tribal Chairman
Fort Hall Reservation
P.O. Box 306
Fort Hall, Idaho 83203

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process, Under Executive Memorandum Concerning Government-to-Government Relations*

Dear Mr. Tinno:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Shoshone and Bannock Tribes may have about the proposal. This consultation is in accordance with the Executive Memorandum (29 April 1994) entitled, "Government-to-Government Relations with Native American Tribal Governments", and DOE Order 1230.2. It also follows prior consultation initiated for compliance with the American Indian Religious Freedom Act (AIRFA) (PL 95-341) and the Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601).

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state-delegated environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

Mr. Keith Tinno, Tribal Chairman, Fort Hall Reservation
10/30/98
Page 2

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the INEEL site (e.g., Alternative 7A), a maximum of about 13 hectares (32 acres) of land inside the Idaho nuclear Technology and Engineering Center (INTEC) protected area adjacent to the Fuel Processing Facility (FPF) would be impacted. Specific Native American resources have not been identified within the proposed construction area, but operations could result in indirect impacts, such as access restrictions. DOE would conduct direct consultation with the Shoshone and Bannock Tribes, consistent with a working agreement between DOE and the tribes, to ensure there are no direct construction-related impacts.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Bob Pence, the INEEL American Indian Program Manager, at (208) 526-6518.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Diana Yupe, Fort Hall
Bob Pence, American Indian Program Manager, INEEL
Brandt Petrasek, EM-20, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585
July 28, 1998

Ms. Susan Burch
U.S. Department of Interior
Fish and Wildlife Service
Snake River Basin Office
Columbia River Basin Ecological Region
1387 South Vinnell Way
Room 368
Boise, ID 83709

Dear Ms. Burch:

INFORMAL CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR SURPLUS PLUTONIUM DISPOSITION

The Department of Energy (DOE) published its Notice of Intent to prepare the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) in the Federal Register (Vol. 92, No. 99) on May 22, 1997. This SPD EIS is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. To summarize, the purpose of the proposed action is to reduce the threat of nuclear weapons proliferation worldwide in an environmentally safe and timely manner by conducting disposition of surplus plutonium in the United States, thus setting a nonproliferation example for other nations.

The SPD Draft EIS, a copy of which is attached for your review, examines twenty-four alternatives and analyzes the potential environmental impacts for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion, mixed oxide (MOX) fuel fabrication, and plutonium conversion and immobilization. The Idaho National Engineering and Environmental Laboratory (INEEL) near Idaho Falls, Idaho is a candidate site for the pit disassembly and MOX facilities. Alternatives 7A, 7B, and 8 propose locating pit disassembly and conversion in the Fuel Processing Facility (FPF) and MOX fuel fabrication in new construction in the Idaho Nuclear Technology and Energy Center (INTEC) area. The candidate sites and alternatives are shown in Table 2-1 of the SPD Draft EIS. Please note that where practical, the modification of existing buildings is being considered.

Preliminary analyses suggest that overall impacts on ecological resources from constructing and operating the proposed surplus plutonium disposition facilities would be limited because the land area required (13 hectares [32 acres]) is relatively small in comparison to regionally available habitat; habitat disturbance would be minimized because construction would take place in previously disturbed or developed areas; and operational impacts would be minimized because facility releases of airborne and aqueous effluents would be controlled and permitted. Section

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4.26.2.3 of the SPD Draft EIS presents the ecological resources analysis for INEEL.

Although sources indicate that no critical habitat for any threatened and endangered species exists near the proposed construction area, there may be Federal or State-classified special status species in the area surrounding INTEC. These species include bald eagle, black tern, burrowing owl, ferruginous hawk, loggerhead shrike, long-eared and small-footed myotis, northern goshawk, northern sagebrush lizard, peregrine falcon, pygmy rabbit, Townsend's western big-eared bat, trumpeter swan, and white-faced ibis. Noise disturbance is probably the most important impact affecting local wildlife populations.

Consistent with the Endangered Species Act, DOE requests that the Fish and Wildlife Service provide any additional information on the presence of threatened and endangered animal and plant species, both listed and proposed, in the vicinity of the INTEC area at INEEL. Information on the habitats of these species would also be appreciated. DOE also requests information on any other species of concern that are known to occur or potentially occur in the vicinity of INTEC.

As part of DOE's National Environmental Policy Act process, DOE encourages the Fish and Wildlife Service to identify any concerns or issues it believes should be addressed in the SPD EIS. To facilitate incorporation of your input into the SPD Final EIS, please provide a written response by September 16, 1998.

Please mail your response to:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
1000 Independence Avenue, SW
Washington, DC 20585

If you have any questions, please contact me at (202) 586-0149.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Roger Twitchell, DOE
Tim Reynolds, ESRF

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Snake River Basin Office, Columbia River Basin Ecoregion
1387 South Vinnell Way, Room 368
Boise, Idaho 83709

August 18, 1998

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
1000 Independence Avenue S.W.
Washington, D.C. 20585

Subject: Surplus Plutonium Disposition–Section 7 Consultation
File #506.0000 SP #1-4-98-SP-247

Dear Mr. Jones:

The U.S. Fish and Wildlife Service (Service) has received your letter announcing your Notice of Intent to prepare the Surplus Plutonium Disposition Environmental Impact Statement. Your letter to us, dated July 28 1998 and received here August 10, 1998 dealt specifically with issues related to species listed under the Endangered Species Act of 1973 (Act). Your letter noted a number of rare and sensitive species that could occur at the Idaho National Engineering and Environmental Laboratory site. Two listed species, the threatened bald eagle and peregrine falcon, are included on your list. The Service concurs that the list you developed is accurate, and we are providing you a reference number to document our concurrence with your list (SP #1-4-98-SP-247).

At this time, staffing and funding constraints will preclude our direct involvement with your analysis of this project. As you know, Idaho Department of Fish and Game's Conservation Data Center is the repository for information about status and distribution of species of concern, including those listed under the Act. We encourage you to work with them to obtain the most current information about the species that may occur at the site. If you determine that a listed species may be affected by the project, Section 7 of the Act requires that you consult with the Service. In that event, we will be available for informal consultation.

Thank you for providing the Service with the opportunity to comment on the proposed project. Contact Alison Beck Haas of my staff in Boise (208) 378-5384 or Mike Donahoo in Pocatello (208) 233-8550 if you have questions.

Sincerely,

Robert D. Russink

Supervisor, Snake River Basin Office

cc: FWS-CBE, Portland (Diggs)
FWS, Pocatello (Donahoo)

Department of Energy
Washington, DC 20585
July 28, 1998

Mr. George Stephens
Idaho Department of Fish and Game
Conservation Data Center
600 South Walnut
Boise, ID 83705

Dear Mr. Stephens:

The Department of Energy (DOE) published its Notice of Intent to prepare the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) in the Federal Register (Vol. 92, No. 99) on May 22, 1997. This SPD EIS is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. To summarize, the purpose of the proposed action is to reduce the threat of nuclear weapons proliferation worldwide in an environmentally safe and timely manner by conducting disposition of surplus plutonium in the United States, thus setting a nonproliferation example for other nations.

The SPD Draft EIS, a copy of which is attached for your review, examines twenty-four alternatives and analyzes the potential environmental impacts for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion, mixed oxide (MOX) fuel fabrication, and plutonium conversion and immobilization. The Idaho National Engineering and Environmental Laboratory (INEEL) near Idaho Falls, Idaho is a candidate site for the pit disassembly and MOX facilities. Alternatives 7A, 7B, and 8 propose locating pit disassembly and conversion in the Fuel Processing Facility (FPF) and MOX fuel fabrication in new construction in the Idaho Nuclear Technology and Energy Center (INTEC) area. The candidate sites and alternatives are shown in Table 2-1 of the SPD Draft EIS. Please note that where practical, the modification of existing buildings is being considered.

Preliminary analyses suggest that overall impacts on ecological resources from constructing and operating the proposed surplus plutonium disposition facilities would be limited because the land area required (13 hectares [32 acres]) is relatively small in comparison to regionally available habitat; habitat disturbance would be minimized because construction would take place in previously disturbed or developed areas; and operational impacts would be minimized because facility releases of airborne and aqueous effluents would be controlled and permitted. Section 4.26.2.3 of the SPD Draft EIS presents the ecological resources analysis for INEEL.

Although sources indicate that no critical habitat for any threatened and endangered species exists near the proposed construction area, there may be Federal or State-classified special status species in the area surrounding INTEC. These species include bald eagle, black tern, burrowing owl, ferruginous hawk, loggerhead shrike, long-eared and small-footed myotis, northern goshawk,

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northern sagebrush lizard, peregrine falcon, pygmy rabbit, Townsend's western big-eared bat, trumpeter swan, and white-faced ibis. Noise disturbance is probably the most important impact affecting local wildlife populations.

As part of DOE's National Environmental Policy Act process, DOE encourages the Idaho Department of Fish and Game to identify any concerns or issues it believes should be addressed in the SPD EIS. To facilitate incorporation of your input into the SPD Final EIS, please provide a written response by September 16, 1998.

Please mail your response to:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
1000 Independence Avenue, SW
Washington, DC 20585

If you have any questions, please contact me at (202) 586-0149.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Roger Twitchell, DOE
Tim Reynolds, ESRF

IDAHO CONSERVATION DATA CENTER

Idaho Department of Fish and Game • 600 South Walnut • P.O. Box 25 Boise, Idaho 83707 • (208) 334-3402 • FAX 334-2114

12 August 1998

Marcus Jones, SPD EIS Document Manager
Department of Energy
Washington, D. C. 20585

Dear Mr. Jones:

I am responding to your request for input relative to special status species associated with INEEL and construction at the Idaho Nuclear Technology and Energy Center (INTEC). Enclosed is a list of special status plants and animals known to occur at INEEL. These represent species for which the Conservation Data Center (CDC) has documentation of occurrence.

Within a 10-mile radius of INTEC, the only occurrences in the CDC database are ferruginous hawk nesting territories and Merriam's shrew capture sites. In the eastern part of Idaho, gray wolf is considered an experimental, nonessential population. With regard to the species listed in your letter, the Lower Snake River Basin office of the U. S. Fish and Wildlife Service does not consider northern sagebrush lizard to be a Species of Concern.

If you have questions regarding this response, please contact me.

Sincerely,

George Stephens

George Stephens
Fish and Game Data Coordinator

IDAHO CONSERVATION DATA CENTER

Idaho Department of Fish and Game • 600 South Walnut • P.O. Box 25, Boise, Idaho 83707 • (208) 334-3402 • FAX 334-2114

gstephen@idfg.state.id.us http://www.state.id.us/fishgame/cdchome.htm

MEMORANDUM

TO: Kevin Folk

FROM: George Stephens

DATE: 12 February 1999

RE: INTEC area at INEEL

I am responding to your phone call this morning. After reviewing the original request (28 Jul 1998, from Marcus Jones) and looking at my response (12 Aug 1998), I can provide an update to our phone conversation.

Jones' request was not clear. His letter refers to the INTEC "area," to multiple sites on INEEL, and to Idaho Fish and Game addressing any concerns it has with the EIS. With regard to special status species, I think my response to Jones' letter is in tune with his request. In the body of my (1998) letter, I addressed (1) the two known species occurrences in the INTEC "area" and (2) the known occurrences on the entirety of INEEL with regard to the multiple sites. If you check the species list accompanying my letter, you will note INEEL is indicated (at the top) of the list.

On the phone, I explained the basis for conducting a database search of a 10-mile radius around a project area. Primarily, it is to check whether a peregrine falcon eyrie or hack site is known from the area. That 10-mile guideline came from the U. S. Fish and Wildlife Service for the CDC to use when developing a Sec. 7 (ESA) species list. Many other species don't have well-defined guidelines, and I simply included other known occurrences found within the 10-mile radius. Animals generally tend to move around and are often found over a larger area than where an individual was observed or trapped.

The pages accompanying this memorandum contain printed database records for the known occurrences in the INTEC area. In addition to these species, pygmy rabbit should be considered as a probable occurrence in any area of big sagebrush habitat. The printout contains a rare plant not addressed in the 1998 response. The CDC only recently began to track nonvascular plants; this plant occurrence had not been processed at the time of Jones' request.

If you have additional questions, please contact me.

Department of Energy
Washington, DC 20585

October 30, 1998

Mr. Virgil Franklin Sr.
Cheyenne-Arapaho Tribe of Oklahoma
P.O. Box 38
Concho OK 73022

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process, Under Executive Memorandum Concerning Government-to-Government Relations with Native American Tribal Governments*

Dear Mr. Franklin:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Cheyenne-Arapaho Tribe of Oklahoma may have about the proposal. This consultation is in accordance with the Executive Memorandum (29 April 1994) entitled, "Government-to-Government Relations with Native American Tribal Governments", and DOE Order 1230.2. It also follows prior consultation initiated for compliance with the American Indian Religious Freedom Act (AIRFA) (PL 95-341) and the Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601).

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

Mr. Virgil Franklin Sr.
Cheyenne-Arapaho Tribe of Oklahoma
10/30/98
Page 2

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Pantex plant (e.g., Alternative 9A), a maximum of 16 hectares (39 acres) of land in or near Zone 4 would be impacted. Based on previous consultations, no traditional cultural properties have been identified in Zone 4 or immediately adjacent areas.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Vicki Battley, Pantex Environmental Protection Team Leader, at (806) 477-3189.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Vicki Battley, DOE – Amarillo Area Office
Brandt Petrasek, EM-20, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585

October 30, 1998

Mr. Billy Evans Horse
Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie OK 73015

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process, Under Executive Memorandum Concerning Government-to-Government Relations with Native American Tribal Governments*

Dear Mr. Evans Horse:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Kiowa Tribe of Oklahoma may have about the proposal. This consultation is in accordance with the Executive Memorandum (29 April 1994) entitled, "Government-to-Government Relations with Native American Tribal Governments", and DOE Order 1230.2. It also follows prior consultation initiated for compliance with the American Indian Religious Freedom Act (AIRFA) (PL 95-341) and the Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601).

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

Mr. Billy Evans Horse
Kiowa Tribe of Oklahoma
10/30/98
Page 2

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Pantex plant (e.g., Alternative 9A), a maximum of 16 hectares (39 acres) of land in or near Zone 4 would be impacted. Based on previous consultations, no traditional cultural properties have been identified in Zone 4 or immediately adjacent areas.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Vicki Battley, Pantex Environmental Protection Team Leader, at (806) 477-3189.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Vicki Battley, DOE – Amarillo Area Office
Brandt Petrasek, EM-20, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585

October 30, 1998

Mr. D. J. Mowatt
Apache Tribe of Oklahoma
P.O. Box 1220
Anadarko OK

Subject: *Consultation for Surplus Plutonium Disposition Environmental Impact Analysis Process, Under Executive Memorandum Concerning Government-to-Government Relations with Native American Tribal Governments*

Dear Mr. Mowatt:

The purpose of this letter is to notify you that the United States Department of Energy (DOE) is in the process of conducting an Environmental Impact Analysis concerning the disposition of surplus plutonium.

With this letter we are soliciting specific concerns the Apache Tribe of Oklahoma may have about the proposal. This consultation is in accordance with the Executive Memorandum (29 April 1994) entitled, "Government-to-Government Relations with Native American Tribal Governments", and DOE Order 1230.2. It also follows prior consultation initiated for compliance with the American Indian Religious Freedom Act (AIRFA) (PL 95-341) and the Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601).

The *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. DOE is producing the SPD EIS in compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations implementing NEPA, DOE's NEPA Implementing Regulations (10 CFR 1021), and other applicable federal and state environmental legislation.

The purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by disposing of surplus plutonium in the United States in an environmentally safe and timely manner. The SPD Draft EIS, a copy of which is attached for your review, examines the potential environmental impacts for 24 alternatives for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion; mixed oxide (MOX) fuel fabrication; and plutonium conversion and immobilization.

Mr. D. J. Mowatt
Apache Tribe of Oklahoma
10/30/98
Page 2

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Pantex plant (e.g., Alternative 9A), a maximum of 16 hectares (39 acres) of land in or near Zone 4 would be impacted. Based on previous consultations, no traditional cultural properties have been identified in Zone 4 or immediately adjacent areas.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149.

You may also contact Vicki Battley, Pantex Environmental Protection Team Leader, at (806) 477-3189.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: Vicki Battley, DOE – Amarillo Area Office
Brandt Petrasek, EM-20, DOE HQ

SPD EIS enclosure

Mr. John Ross, Chief Elect
United Keetoowah Band
10/30/98
Page 2

If an alternative is selected that includes siting of surplus plutonium disposition facilities at the Savannah River Site (e.g., Alternatives 3A or 3B), a maximum of about 31 hectares (77 acres) of land adjacent to the Actinide Packaging and Storage Facility (APSF) in F-Area, would be impacted. No Native American cultural sites are known to exist within the proposed construction area.

If you have any specific concerns about the SPD EIS proposal, we would like to hear from you. Please contact me with your concerns or questions at:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(202) 586-0149

You may also contact A. Ben Gould, Savannah River Site Indian Liaison Officer, at: (803) 725-3969.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: A. Ben Gould, SRS
Brandt Petrasek, EM-20, DOE HQ

SPD EIS enclosure

Department of Energy
Washington, DC 20585
July 28, 1998

Mr. Roger Banks
Field Supervisor
U.S. Department of the Interior
Fish and Wildlife Service
Post Office Box 12559
217 Fort Johnson Road
Charleston, SC 29422-2559

Dear Mr. Banks:

INFORMAL CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR SURPLUS PLUTONIUM DISPOSITION

The Department of Energy (DOE) published its Notice of Intent to prepare the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) in the Federal Register (Vol. 92, No. 99) on May 22, 1997. This SPD EIS is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. To summarize, the purpose of the proposed action is to reduce the threat of nuclear weapons proliferation worldwide in an environmentally safe and timely manner by conducting disposition of surplus plutonium in the United States, thus setting a nonproliferation example for other nations.

The SPD Draft EIS, a copy of which is attached for your review, examines twenty-four alternatives and analyzes the potential environmental impacts for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion, mixed oxide (MOX) fuel fabrication, and plutonium conversion and immobilization. The Savannah River Site (SRS) near Aiken, South Carolina is a candidate site for all three facilities. The candidate sites and alternatives are shown in Table 2-1 of the SPD Draft EIS. Please note that where practical, the modification of existing buildings is being considered.

Alternative 3A proposes locating the three surplus plutonium disposition facilities in new construction adjacent to the Actinide Packaging and Storage Facility in F-Area at SRS. In addition, the canister receipt area at the Defense Waste Processing Facility in S-Area would be modified to accommodate the receipt and processing of the canisters from the plutonium conversion and immobilization facility. Although several alternatives include locating facilities at SRS, Alternative 3A has the greatest potential for impacts on ecological resources.

Preliminary analyses suggest that overall impacts on ecological resources from constructing and operating the proposed surplus plutonium disposition facilities would be limited because the land area required (31 hectares [77 acres]) is relatively small in comparison to regionally available habitat; habitat disturbance would be minimized because construction would take place in

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previously disturbed or developed areas; and operational impacts would be minimized because facility releases of airborne and aqueous effluents would be controlled and permitted. Section 4.26.4.3 of the SPD Draft EIS presents the ecological resources analysis for SRS.

Although sources indicate that no critical habitat for any threatened and endangered species exists at SRS, there may be Federal or State-classified special status species in the environs surrounding F-Area. These species include American alligator, bald eagle, Oconee azalea, red-cockaded woodpecker, smooth purple coneflower, and wood stork. Noise disturbance is probably the most important impact affecting local wildlife populations.

Consistent with the Endangered Species Act, DOE requests that the Fish and Wildlife Service provide any additional information on the presence of threatened and endangered animal and plant species, both listed and proposed, in the vicinity of F- and S-Areas at SRS. Information on the habitats of these species would also be appreciated. DOE also requests information on any other species of concern that are known to occur or potentially occur in the vicinity of F- and S-Areas.

As part of DOE's National Environmental Policy Act process, DOE encourages the Fish and Wildlife Service to identify any concerns or issues it believes should be addressed in the SPD EIS. To facilitate incorporation of your input into the SPD Final EIS, please provide a written response by September 16, 1998.

Please mail your response to:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
1000 Independence Avenue, SW
Washington, DC 20585

If you have any questions, please contact me at (202) 586-0149.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: John B. Gladden, WSRC
David P. Roberts, DOE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
P.O. Box 12559
217 Fort Johnson Road
Charleston, South Carolina 29422-2559

September 8, 1998

Mr. Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
1000 Independence Avenue, SW
Washington, DC 20585

Re: FWS Log No. 4-6-98-364, Surplus Plutonium Disposition, Savannah River Site (SRS), Aiken County, South Carolina

Dear Mr. Jones:

We have reviewed the information received August 4, 1998 concerning the above-referenced project in Aiken County, South Carolina. The following comments are provided in accordance with the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-667e), and Section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531-1543), as well as, general comments from the review of the Draft Environmental Impact Statement (DEIS).

As indicated in your August 4 letter there is potential habitat for federally protected species within the action area of your proposed project. Therefore, we are providing you with the list of the federally endangered (E) and threatened (T) species which potentially occur in Aiken South Carolina (Table 1) and the habitat information you requested (Table 2). The list also includes species of concern under review by the Service. Species of concern (SC) are not legally protected under the Endangered Species Act, and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as endangered/threatened. We are including these species in our response for the purpose of giving you advance notification. These species may be listed in the future, at which time they will be protected under the Endangered Species Act. Therefore, it would be prudent for you to consider these species early in project planning to avoid any adverse effects.

TABLE 1. SOUTH CAROLINA COUNTY DISTRIBUTION RECORDS OF ENDANGERED, THREATENED, AND CANDIDATE SPECIES FOR AIKEN COUNTY
Updated July 18, 1996

These lists should be used only as a guideline. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated continually and may be different from the following.

Aiken County		
Bald eagle (Haliaeetus leucocephalus)	T	Known
Wood stork (Mycteria americana)	E	Known
Red-cockaded woodpecker (Picoides borealis)	E	Known
Shortnose sturgeon (Acipenser brevirostrum)*	O	Known
Relict trillium (Trillium reliquum)	E	Known
Piedmont bishop-weed (Ptilimnium nodosum)	E	Known
Smooth coneflower (Echinacea laevigata)	E	Known
Rafinesque's big-eared bat (Corynorhinus rafinesquii)	SC	Possible
Southeastern myotis (Myotis austroriparius)	SC	Possible
Loggerhead shrike (Lanius ludovicianus)	SC	Possible
Painted bunting (Passerina ciris)	SC	Known
Gopher tortoise (Gopherus polyphemus)	SC	Known
Gopher frog (Rana areolata capito)	SC	Known
Aphodius tortoise commensal scarab (Aphodius troglodytes)	SC	Possible
Onthophagus tortoise commensal scarab (Onthophagus polyphemi)	SC	Possible
Georgia aster (Aster georgianus)	SC	Possible
Sandhills milk-vetch (Astragalus michauxii)	SC	Possible
Chapman's sedge (Carex chapmanii)	SC	Possible
Burhead (Echinodorous tenellus var. parvulus)	SC	Known
Stream-bank spider-lily (Hymenocallis coronaria)	SC	Known
Bog spicebush (Lindera subcoriacea)	SC	Known
Boykin's lobelia (Lobelia boykinii)	SC	Possible
Carolina birds-in-a nest (Macbridea caroliniana)	SC	Known
Loose watermilfoil (Myriophyllum laxum)	SC	Known
Pickering's morning-glory (Stylisma pickeringii)	SC	Known
Meadow rue (Thalictrum subrotundum)	SC	Known
American sandfiltering mayfly (Dolania americana)	SC	
Arogos Skipper (Atrytone Arogus Arogos)	SC	Known

E=Endangered; T=Threatened; SC=Service has on file limited evidence to support proposals for listing these species; 0=Contact National Marine Fisheries Service.

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TABLE 2. HABITAT, FRUITING/FLOWERING PERIOD & COUNTY OCCURRENCES		
Scientific Name	**Common Name**	**Federal Status**
Haliaeetus leucocephalus	Bald eagle	E
Associated with coasts, rivers, lakes, usually nesting near bodies of water where it feeds. Aiken, Barnwell, Beaufort, Berkeley, Calhoun, Charleston, Chesterfield, Clarendon, Colleton, Dorchester, Fairfield, Georgetown, Jasper, Kershaw, Lexington, Marion, McCormick, Newberry, Oconee, Orangeburg, Pickens, Richland, Sumter, Williamsburg.		
Mycteria americana	Wood stork	E
Freshwater and brackish wetlands, primarily nesting in cypress or mangrove swamps. Feeding in freshwater marshes, flooded pastures, flooded ditches. Aiken, Allendale, Barnwell, Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Hampton, Horry, Jasper, Marion, Williamsburg.		
Picoides borealis	Red-cockaded woodpecker	E
Open stands of pines 60+ years old provide roosting/nesting habitat. Foraging habitat is pine and pine/hardwood stands 30+ year old. Aiken, Allendale, Bamberg, Barnwell, Beaufort, Berkeley, Calhoun, Charleston, Chesterfield, Clarendon, Colleton, Darlington, Dillon, Dorchester, Edgefield, Florence, Georgetown, Hampton, Horry, Jasper, Kershaw, Laurens, Lee, Lexington, Marion, Marlboro, McCormick, Orangeburg, Richland, Saluda, Sumter, Williamsburg.		
Alligator mississippiensis	American alligator	T(S/A)
Rivers systems, canals, lakes, swamps.		
Echinacea laevigata	Smooth coneflower	E
Piedmont- mountains. Basic or circumneutral soils (Hayesville, Cecil, Porter, Madison) of meadows and woodlands. Successful colonies are almost always at sites featuring open, bare soil, a fairly high soil pH, and exposures allowing optimal sunshines. Late May-July. Aiken, Allendale, Anderson, Barnwell, Lancaster, Lexington, Oconee, Pickens, Richland.		

From review of the DEIS for this project, it does not appear that the proposed siting or construction of the proposed facilities represent a substantial risk to federally listed or proposed endangered or threatened plant or animal species. In view of this, we believe that the requirements of Section 7 of the Endangered Species Act have been satisfied. However, obligations under Section 7 of the Act must be reconsidered if (1) new information reveals

3

impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered, (2) this action is subsequently modified in a manner which was not considered in this assessment, or (3) a new species is listed or critical habitat determined that may be affected by the identified action.

In addition, the operation of these facilities and the subsequent disposition of large quantities of immobilized plutonium in geologic repositories at the SRS, may impact the future quality of the environment at the site. The DEIS does not fully address the issues associated with geological disposition and therefore they are not a part of this consultation. Once the issue of disposition in geologic repositories is addressed we would be glad to consult with DOE and provide any information necessary for the assessment of potential impacts to the environment.

Also, the DEIS does not present an adequate analysis of potential environmental impacts to the non-human environment. While human health is considered throughout the document, ecological health is rarely discussed. This presumably occurred due to the assumption that environmental receptors are not present within the action area. This assumption does suggest that substantial environmental impacts are improbable in the action area, but does not justify the exclusion of this analysis as a part of the environmental impact assessment. We suggest that the final Environmental Impact Statement (EIS) reflect that appropriate consideration was given not only to the human environment, but the ecological environment as well.

Your interest in ensuring the protection of endangered and threatened species and our nation's valuable wetland resources is appreciated. We hope this letter and the accompanying information on endangered and threatened species will be useful in project development. If you require further assistance please contact Mr. Rusty Jeffers of my staff at (803) 727-4707 ext. 20. In future correspondence concerning the project, please reference FWS Log No. 4-6-98-364.

Sincerely yours,

Edwin M. EuDaly

Edwin M. EuDaly
Acting Field Supervisor

EME/RDJ/km

Department of Energy
Washington, DC 20585
July 28, 1998

Mr. Tom Murphy
South Carolina Department of Natural Resources
Lower Coastal Wildlife Diversity
585 Donnelley Drive
Green Pond, SC 29446

Dear Mr. Murphy:

The Department of Energy (DOE) published its Notice of Intent to prepare the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) in the Federal Register (Vol. 92, No. 99) on May 22, 1997. This SPD EIS is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS* (DOE/EIS-0229), issued in December 1996, and the associated Record of Decision (62 FR 3014), issued on January 14, 1997. To summarize, the purpose of the proposed action is to reduce the threat of nuclear weapons proliferation worldwide in an environmentally safe and timely manner by conducting disposition of surplus plutonium in the United States, thus setting a nonproliferation example for other nations.

The SPD Draft EIS, a copy of which is attached for your review, examines twenty-four alternatives and analyzes the potential environmental impacts for the proposed siting, construction, and operation of three types of facilities: pit disassembly and conversion, mixed oxide (MOX) fuel fabrication, and plutonium conversion and immobilization. The Savannah River Site (SRS) near Aiken, South Carolina is a candidate site for all three facilities. The candidate sites and alternatives are shown in Table 2-1 of the SPD Draft EIS. Please note that where practical, the modification of existing buildings is being considered.

Alternative 3A proposes locating the three surplus plutonium disposition facilities in new construction adjacent to the Actinide Packaging and Storage Facility in F-Area at SRS. In addition, the canister receipt area at the Defense Waste Processing Facility in S-Area would be modified to accommodate the receipt and processing of the canisters from the plutonium conversion and immobilization facility. Although several alternatives include locating facilities at SRS, Alternative 3A has the greatest potential for impacts on ecological resources.

Preliminary analyses suggest that overall impacts on ecological resources from constructing and operating the proposed surplus plutonium disposition facilities would be limited because the land area required (31 hectares [77 acres]) is relatively small in comparison to regionally available habitat; habitat disturbance would be minimized because construction would take place in previously disturbed or developed areas; and operational impacts would be minimized because facility releases of airborne and aqueous effluents would be controlled and permitted. Section 4.26.4.3 of the SPD Draft EIS presents the ecological resources analysis for SRS.

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Although sources indicate that no critical habitat for any threatened and endangered species exists at SRS, there may be Federal or State-classified special status species in the environs surrounding F-Area. These species include American alligator, bald eagle, Oconee azalea, red-cockaded woodpecker, smooth purple coneflower, and wood stork. Noise disturbance is probably the most important impact affecting local wildlife populations.

As part of DOE's National Environmental Policy Act process, DOE encourages the South Carolina Department of Natural Resources to identify any concerns or issues it believes should be addressed in the SPD EIS. To facilitate incorporation of your input into the SPD Final EIS, please provide a written response by September 16, 1998.

Please mail your response to:

Marcus Jones
SPD EIS Document Manager
U.S. Department of Energy
Office of Fissile Materials Disposition
1000 Independence Avenue, SW
Washington, DC 20585

If you have any questions, please contact me at (202) 586-0149.

Sincerely,

Marcus Jones
SPD EIS Document Manager

cc: John B. Gladden, WSRC
David P. Roberts, DOE

Appendix P
Environmental Synopsis

ENVIRONMENTAL SYNOPSIS OF INFORMATION PROVIDED IN RESPONSE TO THE REQUEST FOR PROPOSALS FOR MOX FUEL FABRICATION AND REACTOR IRRADIATION SERVICES

April 1999

1.0 INTRODUCTION

In the aftermath of the Cold War, significant quantities of weapons-usable fissile materials (primarily plutonium and highly enriched uranium) have become surplus to national defense needs both in the United States and Russia. President Clinton announced, on September 27, 1993, the establishment of a framework for United States efforts to prevent the proliferation of weapons of mass destruction. As key elements of the President's policy, the United States will:

X Seek to eliminate, where possible, accumulation of stockpiles of highly enriched uranium and plutonium,
X Ensure that where these materials already exist, they are subject to the highest standards of safety, security, and international accountability, and
X Initiate a comprehensive review of long-term options for plutonium disposition, taking into account technical, nonproliferation, environmental, budgetary, and economic considerations.

In January 1994, President Clinton and Russian President Yeltsin agreed that the proliferation of weapons of mass destruction and their delivery systems represent an acute threat to international security. They declared that both Nations would cooperate actively and closely with each other, and also with other interested nations, for the purpose of preventing and reducing this threat.

The Secretary of Energy and the Congress took action in October 1994 to create a permanent Office of Fissile Materials Disposition (MD) within the Department of Energy (DOE) to focus on the important national security objective of eliminating surplus weapons-usable fissile materials. As one of its major responsibilities, MD is tasked with determining how to disposition surplus weapons-usable plutonium. In January 1997, DOE issued a Record of Decision (ROD) for the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (S&D PEIS)[1]. In that decision document, DOE decided to pursue a strategy that would allow for the possibility of both the immobilization of surplus plutonium and the use of surplus plutonium as mixed oxide (MOX) fuel in existing domestic, commercial reactors. In July, 1998, DOE issued the *Draft Surplus Plutonium Disposition Environmental Impact Statement* (SPD Draft EIS)[2] which analyzes sites for plutonium disposition activities and plutonium disposition technologies to support this strategy.

To support the timely undertaking of the surplus plutonium disposition program, DOE initiated a procurement action to contract for fuel fabrication and reactor irradiation services. On May 19, 1998, DOE issued a Request for Proposals (RFP) for these services (Solicitation Number DE-RP02-

[1] DOE/EIS-0229; December 1996
[2] DOE/EIS-0283D; July 1998

98CH10888). The services requested in this procurement process include design, licensing, construction, operation, and eventual decontamination and decommissioning of a MOX facility as well as irradiation of the MOX fuel in existing domestic, commercial reactors should the decision be made by DOE in the SPD EIS ROD to go forward with the MOX program.

In accordance with DOE's National Environmental Policy Act (NEPA) regulations (10 CFR 1021.216), DOE required offerors to submit reasonably available environmental data and analyses as a part of their proposals. DOE independently evaluated and verified the accuracy of the data provided by the offeror in the competitive range, and prepared and considered an Environmental Critique before the procurement selection was made.

As required by Section 216, the Environmental Critique included a discussion of the purpose of the procurement; the salient characteristics of the offeror's proposal; any licenses, permits or approvals needed to support the program; and an evaluation of the potential environmental impacts of the offer. In March 1999, after considering the Environmental Critique, DOE awarded a contract for MOX fuel fabrication and reactor irradiation services. Under this contract, MOX fuel would be fabricated at a DOE site to be selected in the SPD EIS ROD and then irradiated in six domestic commercial nuclear reactors at three commercial reactor sites. Additionally, under the contract only limited activities may be performed prior to issuance of the SPD EIS ROD. These activities include non-site-specific work primarily associated with the development of the initial conceptual design for the fuel fabrication facility, and plans (paper studies) for outreach, long lead-time procurements, regulatory management, facility quality assurance, safeguards, security, fuel qualifications, and deactivation. There would be no construction started on a MOX fuel fabrication facility until the SPD EIS ROD is issued. The MOX facility, if built, would be government-owned, licensed by the Nuclear Regulatory Commission (NRC), and located at one of four candidate DOE sites.

This Synopsis is based on the Environmental Critique and provides a publicly available assessment of the potential environmental impacts associated with the proposal based on an independent review of the representations and data contained in the proposal. The Synopsis serves as a record that DOE has considered the environmental factors and potential consequences of the reasonable alternatives analyzed during the selection process. The Synopsis will be filed with the U.S. Environmental Protection Agency and made publicly available. The Synopsis will also be incorporated into a Supplement to the SPD Draft EIS, which is to be issued in the near future.

2.0 ASSESSMENT METHODS

The analyses in this Synopsis (and in the Environmental Critique) were performed using information submitted by the offeror in the competitive range, independently developed information, publicly available information, and standard computer models and techniques.

In order to evaluate the reasonableness of the offeror's projected environmental impacts compared to those projected by DOE, the offeror's data for the MOX facility was compared to information in the SPD Draft EIS; for the use of MOX fuel in domestic commercial reactors, the offeror's data was compared to

information in the S&D PEIS.[3]

Data developed independently to support these analyses include the projection of populations around the proposed reactor sites[4] and information related to the topography surrounding the proposed reactor sites for evaluating air dispersal patterns. Information was also provided by Oak Ridge National Laboratory (ORNL) on the expected ratio of radionuclide activities in MOX fuel compared to that in low enriched uranium (LEU) fuel for use in reactor accident analyses. Standard models for determining radiation doses from normal operations and accident scenarios, and air pollutant concentrations at the proposed disposition facility sites and reactors were run using data provided by the offeror. Reactor accident analyses assumed a 40 percent MOX core because this is a conservative estimate of the amount of MOX fuel that would be used in each of the reactors. The environmental analyses were prepared using the following computer models: GENII for estimating radiation doses to the public from normal operation of the MOX fuel fabrication facility and the proposed reactors; MACCS2 for design-basis and beyond-design-basis accident analyses at the proposed reactors; and ISC3 and SCREEN3 for estimated air pollutant concentrations as a result of normal MOX facility and reactor operations.

3.0 DESCRIPTION OF THE OFFER

The offeror has proposed to build a MOX facility on a DOE site[5] with subsequent irradiation services being provided in six existing reactors at three commercial nuclear power plants in the Eastern United States.

The proposed MOX facility design, which is based on an existing MOX facility in France, will be modified to meet U.S. regulations. Under the proposed design, plutonium dioxide powder would be received from DOE's proposed pit disassembly and conversion facility. The plutonium dioxide would be aqueously processed (polished) to ensure that it meets the agreed-to fuel specification for MOX fuel. Following the polishing step, the plutonium in solution would then be converted back into plutonium dioxide. At that point, the process proposed by the offeror would be similar to that described in Chapter 2 of the SPD Draft EIS[6]. The plutonium dioxide would be mixed with uranium dioxide and formed into MOX fuel pellets.

---

[3] Such information is also summarized in the SPD Draft EIS.

[4] Population projections for the area encompassed in a 50-mile radius around the proposed reactor sites were projected to 2015 to approximate the mid-point of the irradiation services program. By 2015, the MOX program would be firmly established at all of the proposed reactor sites and would be expected to remain stable through the end of the program. Using 1990 census data as the base year and state-provided population increase factors for all counties included in this analysis, the population around the sites was projected for 2015. Baseline projections were needed for two of the reactor sites because the population information provided in the proposal was based on 1970 census data. Recent (i.e., 1990) census data were provided for the other proposed site and projected by the offeror to the years 2010 and 2020. From these data points, 2015 projections were interpolated.

[5] This site would be selected in the SPD EIS ROD. As explained in the SPD Draft EIS, DOE's preference is to locate the MOX fuel fabrication plant at DOE's Savannah River site.

[6] The SPD Draft EIS also included evaluation of an aqueous processing facility in Appendix N, that could be added to either the pit conversion or the MOX facility. Based on public comments received and information presented by the offeror subsequent to the release of the SPD Draft EIS, DOE is now considering whether to add the aqueous polishing process to the front end of the MOX facility. The environmental impacts associated with this option will be presented in Chapter 4 of the SPD Final EIS.

These pellets would be baked at high temperature, ground to exact dimensions, then loaded into fuel rods. The MOX fuel rods would then be bundled with standard LEU fuel rods to form MOX fuel assemblies. The MOX fuel assemblies would be shipped to the proposed reactor sites in DOE-provided safe, secure transport vehicles on a near just-in-time basis to minimize the amount of time the fresh MOX fuel would be stored at a reactor site prior to loading into the reactor.

Three sites, each with two operating pressurized light water reactors (PWRs), have been proposed for MOX fuel irradiation. The proposed sites are: the Catawba nuclear generation station near York, South Carolina; the McGuire nuclear generation station near Huntersville, North Carolina; and the North Anna nuclear generation station near Mineral, Virginia. All of these sites have been operating safely for a number of years. Table 1 provides some general information about each of the proposed plants.

Table 1. Reactor Plant Operating Information

Plant	Operator	Capacity (net MWe)	Date of First Operation (mo/yr)
Catawba No. 1	Duke Power Co.	1,129	01/85
Catawba No. 2	Duke Power Co.	1,129	05/86
McGuire No. 1	Duke Power Co.	1,129	07/81
McGuire No. 2	Duke Power Co.	1,129	05/83
North Anna No. 1	Virginia Power Co.	900	04/78
North Anna No. 2	Virginia Power Co.	887	08/80

Table 2 shows the results of the most recent Systematic Assessment of Licensee Performance performed by NRC for each of the proposed reactors. As can be seen in this table, all the proposed reactors have been operated and maintained in a safe manner.

Table 2. Systematic Assessment of Licensee Performance Results

	Catawba	McGuire	North Anna
Date of Latest SALP	06/97	04/97	02/97
Operations	Superior	Superior	Superior
Maintenance	Good	Good	Superior
Engineering	Superior	Good	Good
Plant Support	Superior	Superior	Superior

As proposed by the offeror, both MOX and LEU fuel assemblies would be loaded into the reactor. The MOX fuel assemblies are scheduled to remain in the core for two 18-month cycles and the LEU assemblies for either two or three cycles. After completing a normal (full) fuel cycle, the spent MOX fuel assemblies would be removed from the reactor in accordance with the plant's standard refueling procedures and placed in the plant's spent fuel pool for cooling along with other spent fuel. The offeror has stated that no changes are expected in the plant's spent fuel storage plans to accommodate the spent MOX fuel. Eventually, the fuel would be shipped to a potential geologic repository to be developed by DOE for permanent disposal of commercial spent fuel.

4.0 ENVIRONMENTAL IMPACTS

Human health risk, waste management, land use, infrastructure requirements, accidents, air quality, water quality, and socioeconomics have been evaluated in this Synopsis. Cultural, paleontological and ecological resources, and transportation requirements are not expected to be impacted other than as discussed in the SPD Draft EIS and were not evaluated in this Synopsis. Although four sites are being considered by DOE for the proposed MOX facility, this Environmental Synopsis focuses primarily on environmental impacts at DOE's Savannah River Site (SRS) for the potential MOX facility because, as stated in Section 1.6 of the SPD Draft EIS, it is DOE's preferred location for the MOX facility. However, this Synopsis also discusses non-radiological impacts at other potential MOX facility sites, where appropriate. Unless otherwise noted, impacts would likely be similar at other sites.

4.1 MOX Fuel Fabrication Facility

4.1.1 Human Health Risk

The annual radiological dose from normal operations to the general population residing within 50 miles of the proposed MOX facility at the preferred site, SRS, was calculated based on radiological emissions estimated by the offeror. The major contributor to this dose would be attributable to the offeror's estimated annual release of 0.25 mg of plutonium.[7] In contrast to the "atmospheric release only" assumption presented in the SPD Draft EIS, the MOX facility data provided by the offeror includes both liquid and airborne releases because the proposed process includes some aqueous processing. Table 3 shows the projected radiological dose that would be received by the general population as a result of normal operations of the MOX facility proposed by the offeror.

The average individual living within 50 miles of the SRS site would be expected to receive an annual dose of 2.3×10^{-4} mrem/yr from normal operation of the MOX facility. The maximally exposed individual (MEI) would be expected to receive an annual dose of 3.7×10^{-3} mrem/yr from operation of the MOX facility at SRS. This dose is well below regulatory limits, which require doses resulting from DOE operations to be below 10 mrem/yr from airborne pathways, 4 mrem/yr from drinking water pathways, and 100 mrem/yr from all pathways combined. The additional dose to the general population would also be small in comparison with the average dose received from other SRS activities. For example, in 1997, the average individual living within 50 miles of SRS received a dose of 1.4×10^{-2} mrem/yr from site activities. (SPD Draft EIS, pg. 3-141)

[7]The isotopic distribution of the potential plutonium releases were modeled based on the isotopic distribution developed by Los Alamos National Laboratory for use in the SPD Draft EIS.

Table 3. Estimated Radiological Impacts on the Public from Operations of the MOX Facility at SRS

	Maximally Exposed Ind. (mrem/yr)	Latent Fatal Cancer Risk from 10 Year Operating Life	Est. Dose to Pop. within 50 mi. radius (person-rem/yr)	Latent Fatal Cancers from 10 Year Operating Life	Avg. Dose to Ind. within 50 mi. radius (mrem/yr)	Latent Fatal Cancer Risk from 10 Year Operating Life
Offeror	$3.7x10^{-3}$	$1.9x10^{-8}$	0.181	$9.1x10^{-4}$	$2.3x10^{-4}$	$1.2x10^{-9}$
SPD Draft EIS*	$3.1x10^{-4}$	$1.6x10^{-9}$	0.029	$1.5x10^{-4}$	$3.7x10^{-5}$	$1.9x10^{-10}$
SRS Base**	0.2	$1.0x10^{-6}$	8.6	$4.3x10^{-2}$	$1.4x10^{-2}$	$7.0x10^{-8}$

* Includes contributions from polishing process discussed in Appendix N in addition to those shown in Chapter 4.
** SPD Draft EIS pg. 3-141

Table 4 shows the potential radiological impacts on involved workers at the proposed MOX facility conservatively calculated from 1997 data from the offeror's European operating facility. As shown in Table 4, the average radiation worker at the offeror's proposed MOX facility would receive an annual dose of 65 mrem/yr from normal operations. The offeror has stated that in 1997 the maximum dose to an individual worker at the offeror's MOX facility was 885 mrem, well below the DOE administrative control level of 2,000 mrem/yr and the Federal regulatory limit of 5,000 mrem/yr. The offeror also estimates that fewer radiation workers would be needed to operate the MOX facility than indicated in the SPD Draft EIS. The offeror estimates that approximately 330 radiation workers would be required, rather than the 410 estimated in the SPD Draft EIS.[8]

Table 4. Potential Radiological Impacts on Involved Workers from Operations of the MOX Facility

	No. of Radiation Workers	Average Worker Dose (mrem/yr)	Latent Fatal Cancer Risk from 10 Years of Operation	Total Dose to Workers (person-rem/yr)	Latent Fatal Cancers from 10 Years of Operations
Offeror	330	65	$2.6x10^{-4}$	22	0.088
SPD Draft EIS*	410	500	$2.0x10^{-3}$	205	0.82
SRS Base**	12,500	19	$7.6x10^{-5}$	237	0.95

* Includes contributions from polishing process discussed in Appendix N in addition to the doses shown in Chapter 4.
** SPD Draft EIS pg. 3-142.

4.1.2 Accidents

Design-basis and beyond-design-basis accidents were evaluated in the SPD Draft EIS for the MOX facility and the aqueous plutonium polishing process. Accidents evaluated for the MOX facility included a criticality, fires, and earthquakes. A spill, an uncontrolled reaction resulting in an explosion, a criticality, and an earthquake were evaluated for the plutonium polishing process. Any of these accidents could occur

[8] Although it is estimated that about 385 personnel would be required to operate the facility, only about 330 of the 385 would be considered radiation workers.

in the proposed MOX facility since it would use similar processes.

Including the plutonium polishing process in the MOX facility as proposed by the offeror would make a criticality the bounding design-basis accident for the facility. As shown in Table 5, no major radiological impacts to the general population would be expected from design-basis accidents at the proposed MOX facility. The frequency of this accident, a criticality in solution, is estimated to be between 1 in 10,000 and 1 in 1,000,000 per year.

The bounding beyond-design-basis accident would be an earthquake of sufficient magnitude to collapse the MOX facility. An earthquake of this magnitude would be expected to result in major radiological impacts. However, an earthquake of this magnitude would also be expected to result in widespread damage across the site and throughout the surrounding area. The frequency of an earthquake of this magnitude is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year. Table 5 shows the impact of this accident on SRS. At the other candidate sites, the estimated dose to the general population from this accident would range from $2.0H10^{3}$ to $5.7H10^{4}$ with the corresponding number of LCFs expected to range from 1.0 to 28 LCFs. The maximum dose to a person at the site boundary at the time of the accident would be expected to range from 16 to 25 rem with a corresponding risk of latent cancer fatality of $8.0H10^{-3}$ to $1.2H10^{-2}$. A noninvolved worker would be exposed to a dose in the range of $2.2H10^{2}$ to $6.4H10^{2}$ rem with a corresponding risk of latent cancer fatality of $8.8H10^{-2}$ to $2.3H10^{-1}$.

Table 5. Bounding Accidents for the Proposed MOX Facility

	Noninvolved Worker (rem)	Probability of Cancer Fatality per Accident	Estimated Dose at Site Boundary (rem)	Probability of Cancer Fatality per Accident	Estimated Dose to Pop. Within 50 mi. radius (person-rem)	Latent Cancer Fatalities per Accident
Criticality at SRS*	$3.0x10^{-1}$	$1.2x10^{-4}$	$1.6x10^{-2}$	$8.0x10^{-6}$	$1.6x10^{1}$	$8.0x10^{-3}$
Beyond-design-basis earthquake**	$2.2x10^{2}$	$8.8x10^{-2}$	8.9	$4.5x10^{-3}$	$2.1x10^{4}$	10.6

*SPD Draft EIS pg. N-15
**SPD Draft EIS pgs. K-50 and N-15

No major consequences for the maximally exposed involved worker would be expected from leaks, spills, and smaller fires. These accidents are such that involved workers would be able to evacuate immediately or would not be affected by the events. However, explosions could result in immediate injuries from flying debris, as well as the uptake of plutonium and uranium particulates through inhalation. If a criticality were to occur, workers within tens of meters could receive very high to fatal radiation exposures from the initial neutron burst. The dose would strongly depend on the magnitude of the criticality (number of fissions), the distance from the criticality, and the amount of shielding provided by the structures and equipment between the workers and the criticality. Earthquakes could also result in substantial consequences to workers, ranging from workers being killed by collapsing equipment and structures to high radiation exposures and uptakes of radionuclides. For all but the most severe accidents, immediate emergency response actions should reduce the magnitude of the consequences to workers near the accident.

4.1.3 Waste Management

The MOX facility would be expected to produce TRU waste, low-level radioactive waste (LLW), mixed LLW, hazardous waste and sanitary waste in the course of its normal operations. As shown in Table 6, the offeror's estimated generation rates for radioactive wastes are consistent with those estimated in the SPD Draft EIS. None of these estimates is expected to impact the proposed sites in terms of their ability to handle these wastes. The ability to store, treat, and/or dispose of radioactive waste is limited at Pantex. If Pantex were chosen as the site for the MOX facility, the wastes would presumably be handled as discussed in the SPD Draft EIS. TRU waste would have to be stored in the MOX facility until it could be shipped to the Waste Isolation Pilot Plant (WIPP) for permanent disposal. Mixed LLW would be handled in the same manner as current mixed waste that is shipped offsite for treatment and disposal. LLW would be treated and stored onsite until shipped to the Nevada Test Site or a commercial facility for disposal.[9]

Table 6. Estimated Annual Waste Generation Rates

	TRU Waste	Mixed LLW	LLW	Hazardous Waste	Sanitary Waste
Offeror					
Liquid (l/yr)	500	0	300	1,200	11 million
Solid (m^3/yr)	~67	3	94	0.1	150
SPD Draft EIS*					
Liquid (l/yr)	0.5	0.1 l	0.3	1,740	18 million
Solid (m^3/yr)	~67	3	94	1.2	440
SRS Generation Rate**					
Liquid (l/yr)	na	na	na	Na	416 million
Solid (m^3/yr)	431	1,135	10,043	74	6,670

na – not available
*Includes contributions from the polishing process discussed in Appendix N of the SPD Draft EIS, in addition to the wastes shown in Chapter 4.
**SPD Draft EIS pg. 3-130.

4.1.4 Land Use

It is estimated that a total of 6.2 hectares (15.3 acres) would be needed for the MOX facility. This estimate includes 1.0 hectares (2.5 acres) for the process building, 0.2 hectares (0.58 acres) for support facilities, and 5 hectares (12.4 acres) for parking and a security buffer. This is very close to the 6.0 hectares (14.9 acres) estimated in the SPD Draft EIS (pg. E-10). As indicated in the SPD Draft EIS, there is sufficient space available to accommodate the proposed MOX facility at any of the candidate sites.

[9] DOE would ensure that any such disposal would be consistent with the RODs for the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*, DOE/EIS-0200F, May 1997.

4.1.5 Infrastructure Requirements

The proposed MOX facility would use electricity, natural gas, water, and fuel oil. As shown in Table 7, the offeror's proposed facility would use more of these materials than estimated in the SPD Draft EIS.

Table 7. Estimated MOX Facility Infrastructure Requirements

	Electricity (MWh/yr)	Natural Gas (m^3/yr)	Water (10^6 l/yr)	Fuel Oil (l/yr)
Offeror	30,000	1,070,000	68	63,000
SPD Draft EIS*	17,520	920,000	44	43,000
SRS F-Area Available Capacity**	482,700	na***	1,216	na****

*Includes contributions from the polishing process as discussed in Appendix N in addition to the infrastructure requirements shown in Chapter 4.
**SPD Draft EIS pg. 3-165.
***Heat in F-Area provided by steam.
****Fuel oil trucked in as needed and stored at MOX facility.

4.1.5 Air Quality

Operation of the proposed MOX facility would result in the release of a small amount of nonradiological air pollutants that would be expected to slightly increase the ambient air pollutant concentrations at the selected site. The majority of these pollutants would be associated with routine maintenance and testing runs of the facility's emergency diesel generator and emissions from facility heating. Table 8 shows the estimated increases in ambient air pollutant concentrations for the proposed facility and the national standards for these pollutants. The projected emissions are a very small fraction of the national standards. Although some small radionuclide discharges are expected from the proposed MOX facility, these discharges are not expected to have a major impact on air quality. As explained in Section 4.1.1, these discharges would result in a very small dose to the general public.

Table 8. Estimated Nonradiological Ambient Air Pollutant Concentrations from the Proposed MOX Facility

	Carbon Monoxide 8 hour 1 hour	Nitrogen Dioxide Annual	PM_{10} Annual 24 hour	Sulfur Dioxide Annual 24 hour 3 hour
National Ambient Air Quality Standards (μg/m^3)	10,000 40,000	100	50 150	80 365 1,300
Offeror (μg/m^3)	0.123 0.371	0.011	0.001 0.011	0.039 0.531 1.39
SPD Draft EIS* (μg/m^3)	0.109 0.345	0.011	0.001 0.010	0.031 0.420 1.11
SRS Base** (μg/m^3)	64 279	9.3	4.14 56.4	15.1 219 962

*Includes contributions from the polishing process discussed in Appendix N in addition to the pollutant concentrations shown in Chapter 4.
**SPD Draft EIS pg. 4-6

4.1.6 Water Quality

Table 9 shows a comparison of water resources information described in the SPD Draft EIS to that provided by the offeror. Although the proposed water use is higher than that analyzed in the SPD Draft EIS, the amount of water needed is estimated to be from 0.9 to 6.0 percent of the site's estimated annual water requirements. Therefore, the additional water use is not expected to have a major impact on water resources. Although some small radionuclide discharges are expected from the proposed MOX facility, these discharges are not expected to have a major impact on water quality. As explained in Section 4.1.1, these discharges would result in a very small dose to the general public.

Table 9. Comparison of Water Resources Information for the MOX Facility

	Water Use (10^6 liters/yr)	Sanitary Wastewater Discharged (10^6 liters/yr)	Radionuclide Emissions to Water (Ci)
SPD Draft EIS	44	18	0
Offeror	68	11	0.0025

4.1.7 Socioeconomics

The proposed MOX facility would employ about 385 workers, somewhat fewer than the 435 workers estimated in the SPD Draft EIS. An increase of 385 workers would not be expected to have a major impact on any of the candidate sites. At three of the four candidate sites (i.e., INEEL, Pantex, and SRS), the workforce is projected to be falling at the same time the proposed MOX facility would begin operations. The additional MOX facility workers would help mitigate the negative socioeconomic impacts

associated with such reductions. The SPD Draft EIS concluded that, at Hanford, although the increase in workforce requirements for proposed surplus plutonium disposition facilities (including MOX) would coincide with an increase in the site's overall workforce (as a result of the planned tank waste remediation system), the projected changes would not have a major impact on the level of community services currently offered in the region of influence. (SPD Draft EIS pg. 4-37)

4.2 Proposed Reactor Sites

The offeror is proposing to use a partial MOX core (up to approximately 40 percent of the fuel in the core at equilibrium) in each of the proposed reactors. The S&D PEIS analyzed a full MOX core at a generic reactor site.

4.2.1 Human Health Risk

Risk to human health was assessed for the proposed reactor sites based on information provided by the offeror and compared to the generic reactor information in the S&D PEIS. The offeror stated that there would be no difference in dose to the general public from normal operations based on the use of MOX fuel versus LEU fuel in the proposed reactors. This is consistent with findings in the S&D PEIS that showed a very small range in the expected difference (-1.1×10^{-2} to 2×10^{-2} person-rem, S&D PEIS pg. 4-729). The doses shown in this section reflect the projected dose in the year 2015.

The annual radiological dose from normal operations to the general population residing within 50 miles of the proposed reactor sites was estimated based on radiological emissions estimated by the offeror. As shown in Table 10, the average individual living within 50 miles of one of the proposed reactor sites could expect to receive an annual dose of between 2.7×10^{-3} to 9.9×10^{-3} mrem/yr from normal operation of these reactors regardless of whether the reactors were using MOX fuel or LEU fuel.

Table 10. Estimated Dose to the General Population from Normal Operations of the Proposed Reactors in the Year 2015 (Partial MOX or LEU Core)

	Maximally Exposed Individual (mrem/yr)	Latent Fatal Cancer Risk	Est. Dose to Pop. within 50 mi. radius (person-rem/yr)	Annual Number of Latent Cancer Fatalities	Avg. Dose to Ind. within 50 mi. radius (mrem/yr)
Catawba[a]	0.73	3.7×10^{-7}	6.1	3.1×10^{-3}	2.7×10^{-3}
McGuire[b]	0.31	1.6×10^{-7}	10.7	5.4×10^{-3}	4.2×10^{-3}
North Anna[c]	0.37	1.9×10^{-7}	20.3	1.0×10^{-2}	9.9×10^{-3}
S&D PEIS (high)*	0.17	8.5×10^{-8}	2.0	1.0×10^{-3}	7.8×10^{-4}

*S&D PEIS pg. 4-729
[a] The population for the year 2015 is estimated to be 2,265,000.
[b] The population for the year 2015 is estimated to be 2,575,000.
[c] The population for the year 2015 is estimated to be 2,042,000.

The offeror also stated that the workers at the proposed reactor sites would be expected to receive about the same amount of radiation dose as a result of their job activities regardless of the plant's decision to use

MOX fuel. As shown in Table 11, the average radiation worker at the proposed reactor sites could expect to receive an annual dose of between 46 and 123 mrem/yr from normal operations. This is lower than the worker dose range estimated in the S&D PEIS (281 to 543 mrem/yr). The offeror's statement that the use of MOX fuel would not change the estimated worker dose is consistent with data presented in the S&D PEIS that showed an incremental increase in worker dose of less than 0.1 percent due to the use of MOX fuel. (S&D PEIS pg. 4-730)

Table 11. Estimated Dose to Workers from Normal Operations of the Proposed Reactors with MOX Fuel

	No. of Radiation Workers*	Total Dose to Workers (person-rem/ year)	Annual Number of Latent Cancer Fatalities	Average Worker Dose (mrem/yr)	Annual Latent Fatal Cancer Risk
Catawba	3,400	265	0.11	78	$3.1x10^{-5}$
McGuire	4,000	492	0.20	123	$4.9x10^{-5}$
North Anna	2,240	103	0.041	46	$1.8x10^{-5}$
S&D PEIS (high)**	2,220	1,204	0.48	543	$2.2x10^{-4}$

*The number of radiation workers at the proposed reactor sites was estimated based on the total dose to workers given by the offeror divided by the average worker dose, also supplied by the offeror.
**S&D PEIS pg. 4-730; adjusted to reflect a two reactor site for comparison to the proposed reactor sites.

4.2.2 Accidents

Two design-basis accidents, a large break loss-of-coolant accident (LOCA) and a fuel handling accident (FHA), were evaluated for the Environmental Critique and are reflected in this Synopsis. These accidents were chosen because they are the limiting reactor and non-reactor design-basis accidents at the proposed facilities. As shown in Tables 12 through 14, only small increases in the estimated impacts would be expected from a LOCA at the proposed reactor sites due to the use of MOX fuel. In a FHA, the consequences (defined as latent cancer fatalities) would decrease as a result of using MOX fuel rather than LEU fuel. This is because the end-of-cycle krypton inventory is less in MOX fuel than in LEU fuel and krypton is one of the greatest contributors to radiation dose from a FHA.

Beyond-design-basis accidents, if they were to occur, would be expected to result in major impacts to workers, the surrounding communities, and the environment regardless of whether the reactor was using a LEU or a partial MOX core. As shown in Tables 15 through 17, the probability of a beyond-design-basis accident happening and the risk to an individual living within 50 miles of the proposed reactors is very low.

The largest estimated risk of a latent cancer fatality for the maximally exposed individual (MEI) at any of the proposed reactors is estimated to be $2.86H10^{-5}$ for a steam generator tube rupture at one of the North Anna reactors when using a partial MOX core. If this same accident were to happen at the reactor when it was using a LEU core, the estimated risk would be $2.46H10^{-5}$. In either case, the risk of a latent cancer fatality is estimated to be less than 3 in 100,000 over the 16 year period the reactors would be using MOX fuel.

For beyond-design-basis accidents, the scenarios that lead to containment bypass or failure were evaluated because these are the accidents with the greatest potential consequences. The public and environmental consequences would be significantly less for accident scenarios that do not lead to containment bypass or failure. A steam generator tube rupture, early containment failure, late containment failure, and an interfacing systems loss-of-coolant accident (ISLOCA) were chosen as the representative set of beyond-design-basis accidents.

Commercial reactors, licensed by the NRC are required to complete Individual Plant Examinations (IPE) to assess plant vulnerabilities to severe accidents. An acceptable method of completing the IPEs is to perform a probabilistic risk assessment (PRA). A PRA analysis evaluates, in full detail (quantitatively), the consequences of all potential events caused by the operating disturbances (known as internal initiating events) within each plant. The PRA uses realistic criteria and assumptions in evaluating the accident progression and the systems required to mitigate each accident. The PRAs for the proposed reactors provided the required data to evaluate beyond-design-basis accidents.

As shown in Table 18, the difference in accident consequences for reactors using MOX fuel versus LEU fuel is generally very small. For beyond-design-basis accidents, the consequences would be expected to be slightly higher, with the largest increase associated with an ISLOCA. This is because the MOX fuel will release a higher actinide inventory in a severe accident. The impacts of an ISLOCA are estimated to be about 10 to 15 percent (an average of about 13 percent) greater to the general population living within 50 miles of the reactor operating with a partial MOX core instead of a LEU core. It should be noted that this accident has a very low estimated frequency of occurrence, an average of 1 in 3.2 million per year of reactor operation for the reactors being proposed.

Table 12. Design-Basis Accident Impacts for Catawba with LEU and Mixed Oxide Fuels

			Noninvolved Worker			Maximally Exposed Offsite Individual			Population		
Accident Release Scenario	Accident Scenario Frequency (per year)	LEU or MOX Core	Dose (rem)	Probability of Latent Cancer Fatality Given Dose to Noninvolved Worker[1]	Risk of Latent Cancer Fatality (over campaign)[2]	Dose (rem)	Probability of Latent Cancer Fatality Given Dose at Site Boundary[1]	Risk of Latent Cancer Fatality (over campaign)[2]	Dose (person-rem)	Number of Latent Cancer Fatalities in the Population within 80 km[3]	Risk of Latent Cancer Fatalities (over campaign)[4]
Loss-of-Coolant Accident	7.50×10^{-6}	LEU	3.78	1.51×10^{-3}	1.81×10^{-7}	1.44	7.20×10^{-4}	8.64×10^{-8}	$3.64 \times 10^{+3}$	1.82	2.19×10^{-4}
		MOX	3.85	1.54×10^{-3}	1.86×10^{-7}	1.48	7.40×10^{-4}	8.88×10^{-8}	$3.75 \times 10^{+3}$	1.88	2.26×10^{-4}
Spent Fuel Handling Accident[5]	1.00×10^{-4}	LEU	0.275	1.10×10^{-4}	1.78×10^{-7}	0.138	6.90×10^{-5}	1.10×10^{-7}	$1.12 \times 10^{+2}$	5.61×10^{-2}	8.98×10^{-5}
		MOX	0.262	1.05×10^{-4}	1.68×10^{-7}	0.131	6.55×10^{-5}	1.05×10^{-7}	$1.10 \times 10^{+2}$	5.48×10^{-2}	8.77×10^{-5}

[1] Increased likelihood (probability) of cancer fatality to a hypothetical individual - a noninvolved worker at a distance of 640 meters or the maximally exposed offsite individual located at the site boundary (762 m) - if exposed to the indicated dose.
[2] Increased likelihood (probability) of cancer fatality over the estimated 16 year campaign (frequency weighted) to a hypothetical individual - a noninvolved worker at a distance of 640 meters or the maximally exposed offsite individual located at the site boundary (762 m).
[3] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 kilometers (50 miles) if exposed to the indicated dose.
[4] Estimated number of cancer fatalities over the estimated 16 year campaign (frequency weighted) in the entire offsite population out to a distance of 80 kilometers (50 miles).
[5] Accident scenario frequency estimated in lieu of plant specific data.

Table 13. Design-Basis Accident Impacts for McGuire with LEU and Mixed Oxide Fuels

			Noninvolved Worker			Maximally Exposed Offsite Individual			Population		
Accident Release Scenario	Accident Scenario Frequency (per year)	LEU or MOX Core	Dose (rem)	Probability of Latent Cancer Fatality Given Dose to Noninvolved Worker[1]	Risk of Latent Cancer Fatality (over campaign)[2]	Dose (rem)	Probability of Latent Cancer Fatality Given Dose at Site Boundary[1]	Risk of Latent Cancer Fatality (over campaign)[2]	Dose (person-rem)	Number of Latent Cancer Fatalities in the Population within 80 km[3]	Risk of Latent Cancer Fatalities (over campaign)[4]
Loss-of-Coolant Accident	1.50×10^{-5}	LEU	5.31	2.12×10^{-3}	5.10×10^{-7}	2.28	1.14×10^{-3}	2.74×10^{-7}	$3.37 \times 10^{+3}$	1.68	4.03×10^{-4}
		MOX	5.46	2.18×10^{-3}	5.25×10^{-7}	2.34	1.17×10^{-3}	2.82×10^{-7}	$3.47 \times 10^{+3}$	1.73	4.16×10^{-4}
Spent Fuel Handling Accident[5]	1.00×10^{-4}	LEU	0.392	1.57×10^{-4}	2.51×10^{-7}	0.212	1.06×10^{-4}	1.70×10^{-7}	99.1	4.96×10^{-2}	7.94×10^{-5}
		MOX	0.373	1.49×10^{-4}	2.38×10^{-7}	0.201	1.01×10^{-4}	1.62×10^{-7}	97.3	4.87×10^{-2}	7.79×10^{-5}

[1] Increased likelihood (probability) of cancer fatality to a hypothetical individual - a noninvolved worker at a distance of 640 meters or the maximally exposed offsite individual located at the site boundary (762 m) - if exposed to the indicated dose.
[2] Increased likelihood (probability) of cancer fatality over the estimated 16 year campaign (frequency weighted) to a hypothetical individual - a noninvolved worker at a distance of 640 meters or the maximally exposed offsite individual located at the site boundary (762 m).
[3] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 kilometers (50 miles) if exposed to the indicated dose.
[4] Estimated number of cancer fatalities over the estimated 16 year campaign (frequency weighted) in the entire offsite population out to a distance of 80 kilometers (50 miles).
[5] Accident scenario frequency estimated in lieu of plant specific data.

Table 14. Design-Basis Accident Impacts for North Anna with LEU and Mixed Oxide Fuels

			Noninvolved Worker			Maximally Exposed Offsite Individual			Population		
Accident Release Scenario	Accident Scenario Frequency (per year)	LEU or MOX Core	Dose (rem)	Probability of Latent Cancer Fatality Given Dose to Noninvolved Worker[1]	Risk of Latent Cancer Fatality (over campaign)[2]	Dose (rem)	Probability of Latent Cancer Fatality Given Dose at Site Boundary[1]	Risk of Latent Cancer Fatality (over campaign)[2]	Dose (person-rem)	Number of Latent Cancer Fatalities in the Population within 80 km[3]	Risk of Latent Cancer Fatalities (over campaign)[4]
Loss-of-Coolant Accident	2.10×10^{-5}	LEU	0.114	4.56×10^{-5}	1.53×10^{-8}	3.18×10^{-2}	1.59×10^{-5}	5.34×10^{-9}	39.4	1.97×10^{-2}	6.62×10^{-6}
		MOX	0.115	4.60×10^{-5}	1.55×10^{-8}	3.20×10^{-2}	1.60×10^{-5}	5.38×10^{-9}	40.3	2.02×10^{-2}	6.78×10^{-6}
Spent Fuel Handling Accident[5]	1.00×10^{-4}	LEU	0.261	1.04×10^{-4}	1.66×10^{-7}	9.54×10^{-2}	4.77×10^{-5}	7.63×10^{-8}	29.4	1.47×10^{-2}	2.35×10^{-5}
		MOX	0.239	9.56×10^{-5}	1.53×10^{-7}	8.61×10^{-2}	4.31×10^{-5}	6.90×10^{-8}	27.5	1.38×10^{-2}	2.21×10^{-5}

[1] Increased likelihood (probability) of cancer fatality to a hypothetical individual - a noninvolved worker at a distance of 640 meters or the maximally exposed offsite individual located at the site boundary (1349 m) - if exposed to the indicated dose.
[2] Increased likelihood (probability) of cancer fatality over the estimated 16 year campaign (frequency weighted) to a hypothetical individual - a noninvolved worker at a distance of 640 meters or the maximally exposed offsite individual located at the site boundary (1349 m).
[3] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 kilometers (50 miles) if exposed to the indicated dose.
[4] Estimated number of cancer fatalities over the estimated 16 year campaign (frequency weighted) in the entire offsite population out to a distance of 80 kilometers (50 miles).
[5] Accident scenario frequency estimated in lieu of plant specific data.

Table 15. Beyond-Design-Basis Accident Impacts for Catawba with LEU and Mixed Oxide Fuels

			Maximally Exposed Offsite Individual			Population		
Accident Release Scenario	Accident Scenario Frequency (per year)	LEU or MOX Core	Dose (rem)	Probability of Latent Cancer Fatality Given Dose at Site Boundary[1]	Risk of Latent Cancer Fatality (over campaign)[2]	Dose (person-rem)	Number of Latent Cancer Fatalities in the Population within 80 km[3]	Risk of Latent Cancer Fatalities (over campaign)[4]
Steam Generator Tube Rupture[5]	6.31×10^{-10}	LEU	$3.46\times10^{+2}$	0.346	3.49×10^{-9}	$5.71\times10^{+6}$	$2.86\times10^{+3}$	2.88×10^{-5}
		MOX	$3.67\times10^{+2}$	0.367	3.71×10^{-9}	$5.93\times10^{+6}$	$2.96\times10^{+3}$	2.99×10^{-5}
Early Containment Failure	3.42×10^{-8}	LEU	5.97	2.99×10^{-3}	1.63×10^{-9}	$7.70\times10^{+5}$	$3.85\times10^{+2}$	2.11×10^{-4}
		MOX	6.01	3.01×10^{-3}	1.65×10^{-9}	$8.07\times10^{+5}$	$4.04\times10^{+2}$	2.21×10^{-4}
Late Containment Failure	1.21×10^{-5}	LEU	3.25	1.63×10^{-3}	3.15×10^{-7}	$3.93\times10^{+5}$	$1.96\times10^{+2}$	3.79×10^{-2}
		MOX	3.48	1.74×10^{-3}	3.38×10^{-7}	$3.78\times10^{+5}$	$1.89\times10^{+2}$	3.66×10^{-2}
Interfacing System Loss of Cooling Accident	6.90×10^{-8}	LEU	$1.40\times10^{+4}$	1	1.10×10^{-6}	$2.64\times10^{+7}$	$1.32\times10^{+4}$	1.46×10^{-2}
		MOX	$1.60\times10^{+4}$	1	1.10×10^{-6}	$2.96\times10^{+7}$	$1.48\times10^{+4}$	1.63×10^{-2}

[1] Increased likelihood (probability) of cancer fatality to the maximally exposed offsite individual located at the site boundary (762 m) - if exposed to the indicated dose.
[2] Increased likelihood (probability) of cancer fatality over the estimated 16 year campaign (frequency weighted) to a hypothetical individual - a noninvolved worker at a distance of 640 meters or the maximally exposed offsite individual located at the site boundary (762 m).
[3] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 kilometers (50 miles) if exposed to the indicated dose.
[4] Estimated number of cancer fatalities over the estimated 16 year campaign (frequency weighted) in the entire offsite population out to a distance of 80 kilometers (50 miles).
[5] McGuire timing and release fractions were used to compare like scenarios.

Table 16. Beyond-Design-Basis Accident Impacts for McGuire with LEU and Mixed Oxide Fuels

			Maximally Exposed Offsite Individual			Population		
Accident Release Scenario	Accident Scenario Frequency (per year)	LEU or MOX Core	Dose (rem)	Probability of Latent Cancer Fatality Given Dose at Site Boundary[1]	Risk of Latent Cancer Fatality (over campaign)[2]	Dose (person-rem)	Number of Latent Cancer Fatalities in the Population within 80 km[3]	Risk of Latent Cancer Fatalities (over campaign)[4]
Steam Generator Tube Rupture	5.81×10^{-9}	LEU	$6.10\times10^{+2}$	0.610	5.66×10^{-8}	$5.08\times10^{+6}$	$2.54\times10^{+3}$	2.37×10^{-4}
		MOX	$6.47\times10^{+2}$	0.647	6.02×10^{-8}	$5.28\times10^{+6}$	$2.64\times10^{+3}$	2.45×10^{-4}
Early Containment Failure	9.89×10^{-8}	LEU	12.2	6.10×10^{-3}	9.65×10^{-9}	$7.90\times10^{+5}$	$3.95\times10^{+2}$	6.26×10^{-4}
		MOX	12.6	6.30×10^{-3}	9.97×10^{-9}	$8.04\times10^{+5}$	$4.02\times10^{+2}$	6.37×10^{-4}
Late Containment Failure	7.21×10^{-6}	LEU	2.18	1.09×10^{-3}	1.26×10^{-7}	$3.04\times10^{+5}$	$1.52\times10^{+2}$	1.76×10^{-2}
		MOX	2.21	1.11×10^{-3}	1.28×10^{-7}	$2.96\times10^{+5}$	$1.48\times10^{+2}$	1.71×10^{-2}
Interfacing System Loss of Cooling Accident	6.35×10^{-7}	LEU	$1.95\times10^{+4}$	1	1.02×10^{-5}	$1.79\times10^{+7}$	$8.93\times10^{+3}$	0.091
		MOX	$2.19\times10^{+4}$	1	1.02×10^{-5}	$1.97\times10^{+7}$	$9.85\times10^{+3}$	0.10

[1] Increased likelihood (probability) of cancer fatality to the maximally exposed offsite individual located at the site boundary (762 m) - if exposed to the indicated dose.

[2] Increased likelihood (probability) of cancer fatality over the estimated 16 year campaign (frequency weighted) to a hypothetical individual - a noninvolved worker at a distance of 640 meters or the maximally exposed offsite individual located at the site boundary (762 m).

[3] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 kilometers (50 miles) if exposed to the indicated dose.

[4] Estimated number of cancer fatalities over the estimated 16 year campaign (frequency weighted) in the entire offsite population out to a distance of 80 kilometers (50 miles).

Table 17. Beyond-Design-Basis Accident Impacts for North Anna with LEU and Mixed Oxide Fuels

			Maximally Exposed Offsite Individual			Population		
Accident Release Scenario	Accident Scenario Frequency (per year)	LEU or MOX Core	Dose (rem)	Probability of Latent Cancer Fatality Given Dose at Site Boundary[1]	Risk of Latent Cancer Fatality (over campaign)[2]	Dose (person-rem)	Number of Latent Cancer Fatalities in the Population within 80 km[3]	Risk of Latent Cancer Fatalities (over campaign)[4]
Steam Generator Tube Rupture[5]	7.38×10^{-6}	LEU	$2.09\times10^{+2}$	0.209	2.46×10^{-5}	$1.73\times10^{+6}$	$8.63\times10^{+2}$	0.102
		MOX	$2.43\times10^{+2}$	0.243	2.86×10^{-5}	$1.84\times10^{+6}$	$9.20\times10^{+2}$	0.109
Early Containment Failure[5]	1.60×10^{-7}	LEU	19.6	1.96×10^{-2}	5.02×10^{-8}	$8.33\times10^{+5}$	$4.17\times10^{+2}$	1.07×10^{-3}
		MOX	21.6	2.16×10^{-2}	5.54×10^{-8}	$8.42\times10^{+5}$	$4.21\times10^{+2}$	1.08×10^{-3}
Late Containment Failure[5]	2.46×10^{-6}	LEU	1.12	5.60×10^{-4}	2.21×10^{-8}	$4.04\times10^{+4}$	20.2	7.95×10^{-4}
		MOX	1.15	5.75×10^{-4}	2.26×10^{-8}	$4.43\times10^{+4}$	22.1	8.70×10^{-4}
Interfacing System Loss of Cooling Accident[5]	2.40×10^{-7}	LEU	$1.00\times10^{+4}$	1	3.84×10^{-6}	$4.68\times10^{+6}$	$2.34\times10^{+3}$	8.99×10^{-3}
		MOX	$1.22\times10^{+4}$	1	3.84×10^{-6}	$5.41\times10^{+6}$	$2.70\times10^{+3}$	1.04×10^{-2}

[1] Increased likelihood (probability) of cancer fatality to the maximally exposed offsite individual located at the site boundary (1349 m) - if exposed to the indicated dose.
[2] Increased likelihood (probability) of cancer fatality over the estimated 16 year campaign (frequency weighted) to a hypothetical individual - a noninvolved worker at a distance of 640 meters or the maximally exposed offsite individual located at the site boundary (1349 m).
[3] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 kilometers (50 miles) if exposed to the indicated dose.
[4] Estimated number of cancer fatalities over the estimated 16 year campaign (frequency weighted) in the entire offsite population out to a distance of 80 kilometers (50 miles).
[5] McGuire release durations and warning times were used in lieu of site specific data.

Table 18. Ratio of Accident Impacts for Mixed Oxide Fueled and Uranium Fueled Reactors (Mixed Oxide Impacts/LEU Impacts)

	Catawba		McGuire		North Anna		S&D PEIS	
Accident Scenario	MEI	Population	MEI	Population	MEI	Population	MEI	Population
Design-Basis Accidents								
Loss-of-Coolant Accident	1.03	1.03	1.01	1.03	1.03	1.03	NA	NA
Fuel Handling Accident	0.95	0.98	0.90	0.94	0.95	0.98	NA	NA
Beyond-Design-Basis Accidents								
Steam Generator Tube Rupture	1.06	1.04	1.16	1.07	1.06	1.04	0.94	0.94
Early Containment Failure	1.01	1.05	1.10	1.01	1.03	1.02	0.96	0.97
Late Containment Failure	1.07	0.96	1.03	1.09	1.01	0.97	1.07	1.08
Interfacing System Loss of Cooling Accident	1.14	1.12	1.22	1.15	1.12	1.10	0.92	0.93

Key: MEI – Maximally Exposed Individual; NA – not available

Note: The number 1 represents the consequences equal to the accident occurring in the proposed reactors with an LEU core

Table 19 shows the number of prompt fatalities estimated from a postulated ISLOCA and a beyond-design-basis steam generator tube rupture. As shown in this table, the differences due to the use of MOX fuel rather than LEU are small. None of the other accidents evaluated in this Synopsis are expected to result in prompt fatalities.

Table 19. Estimated Prompt Fatalities from Beyond-Design-Basis Reactor Accidents

Reactor Site	LEU Core	MOX Core
Steam Generator Tube Rupture		
Catawba	1	1
McGuire	1	1
North Anna	0	0
Interfacing System Loss of Cooling Accident		
Catawba	815	843
McGuire	398	421
North Anna	54	60

4.2.3 Waste Management

The proposed reactors would be expected to continue to produce mixed LLW, LLW, hazardous waste, and nonhazardous waste as part of their normal operations. According to the offeror, the volume of waste generated is not expected to increase as a result of the reactors using MOX fuel. This is consistent with information presented in the S&D PEIS that stated the use of MOX fuel is not expected to increase the amount or change the content of the waste being generated. (S&D PEIS, pg. 4-734) Table 20 shows the annual waste volume that would be generated during operation of the proposed reactors.

Table 20. Estimated Waste Generation Rates

Reactor Site	Mixed LLW (m^3/yr)	LLW (m^3/yr)	Hazardous Waste (m^3/yr)	Nonhazardous Waste Solid (m^3/yr)
Catawba (per unit)	0.3	25	15	455
McGuire (per unit)	0.1	21	14	568
North Anna (per unit)	0.0	118	6	5,200
S&D PEIS*	na	178	na	na

na - not available.
*S&D PEIS pg. 4-734.

As shown in Table 20, the estimated LLW generation for each of the proposed reactors is less than the amount estimated in the S&D PEIS. None of these waste estimates are expected to impact the proposed reactor sites in terms of their ability to handle these wastes. The wastes would continue to be handled in the same manner as they are today with no change required due to the use of MOX fuel at the reactors.

4.2.4 Spent Fuel

As shown in Table 21, it is likely that some additional spent fuel would be generated by using a partial MOX core in the proposed reactors. The amount of additional spent nuclear fuel generated is estimated to range from approximately 2 to 16 percent of the total amount of spent fuel that would be generated by the proposed reactors during the time period MOX fuel would be used. The offeror intends to manage the spent MOX fuel the same as its spent LEU fuel, by storing it in the reactor's spent fuel pool or in dry storage. According to the offeror, the amount of additional spent fuel is not expected to impact spent fuel management at the reactor sites.

Table 21. Total Additional Spent Fuel Assemblies Generated for the MOX Fuel Option

	Number of Spent Fuel Assemblies Generated with no MOX Fuel	Number of Additional Spent Fuel Assemblies with MOX Fuel	Percent Increase
S&D PEIS (based on a shorter fuel cycle)			
Typical PWR*	48/yr	32/yr	66.7%
Offeror's Reactors			
Total Over MOX Campaign	3,732	199	5.3%

*S&D PEIS pg. 4-734

For the four units at Catawba and McGuire, all of the additional spent nuclear fuel assemblies would be generated during the transition cycles from LEU to MOX fuel. Additional assemblies help to maintain peaking below design and regulatory limits, and compensate for the greater end-of-cycle reactivity. Once equilibrium is reached in the partial MOX core, additional fuel assemblies would not be required.

Like Catawba and McGuire, the North Anna units are expected to require additional LEU assemblies during the first transition cores. However, additional assemblies will also be required during equilibrium cycles because the smaller North Anna cores (157 fuel assemblies compared to 193 each for the McGuire and Catawba units) are more prone to neutron leakage and provide less flexibility with respect to meeting power peaking limits.

As designs are finalized and optimized for MOX fuel it may be possible to reduce MOX fuel assembly peaking and thereby reduce the number of additional assemblies required (and spent fuel generated) at the proposed reactors. As it currently stands, the North Anna site could generate approximately 16 percent more spent fuel by using MOX fuel than if the plants continued to use LEU fuel. The total amount of additional spent fuel generated by all six proposed reactors is estimated to be approximately 92 metric tons heavy metal. However, such MOX spent fuel is included in the inventory for the potential Nuclear Waste Policy Act geologic repository being studied by DOE. DOE is in the process of completing an environmental impact statement for a geologic repository.

4.2.5 Land Use

The offeror has stated that the proposed reactor sites would not require any additional land to support the use of MOX fuel in their reactors. This statement is consistent with information presented in the S&D PEIS. (S&D PEIS, pg. 4-720)

4.2.6 Infrastructure Requirements

The offeror has stated that the proposed reactor sites would not require any additional infrastructure to support the use of MOX fuel in their reactors. This statement is consistent with information presented in the S&D PEIS. (S&D PEIS, pg. 4-721)

4.2.7 Air Quality

Continued operation of the proposed reactor sites would result in a small amount of nonradiological air pollutants being released to the atmosphere, mainly due to the requirement to periodically test emergency diesel generators. The estimated air pollutants resulting from operation of the proposed reactors would not be expected to increase due to the use of MOX fuel in these reactors. Table 22 shows the estimated air pollutant concentrations and the national standards for these pollutants at the proposed sites. The impact of radiological releases is included in Section 4.2.1.

Table 22. Nonradiological Ambient Air Pollutant Concentrations with or without MOX Fuel from the Continued Operation of the Proposed Reactors

	Carbon Monoxide 8 hour 1 hour	Nitrogen Dioxide Annual	PM_{10} Annual 24 hour	Sulfur Dioxide Annual 24 hour 3 hour
National Ambient Air Quality Standards ($\mu g/m^3$)	10,000 40,000	100	50 150	80 365 1,300
Catawba ($\mu g/m^3$)	978 1400	3.26	0.102 65.4	0.0418 26.9 60.4
McGuire ($\mu g/m^3$)	1060 1510	2.6	0.08 71.2	0.03 29.9 67.4
North Anna ($\mu g/m^3$)	416 594	0.01	0.004 15.4	0.02 63 142

4.2.8 Water Quality

The offeror stated that there would be no change in water usage or discharge of nonradiological pollutants resulting from use of MOX fuel in the proposed reactors. Each of the reactor sites discharges nonradiological wastewater in accordance with a National Pollutant Discharge Elimination System

(NPDES) Permit, or an analogous state-issued permit. Permitted outfalls discharge conventional and priority pollutants from the reactor and ancillary processes that are similar to discharges from most reactor sites. Discharge Monitoring Reports (DMRs) for North Anna (May 1994 through April 1998) and Catawba (calendar years 1995 through 1997) showed that for the most part, there were only occasional noncompliances with permit limitations, only one of which occurred at an outfall receiving reactor process discharges. (The offeror did not provide DMRs for McGuire.) During the period reviewed, Catawba experienced four noncompliances, two in 1995 and two in early 1996. North Anna has exceeded the chlorine limitation at its sewage treatment facility, but this would neither affect nor be affected by, the use of MOX fuel. The impact of radiological releases is included in Section 4.2.1.

4.2.9 Socioeconomics

The offeror has stated that the proposed reactor sites would not need to employ any additional workers to support the use of MOX fuel in their reactors so there would not be any expected socioeconomic impacts. This statement is consistent with information presented in the S&D PEIS which concluded that the use of MOX fuel could result in small increases in the worker population at the reactor sites (between 40 and 105), but that any increase would be filled from the area's existing workforce. Therefore, there would be little impact on the local economy and communities (S&D PEIS, pgs. 4-727).

5.0 REQUIRED PERMITS AND LICENSES

Both the MOX fabrication facility and the selected reactors will require permitting and licensing activities to support the proposed fabrication and use of MOX fuel. The MOX fabrication facility will be constructed and operated at an existing DOE-owned site, but will be licensed by the NRC. The selected reactors are all U.S. operating, commercial PWRs, licensed by the NRC. The MOX facility, in particular, has special licensing considerations apart from most facilities that are built and operated in the United States today. This section discusses the particular licensing and permitting requirements of both facilities.

Both DOE and NRC have their origins in the Atomic Energy Act (AEA). The AEA first established their predecessor agency, the Atomic Energy Commission (AEC) to promote and regulate the use of atomic energy in the United States. The AEC was subsequently split into two organizations that have since become DOE and NRC. DOE was authorized to manage defense-related nuclear activities, while NRC was given the responsibility of regulating civilian uses of nuclear materials. Both DOE and NRC publish their regulations in Title 10 of the *Code of Federal Regulations* (10 CFR), with NRC publishing in Parts 0–199, and DOE, Parts 200–1099. DOE supplements its regulations with a series of Orders, while NRC uses Regulatory Guides to further establish specific methods of implementation of its regulations. The proposed actions that are the subject of this Synopsis are unique in that DOE and NRC each have regulatory responsibility for certain parts of the activities.

The AEA authorizes DOE to establish standards to protect health or minimize dangers to life or property for activities under DOE's jurisdiction. Through a series of DOE orders and regulations, an extensive system of standards and requirements has been established to ensure safe operation of facilities. The DOE orders have been revised and reorganized to reduce duplication and eliminate obsolete provisions (though some older orders remain in effect during the transition). For DOE orders, the new organization is by Series and is generally intended to include all DOE policies, manuals, requirements documents, notices,

guides, and orders. For proposed actions involving fuel qualification, relevant DOE regulations include 10 CFR 820, Procedural Rules for DOE Nuclear Activities; 10 CFR 830, Nuclear Safety Management; 10 CFR.834, Radiation Protection of the Public and the Environment (Draft); 10 CFR 835, Occupational Radiation Protection; 10 CFR 1021, Compliance with the National Environmental Policy Act; and 10 CFR 1022, Compliance with Floodplains/Wetlands Environmental Review Requirements. DOE orders include those in new Series 400, which deals with Work Process; and within this Series, DOE Order 420.1 addresses Facility Safety; 425.1 addresses Startup and Restart of Nuclear Facilities; 452.1A addresses Nuclear Explosive and Weapons Surety Programs; 452.2A addresses the Safety of Nuclear Explosives Operations; 452.4 addresses the Security and Control of Nuclear Explosives; 460.1A addresses Packaging and Transportation Safety; 470.1 addresses the Safeguards and Security Program; and 474.1 addresses the Control and Accountability of Nuclear Materials. In addition, DOE (older number) Series 5400 addresses environmental, safety, and health programs for DOE operations. Not all of these DOE regulations and orders would apply to operation of the proposed MOX fuel fabrication facility, and most would not apply to use of the proposed reactors.

There are a number of Federal environmental statutes dealing with environmental protection, compliance, or consultation. In addition, certain environmental requirements have been delegated to state authorities for enforcement and implementation. Certain statutes and regulations require DOE to consult with Federal, State, and local agencies and federally recognized Native American groups. Most of these consultations are related to biotic resources, cultural resources, and Native American resources. Biotic resources consultations generally pertain to the potential for activities to disturb sensitive species or habitats. Cultural resources consultations relate to the potential for disruption of important cultural resources and archaeological sites. Finally, Native American consultations are concerned with the potential for disturbance of Native American sites and resources. DOE has conducted appropriate consultations at the candidate sites and will report the results of these consultations in the SPD Final EIS.

It is DOE policy to conduct its operations in an environmentally safe manner in compliance with all applicable statutes, regulations, and standards. Although this chapter does not address pending or future regulations, DOE recognizes that the regulatory environment is subject to change, and that the construction, operation, and decommissioning of any surplus plutonium disposition facility must be conducted in compliance with all applicable regulations and standards.

5.1 Regulatory Activities

It is likely that new or modified permits will be needed before the proposed surplus plutonium disposition facilities may be constructed or operated. Permits regulate many aspects of facility construction and operations, including the quality of construction, treatment and storage of hazardous waste, and discharges of effluents to the environment. These permits will be obtained from appropriate Federal, state, and local agencies. NRC issues operating licenses for major facilities such as commercial nuclear power reactors and fuel fabrication facilities, although the regulations under which these two facilities would be licensed are different.

5.1.1 The MOX Facility

The MOX facility would be licensed to operate by NRC under its regulations at 10 CFR 70, *Domestic Licensing of Special Nuclear Materials*. Because the facility would be located at a DOE site, however,

certain DOE requirements affecting site interfaces and infrastructure will also be applicable. In addition, as would be the case regardless of where the facility were built, Federal or state regulations implementing certain provisions of the Clean Water Act, Clean Air Act, and Resource Conservation and Recovery Act would be applicable. These regulations are implemented through permits. Evaluation would be required to determine whether MOX facility emissions and activities would necessitate modification of any of these permits. Analyses in the SPD Draft EIS have shown that there would be minimal impact from construction and operation of the MOX facility.

MOX facility design and operating parameters will be imposed by requirements of 10 CFR 70. Facility robustness, worker health and safety, and material and personnel security are all specified by 10 CFR 70. This regulation incorporates and refers the licensee to provisions of other NRC regulations such as those found at 10 CFR 20, *Radiation Protection Standards*. Safety and environmental analyses will be required to support the license application for the MOX facility.

Integral to the NEPA process is consideration of how the proposed action might affect biotic, cultural, and Native American resources, and the need for mitigation of any potential impacts. Required consultations with agencies and recognized Native American groups have been conducted.

5.1.2 Reactors

Nuclear power reactors undergo a lengthy licensing process under 10 CFR 50, *Domestic Licensing of Production and Utilization Facilities*, beginning before facility construction commences. This process includes preparation of safety analysis and environmental reports. The safety analysis report remains a living document that serves as the licensing basis for the plant, and is updated throughout the life of the plant. Public hearings before a licensing board are conducted prior to a license being issued. Once issued, operating licenses may be amended only with proper evaluation, review and approval as specified in 10 CFR 50.90. This prescriptive process requires demonstration that a proposed change does not involve an unreviewed environmental or safety question and provides for public notice and opportunity to comment prior to issuance of the license amendment. Minor license amendments can be processed fairly expeditiously, but more involved amendments can require multiple submittals before the NRC is assured that the proposed action will not reduce the margin of safety of the plant. All submittals, except portions that contain proprietary information, are available to the public.

The regulatory process for requesting reactor license amendments to use MOX fuel will be the same as for any 10 CFR 50 Operating License amendment request. The reactor licensee submitting an operating license amendment request in accordance with 10 CFR 50.90 initiates this process. Safety and environmental analyses commensurate with the level of potential impact are submitted in support, and as part, of the amendment request. NRC reviews the submitted information and denies or approves the request. The review process can involve submittal of additional information and face-to-face meetings between the licensee and NRC, and can result in modified license amendment requests. NRC provides notice in the *Federal Register* for certain steps in the process. The notice for the amendment request initially appears in the *Federal Register* with a Notice of Opportunity for Public Hearing. *Federal Register* notices are also required for the Proposed No Significant Hazards Determination, associated environmental documents, Consideration of Issuance of the License Amendment, and issuance of the final amendment. Certain of these notices allow for the opportunity to provide written comments, and for potentially affected parties to petition to intervene or request public hearings.

The six reactors proposed to use MOX fuel have been operating for a number of years. Revisions to each of their operating licenses will be required prior to MOX fuel being brought to the reactor sites and loaded into the reactors. The license amendment request will need to include a discussion of all potential impacts and changes in reactor operation that could be important to safety or the environment. This will include fresh and spent fuel handling, security and operational changes, as well as complete core load analysis and safety analyses, including potential changes to the severe accident analyses. Because the offeror has indicated that no new construction would be required to accommodate the use of MOX fuel, it is unlikely that any biotic, cultural or Native American resources would be impacted by the proposed action. The analyses performed for the Environmental Critique have demonstrated very little difference between the impacts from using a partial MOX core over a LEU core.

The need for modifications to site permits will be evaluated by the individual plants as part of their licensing activities. The offeror has indicated, and the analyses and reviews performed for the Environmental Critique, support the assertion, that there would be minimal or no change in effluents, emissions, and wastes (both radiological and nonradiological). Therefore, it is expected that few, if any, environmental permits or agreements will require modification for use of MOX fuel.

6.0 CONCLUSION

No major impacts to the environment surrounding the proposed MOX facility or reactor sites are expected to result from normal operation of these facilities. Environmental impacts from operation of the proposed reactors are not expected to change appreciably due to the use of MOX fuel. Impacts from construction and operation of the MOX facility are expected to be generally consistent with those presented in the SPD Draft EIS, and impacts at the reactor sites are expected to be generally consistent with those in the S&D PEIS.

Office of
Fissile Materials Disposition

United States Department of Energy

Surplus Plutonium Disposition Final Environmental Impact Statement

Comment Response Document

Volume III - Part A

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For Further Information Contact:
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Cover Sheet

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Locations of Candidate Sites: California, Idaho, New Mexico, North Carolina, South Carolina, Tennessee, Texas, Virginia, and Washington

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Abstract: On May 22, 1997, DOE published a Notice of Intent in the Federal Register (62 Federal Register 28009) announcing its decision to prepare an environmental impact statement (EIS) that would tier from the analysis and decisions reached in connection with the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS*. At that time, the U.S. Environmental Protection Agency decided to be a cooperating agency. The *Surplus Plutonium Disposition Draft Environmental Impact Statement* (SPD Draft EIS) (DOE/EIS-0283-D) was prepared in accordance with NEPA and issued in July 1998. It identified the potential environmental impacts of reasonable alternatives for the proposed siting, construction, and operation of three facilities for the disposition of up to 50 metric tons (55 tons) of surplus plutonium, as well as a No Action Alternative. These three facilities would accomplish pit disassembly and conversion, plutonium conversion and immobilization, and mixed oxide (MOX) fuel fabrication.

For the alternatives that included MOX fuel fabrication, the SPD Draft EIS described the potential environmental impacts of using from three to eight commercial nuclear reactors to irradiate MOX fuel. The potential impacts were based on a generic reactor analysis that used actual reactor data and a range of potential site conditions. In May 1998, DOE initiated a procurement process to obtain MOX fuel fabrication and reactor irradiation services. In March 1999, DOE awarded a contract to Duke Engineering & Services, COGEMA Inc., and Stone & Webster (known as DCS) to provide the requested services. A *Supplement to the SPD Draft EIS* was issued in April 1999, which analyzed the potential environmental impacts of using MOX fuel in six specific reactors named in the DCS proposal. Those reactors are Catawba Nuclear Station Units 1 and 2 in South Carolina, McGuire Nuclear Station Units 1 and 2 in North Carolina, and North Anna Power Station Units 1 and 2 in Virginia.

DOE has identified the hybrid approach as its Preferred Alternative for the disposition of surplus plutonium. This approach allows for the immobilization of 17 metric tons (19 tons) of surplus plutonium and the use of 33 metric tons (36 tons) as MOX fuel. DOE has identified the Savannah River Site near Aiken, South Carolina, as the preferred site for all three disposition facilities (Alternative 3). DOE has also identified Los Alamos National

Laboratory in New Mexico as the preferred site for lead assembly fabrication, and Oak Ridge National Laboratory in Tennessee as the preferred site for postirradiation examination of lead assemblies.

Public Involvement: In preparing the SPD Final EIS, DOE considered comments on the SPD Draft EIS and the *Supplement to the SPD Draft EIS* received via mail, fax, and email, and comments recorded by phone and transcribed from videotapes. In addition, comments were captured by notetakers during interactive public meetings held on the SPD Draft EIS in August 1998 in Amarillo, Texas; Idaho Falls, Idaho; North Augusta, South Carolina; Portland, Oregon; and Richland, Washington, as well as during a public meeting on the *Supplement to the SPD Draft EIS* held in June 1999 in Washington, D.C. Comments received and DOE's responses to these comments are found in Volume III, the Comment Response Document, of the SPD Final EIS. Information on the surplus plutonium disposition program can be obtained by visiting the Office of Fissile Materials Disposition Web site at http://www.doe-md.com.

DOE/EIS-0283

Surplus Plutonium Disposition Final Environmental Impact Statement

Comment Response Document

Volume III - Part A

United States Department of Energy
Office of Fissile Materials Disposition

November 1999

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List of Acronyms

AEA	Atomic Energy Act of 1954
AECL	Atomic Energy of Canada Limited
AED	aerodynamic equivalent diameter
AIRFA	American Indian Religious Freedom Act
ALARA	as low as is reasonably achievable
AMWTP	Advanced Mixed Waste Treatment Project
ANL–W	Argonne National Laboratory–West
APSF	Actinide Packaging and Storage Facility
AQCR	Air Quality Control Region
ARF	airborne release fraction
ARIES	Advanced Recovery Integrated Extraction System
AVLIS	Atomic Vapor Laser Isotope Separation
BEA	Bureau of Economic Analysis
BEIR V	Report V of the Committee on the Biological Effects of Ionizing Radiations
BIO	Basis for Interim Operation
BLM	Bureau of Land Management
BNFL	British Nuclear Fuels
BWR	boiling water reactor
CAA	Clean Air Act
CAB	Citizens Advisory Board
CANDU	Canadian Deuterium Uranium (reactors)
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CPP	Chemical Processing Plant
CWA	Clean Water Act of 1972, 1987
D&D	decontamination and decommissioning
DBA	design basis accident
DCS	Duke Engineering & Services, COGEMA Inc., and Stone & Webster
DNFSB	Defense Nuclear Facilities Safety Board
DOC	U.S. Department of Commerce
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
DR	damage ratio
DU PEIS	*Final Programmatic Environmental Impact Statement for Alternative Strategies for Long-Term Management and Use of Depleted Uranium Hexafluoride*
DWPF	Defense Waste Processing Facility
EA	environmental assessment
EBR	Experimental Breeder Reactor (I or II)
EIS	environmental impact statement
EPA	Environmental Protection

	Agency
ES&H	environment, safety, and health
ESTEEM	Education in Science, Technology, Energy, Engineering, and Math
ETB	Engineering Test Bay
ETTP	East Tennessee Technology Park
FAA	Federal Aviation Administration
FDP	fluorinel dissolution process
FEMA	Federal Emergency Management Agency
FFCA	Federal Facility Compliance Agreement
FFF	Uranium Fuel Fabrication Facility
FFTF	Fast Flux Test Facility
FI	field investigation
FM	Farm-to-Market (road)
FMF	Fuel Manufacturing Facility
FMEA	failure modes and effects analysis
FMEF	Fuels and Materials Examination Facility
FONSI	finding of no significant impact
FPF	Fuel Processing Facility
FPPA	Farmland Protection Policy Act
FR	Federal Register
GAO	General Accounting Office
GDP	gaseous diffusion plant
GE	General Electric Company
GENII	Generation II, Hanford environmental radiation dosimetry software system
GPS	global positioning satellite
HE	high explosive
HEPA	high-efficiency particulate air (filter)
HEU	highly enriched uranium
HFEF	Hot Fuel Examination Facility
HHS	Department of Health and Human Services
HIGHWAY	(computer code for distances and populations along U.S. highways)
HLW	high-level waste
HLWVF	high-level-waste vitrification facility
HMIS	Hazardous Materials Information System
HWTPF	Hazardous Waste Treatment and Processing Facility
HYDOX	hydride oxidation
IAEA	International Atomic Energy Agency
ICPP	Idaho Chemical Processing Plant
ICRP	International Commission on Radiological Protection
ID DHW	Idaho Department of Health and Welfare
INEEL	Idaho National Engineering and Environmental Laboratory
INRAD	Intrinsic Radiation
INTEC	Idaho Nuclear Technology and Engineering Center
IPE	Individual Plant Examination
ISC	Industrial Source Complex Model
ISC3	Industrial Source Complex Model, Version 3
ISCST3	Industrial Source Complex Model, Short-Term, Version 3
ISLOCA	interfacing systems loss-of-coolant accident
ITP	In-Tank Precipitation Process
LANL	Los Alamos National Laboratory

LCF	latent cancer fatality
LDR	Land Disposal Restrictions
LEU	low-enriched uranium
LLNL	Lawrence Livermore National Laboratory
LLW	low-level waste
LOCA	loss-of-coolant accident
LPF	leak path factor
LWR	light water reactor
M&H	Mason & Hanger Corporation
MACCS2	Melcor Accident Consequence Code System (computer code)
MAR	material at risk
MD	Office of Fissile Materials Disposition
MEI	maximally exposed individual
MIMAS	Micronized Master
MMI	Modified Mercalli Intensity
MOX	mixed oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Science
NCRP	National Council on Radiation Protection and Measurements
NDA	nondestructive analysis
NEPA	National Environmental Policy Act of 1969
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPH	natural phenomena hazard
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRU	National Research Universal
NTS	Nevada Test Site
NWCF	New Waste Calcining Facility
NWPA	Nuclear Waste Policy Act
NWS	National Weather Service
ORIGEN	ORNL Isotope Generation and Depletion Code
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PBF	Power Burst Facility
PEIS	programmatic environmental impact statement
PFP	Plutonium Finishing Plant
PIE	postirradiation examination
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
PNNL	Pacific Northwest National Laboratory
PRA	probabilistic risk assessment
PSD	prevention of significant deterioration
PUREX	Plutonium-Uranium Extraction (Facility)
PWR	pressurized water reactor

R&D	research and development
RADTRAN 4	(computer code: risks and consequences of radiological materials transport)
RANT	Radioactive Assay and Nondestructive Test
RAMROD	Radioactive Materials Research, Operations and Demonstration
RCRA	Resource Conservation and Recovery Act, as amended
REA	regional economic area
RF	respirable fraction
RfC	reference concentration
RfD	reference dose
RFETS	Rocky Flats Environmental Technology Site
RFP	Request for Proposal
RIA	Reactivity Insertion Accidents
RIMS II	Regional Input-Output Modeling System II (computer code)
RISKIND	(computer code: risks and consequences of radiological materials transport)
ROD	Record of Decision
ROI	region of influence
RMF	Radiation Measurements Facility
RWMC	Radioactive Waste Management Complex
S/A	Similarity of Appearance (provision of Endangered Species Act)
SAR	safety analysis report
SARA	Superfund Amendments and Reauthorization Act of 1986
SCDHEC	South Carolina Department of Health and Environmental Control
SCE&G	South Carolina Electric & Gas Company
SCSHPO	South Carolina State Historic Preservation Officer
SDWA	Safe Drinking Water Act, as amended
SEIS	supplemental environmental impact statement
SHPO	State Historic Preservation Officer
SI	sealed insert
SMC	Specific Manufacturing Complex
SNF	spent nuclear fuel
SNM	special nuclear material
SPD	surplus plutonium disposition
SPD EIS	*Surplus Plutonium Disposition Environmental Impact Statement*
SPERT	Special Power Excursion Reactor Test
SRS	Savannah River Site
SSM PEIS	*Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management*
SST/SGT	safe, secure trailer/SafeGuards Transport
SWMU	solid waste management unit
SWP 1	Service Waste Percolation Pond 1
TA	Technical Area
TCE	trichloroethylene
TNRCC	Texas Natural Resource Conservation Commission
TPBAR-LTA	tritium-producing burnable absorber rod lead test assembly
TRA	technical risk assessment

TRANSCOM	transportation tracking and communications system
TRU	transuranic
TRUPACT	TRU waste package transporter
TSCA	Toxic Substances Control Act
TSP	total suspended particulates
TVA	Tennessee Valley Authority
TWRS	tank waste remediation system
TWRS EIS	*Tank Waste Remediation System Final Environmental Impact Statement*
UC	Regents of the University of California
UFSAR	updated final safety analysis report
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEC	United States Enrichment Corporation
USFWS	U.S. Fish and Wildlife Service
UV	ultraviolet
VOC	volatile organic compounds
VORTAC	very high frequency omnidirectional range/tactical air navigation (facility)
VRM	Visual Resource Management
WAG 3	Waste Area Grouping 3
WERF	Waste Experimental Reduction Facility
WIPP	Waste Isolation Pilot Plant
WM PEIS	*Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*
WNP–1	Washington Nuclear Plant–1
WNP–2	Washington Nuclear Plant–2
WPPSS	Washington Public Power Supply System
WROC	Waste Reduction Operations Complex
WSRC	Westinghouse Savannah River Company
ZPPR	Zero Power Physics Reactor

Chemicals and Units of Measure

°C	degrees Celsius (Centigrade)
°F	degrees Fahrenheit
μCi	microcurie
μg	microgram
μm	micrometer (micron)
46°26'07"	46 degrees, 26 minutes, 7 seconds
Ci	curie
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dBA	decibel, A-weighted
DUF_6	depleted uranium hexafluoride
eH	oxidation reduction potential
ft	foot
ft^2	square foot
ft^3	cubic foot
g	gram
g	gravitational acceleration
gal	gallon
GWD/t	gigawatt days (per ton)
ha	hectare
hr	hour (in compound units)
in	inch
kg	kilogram
km	kilometer
km^2	square kilometers
kV	kilovolt
l	liter
lb	pound
m	meter
m^2	square meter
m^3	cubic meter
mg	milligram
mi	mile
min	minute
mph	miles per hour
mrem	millirem
MTHM	metric tons of heavy metal
MVA	megavolt-ampere
MW	megawatt
MWe	megawatt electric
MWh	megawatt-hour
N_2	nitrogen
nCi	nanocurie
NO_2	nitrogen dioxide
pCi	picocurie
pcm/F	percent mille/per degree Farenheit
pH	hydrogen ion concentration
$PM_{2.5}$	particulate matter less than or equal to 2.5 μm in diameter
PM_{10}	particulate matter less than or equal to 10 μm in diameter
ppm	parts per million
PuO_2	plutonium dioxide
rad	radiation absorbed dose
rem	roentgen equivalent man
s	second
SO_2	sulfur dioxide
t	metric ton
ton	short ton
UF_6	uranium hexafluoride
UO_2	uranium dioxide
yd	yard
yd^3	cubic yard
yr	year (in compound units)
wt %	weight percent

Metric Conversion Chart

To Convert Into Metric			To Convert Out of Metric		
If You Know	**Multiply By**	**To Get**	**If You Know**	**Multiply By**	**To Get**
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
sq. inches	6.4516	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.092903	sq. meters	sq. meters	10.7639	sq. feet
sq. yards	0.8361	sq. meters	sq. meters	1.196	sq. yards
acres	0.40469	hectares	hectares	2.471	acres
sq. miles	2.58999	sq. kilometers	sq. kilometers	0.3861	sq. miles
Volume					
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.45360	kilograms	kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

Metric Prefixes

Prefix	Symbol	Multiplication Factor
exa-	E	1 000 000 000 000 000 000 = 10^{18}
peta-	P	1 000 000 000 000 000 = 10^{15}
tera-	T	1 000 000 000 000 = 10^{12}
giga-	G	1 000 000 000 = 10^{9}
mega-	M	1 000 000 = 10^{6}
kilo-	k	1 000 = 10^{3}
hecto-	h	100 = 10^{2}
deka-	da	10 = 10^{1}
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	μ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001= 10^{-12}
femto-	f	0.000 000 000 000 001 = 10^{-15}
atto-	a	0.000 000 000 000 000 001= 10^{-18}

Chapter 1
Introduction

1.1 BACKGROUND

In July 1998, the U.S. Department of Energy (DOE) published the *Surplus Plutonium Disposition Draft Environmental Impact Statement* (SPD Draft EIS) (DOE/EIS-0283-D), which analyzed the direct, indirect, and cumulative environmental effects of reasonable alternatives for siting, constructing, and operating three facilities proposed for surplus plutonium disposition at four candidate DOE sites. In April 1999, DOE also published the *Supplement to the SPD Draft EIS* (*Supplement*) (DOE/EIS-0283-DS), which describes the potential environmental impacts of using mixed oxide (MOX) fuel in six specific reactors named in the proposal from Duke Engineering & Services, COGEMA Inc., and Stone & Webster (DCS), as well as program changes made since the SPD Draft EIS was published.

In accordance with Under the guidelines set forth in the National Environmental Policy Act (NEPA), DOE established a 60-day period for public review and comment on the SPD Draft EIS. The public comment period began on July 17, 1998, and closed on September 16, 1998. For the *Supplement*, DOE established a 45-day period for public review and comment beginning on May 14, 1999, and closing on June 28, 1999. DOE also considered all comments received after these closing dates.

In August 1998, DOE convened five public hearings, one near each of the candidate sites (Richland, Washington; Amarillo, Texas; North Augusta, South Carolina; and Idaho Falls, Idaho) and one at a regional location (Portland, Oregon) to obtain oral and written comments on the SPD Draft EIS. On June 15, 1999, a public hearing was convened by DOE in Washington, D.C., to obtain written and oral comments on the *Supplement*.

Figure 1–1 reflects the dates and locations of these public hearings. All hearings were moderated by a facilitator, and comments and concerns were recorded by trained notetakers. The public was also encouraged to provide comments on both the SPD Draft EIS and the *Supplement* by mail, on a toll-free telephone and fax line, or by email through the Web site of DOE's Office of Fissile Materials Disposition (MD).

Attendance at the public hearings and the number of unique oral comments recorded at each are presented in Table 1–1. Attendance statistics for the public hearings were based on the number of participants who completed registration forms. A number of the written comments submitted during the public hearings were also presented orally. As these were considered written comments, they were not recorded as part of the hearing minutes. The number of comments collected by the various methods of submission are shown in Table 1–2.

Each comment document received by email, fax, mail, or telephone and each written comment submitted at the public hearings was marked with the date it was processed and assigned a unique identification code consisting of a prefix designating the method of transmission and a sequential number. Oral comments collected at the public hearings were similarly identified: each comment was assigned a unique code comprising a prefix designating the hearing location and a sequential number. Postcards received as part of a campaign were the only exception to this procedure; regardless of how the postcard was submitted, it was automatically given a distinctive postcard designation.

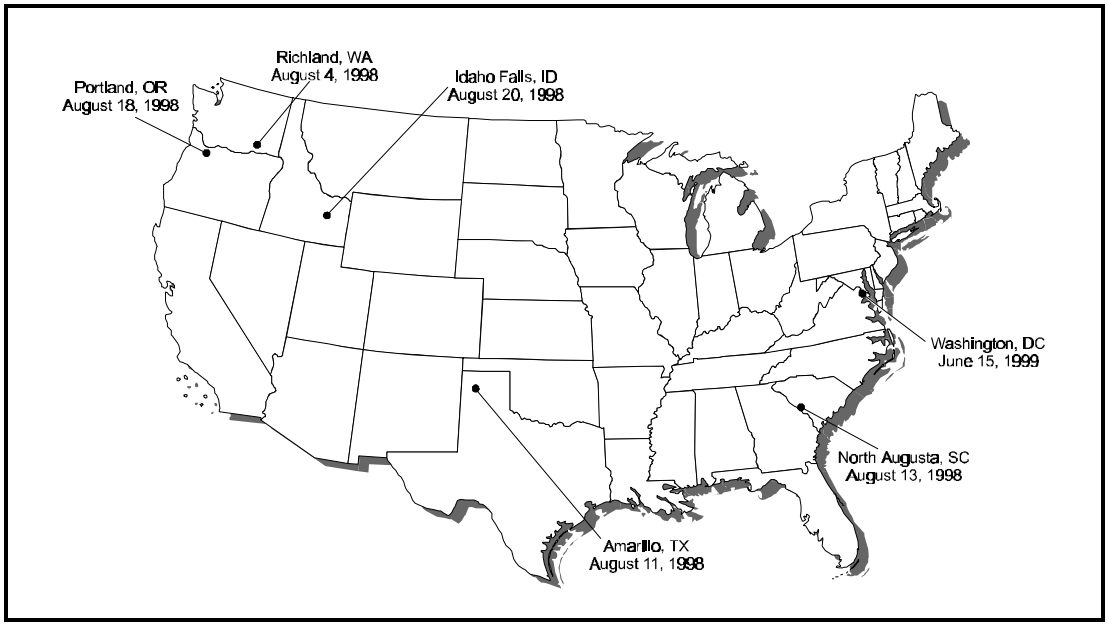

Figure 1–1. Dates and Locations of Public Hearings

Table 1–1. Hearing Attendance and Oral Comments

Public Hearings	Attendance	Oral Comments
Richland, WA	55	76
Amarillo, TX	450	145
North Augusta, SC	963	48
Portland, OR	69	113
Idaho Falls, ID	26	56
Washington, DC	54	82
Total	**1,617**	**520**

Table 1–2. Document Submission Summary

Method of Submission	Documents Received
Hand-ins at public hearings	434
Fax	358
Mail	358
Postcards	2,234
Telephone	71
MD Web site (email)	34
Total	**3,489**

All comment documents and oral comments were then processed through the comment analysis and response system for inclusion in this Comment Response Document. Over 3,400 comment documents were submitted by various individuals and organizations on the SPD Draft EIS and 77 were submitted on the *Supplement*. Analysis of these documents and unique oral comments resulted in the delineation of approximately 4,800 and 340 comments on the SPD Draft EIS and the *Supplement*, respectively. Each comment was then assigned to a

specific issue category. Responses developed for each delineated comment are identified by a response code that corresponds to the coding on the scanned comment document image.

Comments determined to be beyond the scope of the SPD Draft EIS and the *Supplement* were forwarded to the cognizant DOE office for consideration, as appropriate. Comments relating to the costs of the alternatives described in the SPD Draft EIS or specifically to the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), were forwarded to the MD cost analysis team. The cost report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999) are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford Site (Hanford), Idaho National Engineering and Environmental Laboratory (INEEL), Pantex Plant (Pantex), Savannah River Site (SRS), and Washington, D.C.

1.2 ORGANIZATION

This Comment Response Document is organized into four chapters. Chapter 1 describes the comment analysis and response process, and Chapter 2, the changes made to this SPD Final EIS in response to public input and updated information. Chapters 3 and 4 present the scanned images of original comment documents and transcribed oral comments received during the public comment period for the SPD Draft EIS and the *Supplement*, respectively. The left side of the page is an image of the comment document marked with numbered sidebars to identify specific issues. DOE's response to each issue appears, correspondingly numbered, on the right side of the page.

The accompanying tables (Tables 1–3 through 1–8 and Tables 1–10 through 1–15) are designed to allow commentors to locate their comments regarding the SPD Draft EIS and the *Supplement* and DOE's responses to these comments. Commentors are listed alphabetically by last name or organization and grouped by State, along with the page number on which the comment document image and responses appear. A guide for locating specific comments and DOE's response is presented as Figure 1–2.

Documents identical in content are presented only once. Campaigns likewise are presented and responded to only once. However, campaign documents with additional comments were responded to separately. Commentors wishing to view comments and responses for specific issue categories should refer to Tables 1–9 and 1–16 for the SPD Draft EIS and the *Supplement*, respectively.

Appendix A is a copy of the transcript of an informational public meeting regarding the proposed use of MOX fuel which was sponsored by a South Carolina State Senator. This meeting, which was attended by DOE, was held during the comment period on the *Supplement*.

HOW CAN I FIND MY COMMENT AND DOE's RESPONSE?

Note: Comment documents were assigned to a State based on the address of the commentor, a telephone area code, or the public hearing location.

For comments by members of Congress and Federal agencies:

Refer to Tables 1–3 and 1–10 for the SPD Draft EIS and the *Supplement*, respectively. These tables are organized alphabetically and grouped by State.

For comments by private organizations from foreign countries:

Refer to Table 1–11 for the *Supplement*. The table is organized alphabetically and grouped by country.

For comments by State and local officials and agencies and private organizations:

Refer to Tables 1–4 and 1–12 for the SPD Draft EIS and the *Supplement*, respectively. These tables are organized alphabetically by organization and grouped by State.

For comments by individuals:

Refer to Tables 1–5 and 1–13 for the SPD Draft EIS and the *Supplement*, respectively. These tables are organized alphabetically by the individual's last name and grouped by State.

For comments on multiple-signatory documents:

Refer to Tables 1–6 and 1–14 for the SPD Draft EIS and the *Supplement*, respectively. These tables are organized with individuals and organizations integrated alphabetically and grouped by State. A multiple-signatory document is one that has been signed by at least two individuals with different last names, and et al. is reflected in the image document heading.

For comments made at public hearings:

Refer to Tables 1–7 and 1–15 for the SPD Draft EIS and the *Supplement*, respectively. If you submitted a completed registration form, you can find your name under the appropriate hearing location. If you orally presented your views, then those views were summarized and are presented in this document. Similar views appear only once. These tables are organized by hearing location, with individuals and organizations integrated alphabetically.

For comments submitted as part of a campaign:

Refer to Table 1–8. This table sets forth the campaign subject and is organized alphabetically, integrating individuals and organizations. Every effort was made to decipher signatures, and those portions that were legible are included in the table. Unreadable names are accounted for under an "illegible" heading within the table. If you provided an additional, unique comment on a campaign document, that campaign document was treated as a separate comment and can be located in Tables 1–4 or 1–5. Signatories of the Statement of Nongovernmental Organizations on Plutonium Disposition submitted on the *Supplement* can be found attached to that statement.

Figure 1–2. Comment and Response Location Guide

Table 1–3. Members of Congress and Federal Agency Commentors by State

Commentors **Page**

Georgia

United States Senate, Honorable Max Cleland 3–3
United States Senate, Honorable Paul D. Coverdell 3–4
United States Senate, Honorable Paul D. Coverdell 3–5
United States House of Representatives, Honorable Charlie Norwood 3–6
United States House of Representatives, Honorable Charlie Norwood 3–9

Oregon

United States House of Representatives, Honorable Peter DeFazio 3–10
United States House of Representatives, Honorable Elizabeth Furse 3–11

South Carolina

United States Senate, Honorable Strom Thurmond and Honorable Ernest F. Hollings,
United States House of Representatives, Honorable James E. Clyburn, Lindsey O. Graham, Bob Inglis,
Mark Sanford, Floyd D. Spence, and John M. Spratt, Jr. 3–12
United States Senate, Honorable Strom Thurmond 3–15
United States Senate, Maury Lane for the Honorable Ernest F. Hollings 3–17
United States House of Representatives, Honorable Lindsey O. Graham 3–23
United States House of Representatives, Honorable Lindsey O. Graham 3–24
United States House of Representatives, Honorable Floyd D. Spence 3–25
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Texas

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Nuclear Control Institute	
Edwin Lyman	
Nuclear Information and Resource Service	
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Constatine Curris (SCUREF)	
Leroy Davis (SCUREF)	
James Edwards (SCUREF)	
John Palms (SCUREF)	
Carl Patton (ERDA)	
William F. Prokasy (ERDA)	
Francis Tedesco (ERDA)	
Texas	
Amarillo Chamber of Commerce	3–726
Gary Molberg	
David Wilkes	
Amarillo Hispanic Chamber of Commerce	3–741
Gilbert Guzman	
Tony Quezada	
Panhandle 2000	3–867
Jerome W. Johnson	
Wales Madden, Jr.	

Table 1–6. Multiple-Signatory Document Commentors by State (Continued)

Commentors	Page
Texas (Continued)	
Potter County	3–880
Manny Perez	
John Stradley	
Arthur Ware	
Strick Watkins	
Texas AFL-CIO	3–997
Joe D. Gunn	
Emmett Sheppard	
Washington	
Condon, M. B.	3–1041
Young, Tim	
Young, Tim.	3–1109
Condon, M. B.	

Table 1–7. Public Hearing Attendees by Location

Affiliation/Attendees	Page
August 4, 1998—Richland, Washington (Hanford Site)	3–1187

Afternoon Session

Associated Press
Linda Ashton

Eckard, Connie

FFTF Technical Support
Stan Scott

Hagan, James

HGO Enterprises
Gai Oglesbee

Hildreth, Norton

ICF Kaiser
Greg Clark

Moore, Roberta

Moore, Robert

Moore, Victor

Munn, Wanda

Nesary, Marlene

Pasco
Honorable Charles Kilbury

Richland
Honorable Larry Haler

Siemens Power Corporation
Dan Nauman

Sisu Technical and Management Consulting
Ronald Liikala

Supply System
Joe Burn

Tri-City Herald
John Stang

U.S. Department of Energy
Scott Puris

U.S. Department of Energy, Richland Operations Office
Rodney A. Almquist
Douglas H. Chapin
George Dragseth
Paul Dunigan Jr.

U.S. Environmental Protection Agency
Craig Cameron
Dennis Faulk

U.S. House of Representatives, Honorable Doc Hastings' Office
Joyce DeFlice

Evening Session

B&W Hanford Company
George Kulynych
Jim Steffen

Ballard, Del

Battelle Pacific Northwest National Laboratory
Walter J. Apley
Jerry Ethridge

Bechtel
Les Davenport

Burk, Linda

DE&S
Ralph Brackett

DESH, Inc.
Jack Kalia

Eastern Washington Section American Nuclear Society
Gerald Woodcock

Fies, Carl

Hoyt, Richard

JAI Corpaoration
Donald Clark

Los Alamos National Laboratory
Dennis Padilla
Roger Wishau

Merrill, David

Oregon Office of Energy
Douglas Huston

Siemens Power Corporation
Ronald Heiks

Supply System
Joe Burn

Szempruch, Rich

Talbert, Robert

Tri-City Industrial Development Council
Harold Heacock

U.S. Department of Energy, Richland Operations Office
Peter Knollmeyer
Shivaji Seth

U.S. Senate, Honorable Slade Gorton's Office
Suzanne Heaston

Venetz, Ted

West Richland
Honorable Ken Dobbin
Honorable Jerry Peltier

Williams, Richard

Wooten, David

August 11, 1998—Amarillo, Texas (Pantex Plant) 3–1213

Afternoon Session

Alpha Pavement Technology Incorporated
Glenn Braudt
Scotty Knutson

Amarillo
Honorable Dianne Bosch
Honorable Robert Keys
Honorable Kel Seliger
Honorable Trent Sisemore

Amarillo Association of Realtors
Richard James
Randy Jeffers

Table 1–7. Public Hearing Attendees by Location (Continued)

Affiliation/Attendees	Page
August 11, 1998—Amarillo, Texas (Pantex Plant)	
Afternoon Session (Continued)	
Amarillo Chamber of Commerce	
Joanne Brown	
Belle Gage	
Jim Henson	
Stacy Knight	
Gary Molberg	
Larry Stalcup	
Diane Vincent	
Amarillo Economic Development Corporation	
Michael Bourn	
Gilbert Guzman	
Bob Juba	
Glenn McMennamy	
Amarillo Globe-News	
Jim McBride	
Garet von Netzer	
Amarillo National Bank	
Jud Simmons	
Amarillo National Resource Center for Plutonium	
Sandy Alvarez	
David Barnes	
Carl Beard	
Lois Cook	
Cathy Dixon	
Richard Edmondson	
Shirley Floyd	
Debbie Frymoyer	
Effie Harle	
Richard Hartley	
Mark Hendricks	
Robin Hightower	
Linda Peirce	
Beth Perry	
Leah Dawn Storey	
Christina Vincent	
David Watson	
Yvonne Weeg	
Angela Woods	
Elda Zounar	
American Real Estate Services	
Cristal Robinson	
Ames, John	
Ana-Lab, Keri Brigham	
Angelo, Chris	
Angelo, LaDonna	
Battelle Pantex	
Kimberly Baker	
Jeff Flowers	
Robert Foulston	
J. Gantos	
Barbara Nava	
Belisle, Mavis	
Carnes, Roberta	
Claughton, J.C.	
Conklin, Danny H.	
Crafts, Clarence Rashada	
Don Harrington Discovery Center	
Thomas Halliday	
Exell Cattle Company	
Lee T. Bivins	
First Bank Southwest	
Don Dodson	
Will Miller	
Joe M. Stange	
Tommy Tyler	
Gray, David	
H. Lichte and Associates	
H.W. Lichte	
Hickman, Joyce	
Ivy, Deloris	
Ivy, Gordon	
Kaczmarek, Doris	
Keep Amarillo Beautiful	
Dusty McGuire	
KFDA	
Sarah Fisher	
Kraft, Trudy	
Lehigh University	
Kenneth Kraft	
Machinist Union Local Lodge 1255	
John Taylor	
Mason and Hanger Corporation	
James Angelo	
Donnell Asberry	
Gary Ashlock	
Larry Backus	
Curtis Broaddus	
J.R. Buchanan	
Douglas K. Burton	
Bruce Campbell	
Linda Caufman	
Selina Chaires	
Joseph Clark	
Charles Clinton	
Doug Connally	
Charles Dodd	
James Dronigo	
Randy Enger	
Gilbert Fajardo	
Billy D. Faubion	
Charlene Ferguson	
Johnny (Rick) Flores	
Lyle Fussell	
Pam George	
Cynthia Gilbreth	
Kenneth J. Gomez	
Michael R. Grusson	
Debra Halliday	
Phillip Halsted	
Mike Haywood	
Perry Hoag	
J. H. Honea	
Dennis Huddleston	
Havon Knighton	
John F. Lemming	
Jarrell Long	
Penny Lucero	
Wally Moulder	
Michael O'Connell	
Jimmy Phillips	
Fred B. Ramirez	
Ray Rusk	
David Smith	
Sam Sottile	
April Stotts	
Paul Teichmann	
Julie Terry	
Willie Watson	
William Weinreich	
H. Anthony Woltermann	
Robin Woolsey	
David Yeager	
Metal Trades Council of Amarillo	
Frank W. George, Jr.	
John F. Meese	
Metal Trades Department, AFL-CIO	
Gordon Baxter	

Table 1–7. Public Meeting Attendees by Location (Continued)

Affiliation/Attendees	Page

August 11, 1998—Amarillo, Texas (Pantex Plant)

Afternoon Session (Continued)

Moore, Donald

Nations Bank
- Steve Brunson
- Louis Cardwell
- David Hemphill
- Shawyna Stump

New Century Energies
- Dean Metcalf

Panhandle
- Chris Coffman

Panhandle 2000
- Randy Erben
- Brian Yarbrough

Pantex Plant Citizens Advisory Board
- Sidney D. Blankenship
- Becky Lopez

Parkrut, R.H.

Peace Farm
- Paula Breeding

Petraglia, Jeffrey

Plains National Bank-Amarillo
- George Sell

PNC Washington
- Takeo Kitazawa
- David Kornhauser

Potter County
- Honorable John Stradley

Purcell, Charles

Rekdal, Sheila

Rivas Environmental Consultants, Inc.
- Charlie Rivas Jr.

Ruddy, Karen

Southwestern Bell
- Lew Bradshaw

Southwestern Public Service Company
- Hermilo Martinez Jr.

STAND–PANAL
Jeri Osborne
James Osborne

STAND of Amarillo, Inc.
- Don Moniak
- Trish Neusch

Texas A&M University
- Ian Hamilton
- James Lohaus
- Kenneth L. Peddicord
- James C. Rock

Texas AFL-CIO
- Walter Hinojosa

Texas Building & Construction Trades Council
- Gale E. Van Hoy

Texas Department of Health
- Gary L. Froemsdorf
- Joseph A. Martillotti

Texas Department of Public Safety
- Tom Castleman

Texas District Council of Carpenters
- James N. Brookes

Texas House of Representatives
- Honorable John Smithee

Texas House of Representatives, David Swinford's Office
- Jenette Taylor

Texas Senate, Honorable Teel Bivins' Office
- Sharon Miner

Texas Natural Resource Conservation Commission
- Brad Broussard
- George FitzGerald
- David W. Hastings
- Judy Headlee
- Shawn Hess
- Joseph Panketh
- Janet Pichette

Texas Radiation Advisory Board
- Michael S. Ford

Texas State Energy Conservation Office
- Venessa L. Gonzalez
- Roger Mulder

Texas Tech University
- Kathleen Harris

The Metal Trades Council
- Ronald Zerm

TN Tech
- Kenneth Krieger

United Association of Plumbers & Pipefitting Industry
- Don Green

University of Texas at Austin
- Alan Dutton
- Michael McNerney

University of Texas System
- Dale Klein

U.S. Department of Energy, Amarillo Area Office
- Vicki Battley
- Mark Blackburn
- B. Hollowe
- Jerry S. Johnson
- Tom Walton

U.S. Department of Energy, Defense Programs
- Tracey Bishop

U.S. Department of Energy, Federal Energy Technology Center
- Steve Cooke

U.S. House of Representatives, Mac Thornberry's Office
- Clay Sell

West Texas A&M University
- B.A. Stewart

Westar Trade Resources
- Cindy Thyfault

Westinghouse Savannah River Company
- Gerald Hardin
- Blake R. Seward

Wonderland Amusements, Inc.
- Paul Borchardt

Table 1–7. Public Hearing Attendees by Location (Continued)

Affiliation/Attendees	Page

August 11, 1998—Amarillo, Texas (Pantex Plant)

Evening Session

Alvarez, Juan

Amarillo Association of Realtors
- Raymond T. Fajardo
- Cindy Whitfield

Amarillo Claim Service, Inc.

Amarillo Globe-News
- Jim McBride

Amarillo High School
- Matthew Johnson

Amarillo Independent School District
- Helen Campbell
- Charles A. Campbell
- Helen Charlene Day
- Melinda Nakayama
- Leta Nixon
- Hanley Reynolds

Amarillo National Bank
- Jayne MiFather

Amarillo National Resource Center for Plutonium
- Sandy Alvarez
- David Barnes
- Carl Beard
- Cathy Dixon
- Richard Edmondson
- Bill Harris
- Richard Hartley
- Mark Hendricks
- Angela Woods
- Elda Zounar

Archer, Johnell

Battelle Pantex
- Tony Biggs
- Mickey Brown
- Larry Damron
- Jerome B. Martin
- Dave McBride
- Inge O'Brien
- Gloria Reynolds
- Lisa Vickers

Biddle, John

Boy Scouts of America
- Christopher Carter
- Darren Haley
- J. Whiserhurt
- Brandon Whiserhurt

Britten, Clifton

Bull, Cristi

Burke, Suzanne

Campbell, Betsy

Campbell, Carol Ann

Castleberry, D.

Cizan, Clifford

Collins, Bettye

Coppinger, Loretta

Crall Products, Inc.
- Daniel R. Walsh

Crown of Texas Hospital
- Brandee Backus

Crumley, Martha

Dillaha, Bobby

Don Harrington Discovery Center
- Thomas Halliday

Duncan, Bob

Duncan, Bettie Ann

Frying Pan Ranch

Hackett, M.E.

Harvey's Precision Body Shop
- Paul Elms
- Harvey Elms

Hatfield, Roger

Hatfield, Rusty

Hernon, Donald

Hispanic Chamber of Commerce of Amarillo
- Demetrio A. Quezada

Houser, James M.

Houser, Denise

Howard Smith Company Realtors
- Carol Smith

Hulquist, Jo Ann

International Guards Union of America, Local 38
- Roger Lucas

Kelly, Carter

Law, Mike

Lemming, Sandy

Lockwood, Jeannine

Los Alamos National Laboratory
- John Heneage

Mason and Hanger Corporation
- Sherri Acker
- Mathe Altman
- B.J. Anderson
- Laura Bailey
- Robert D. Baker
- Ronald Barker
- Herbert S. Berman
- William Bingham
- Sheila Black
- Randy Boone
- Alan Booth
- Kathy Brack
- Leigh Bratcher
- Steven Briley
- Susan Britten
- James Brown
- Nolan Brown
- Christie Brown
- Richard Burke
- Vicky Lynn Caffee
- Ramon Camarillo
- Scott Campbell
- Leonard Castellano
- Selina Chaires
- Jesus S. Chavez
- Roger D. Chumney
- Glenn Cockrell
- Gary Cockrell
- Edgar J. Collier
- Larry Collins
- Michael Coppinger
- Deborah Daniel
- Marilyn Daves
- David Daves
- Rick Day
- Carolyn Demerson
- Tammy Denton
- Carey Dickerman
- Alan Egoodkin
- Inez Erwin
- Maria Fajardo
- Gilbert Fajardo

Table 1–7. Public Meeting Attendees by Location (Continued)

Affiliation/Attendees	Page

August 11, 1998—Amarillo, Texas (Pantex Plant)

Evening Session (Continued)

Mason and Hanger Corporation (Continued)
- Sarah Fansler
- Robert Farley
- Monte Ferguson
- Gerald Findley
- Michael Foster
- Jack Francis
- Michael L. Fureigh
- James D. Gallagher
- Frank Garcia
- Jose Garcia
- Dale Garner
- Pam George
- Sandy Gilmore
- Denis Glasscock
- Kenneth J. Gomez
- Kathryn Griffin
- Steve Hallett
- Debra Halliday
- Jim Harbin
- Cathie Harris
- Donna Hatfield
- Chris Herring
- Charles Hills
- J.D. Hinton
- Walter A. Howard
- Richard Hulquist
- Dave Humbert
- David Irons
- Jerry Ithaca
- Shirley Jackson
- James Jay
- Robert Johnson
- Connie Johnson
- John Johnson
- Paul Johnson
- Bruce Johnston
- Troy E. Jones
- Francis R. Jones
- Robert Karrh
- Scott Kennedy
- George Kenney
- Heidi Kenney
- Jerry King
- Pam Klahr
- Michael Knight
- Mark Kopke
- Tyfani Lanier
- Steven Larsen
- Louie Lincoln
- Janelle Loftin
- DeAnn Long
- Jarrell Long
- Brandy Lyles
- Chris Lyles
- Jeff Manspeaker
- Glenda Martin
- Daniel Martin
- Kay Mask
- Richard Maxey
- Shane McFather
- Brian McKnight
- Forrest McLaughlon
- David Meyer
- Erma Mitchell
- Stephen R. Moore
- Cathie Nall
- Roger Nance
- Darlene Nunn
- Michael O'Connell
- Johnny R. Painter
- Dudley Parker
- Ronnie Payne
- Casey Phillips
- Jimmy Phillips
- Maurice Pierson
- Jane Pinkston
- Raul Pompa
- Ruben Pompa
- Gary Proffitt
- Cathy Prosser
- Paul Ptashne
- Lola Ptashne
- Don Ray
- Denver Redwine
- J. Blair Rhodes
- Jeff Rices
- Erin Richardson
- Allen J. Roberts
- Rene Rodrigez
- Elizabeth Rodrigez
- Edward D. Sain
- Elvis Sain
- Ramon Saldana
- Patrick Sanchez
- Glvira Sanchez
- Lavon Sauage
- Mike Schmidt
- Daniel Schmitt
- Mark Self
- Joe Sexton
- Randall Skinner
- Mark Smith
- Chester Smith
- Richard Kevin Smith
- Paul Sowle
- Terry Spangler
- Walter Starr
- Susan M. Steen
- James Stevens
- Don Strattin
- Herald Summers
- Annette Teter
- Kevin Teter
- David J. Toledo
- Leon E. Tomlinson
- Dennis Trent
- Lisa Trevino
- Billy Tucker
- Manuel Vallassor
- Clyde J. Vanarsdall
- Linda Vickers
- Patricia Walsh
- Bob Wells
- Jan Whaley
- Lawrence V. Whicker
- Jerry Williams
- Howard Willis
- Wilbur L. Willson
- Gary Winters
- H. Anthony Woltermann
- Jeff Yokum
- Frank S. Zamora
- Darla Zerm

Maxie, Donald

Metal Trades Council
- Ronald Zerm

Metal Trades Council of Amarillo
- Frank W. George Jr.

Mills, Robin

Nations Bank
- Dusti Bradstreet
- S. Gearn

Neusch, Kevin

Table 1–7. Public Hearing Attendees by Location (Continued)

Affiliation/Attendees	Page

August 11, 1998—Amarillo, Texas (Pantex Plant)

Evening Session (Continued)

Neusch, Gayle

Panhandle 2000
- Randy Erben
- Brian Yarbrough

Papp, A.G.

Petraglia, Jeffrey

Quinto, Albert

Revell, Tim

Revell, Cathy

STAND of Amarillo, Inc.
- Allen Finegold
- Don Moniak
- Billie Poteet

Stewart Title
- Conny Sain

Texas A&M University
- Ian Hamilton
- Kenneth L. Peddicord

Texas Department of Health
- Gary L. Froemsdorf
- Joseph A. Martillotti

Texas Natural Resource Conservation Commission
- Richard Lee
- Joseph Panketh
- Janet Pichette

Texas Radiation Advisory Board
- Michael S. Ford

Texas State Energy Conservation Office
- Denise Brooks
- Venessa L. Gonzalez
- Roger Mulder

Thompson, L. O'Brien

Trovino, Edward

Tucker, Lynnette

U.S. Department of Energy, Albuquerque Operations Office
- Richard Sena

U.S. Department of Energy, Amarillo Area Office
- Mark Blackburn
- B. Hollowe
- Tom Walton

U.S. Department of Energy, Defense Programs
- Tracey Bishop

U.S. Department of Energy, Federal Energy Technology Center
- Steve Cooke

U.S. House of Representatives
- Honorable Bob Inglis

University of Texas at Austin
- Alan Dutton

Westinghouse Savannah River Company
- Gerald Hardin
- Jerry Hardin
- Blake R. Seward

Winters, Rosemary

Zamora, Luis

Zamora, Gilbert

August 13, 1998—North Augusta, South Carolina (Savannah River Site).....3–1261

Afternoon Session

Aiken County
- Linda B. Eldridge

Aiken Standard
- Craig Gibbs

Aiken Technical College
- Don Campbell
- Howard Lobaugh
- Dennis C. Rogers
- James A. Schmidt
- Lynne Weldon
- Carolane Williams

Allendale Chamber of Commerce
- Joseph Vuknic

Allendale County DSS
- Linda H. Brigman
- Christi Kirkland

Allendale County, Chamber of Commerce
- Anne Rice

American Express Financial Advisors
- John J. S. Mead

American Nuclear Society-Savannah River Section
- John Dewes

Asbestos Workers
- Raymond Storey

Augusta Tomorrow, Inc.
- Charles A. DeVaney

Azzaro, Karen

B&W Savannah River Company
- Timothy C. Marks

Bamberg City Development Association, Inc.
- Mary O. Olson

Bamberg County Council
- Isaiah Odom
- Jasper B. Varn Jr.

Bamberg County Department of Social Sciences
- Patricia Williams

Barnard, Jr., Doug

Barnwell
- Albert Black

Barnwell City Council
- Benjamin Duncan

Barnwell County
- Harold Buckmon
- Inez Collins
- Debra D. Fickling
- Vernon F. Grady
- W. A. Gripp
- Clyde T. Reed

Barnwell County Chamber of Commerce
- Dennis Hutto

Table 1–7. Public Meeting Attendees by Location (Continued)

Affiliation/Attendees	Page
August 13, 1998—North Augusta, South Carolina (Savannah River Site)	
Afternoon Session (Continued)	
Richard Lamar	
Cathie Lynn	
John H. Mole	
Barnwell County Council	
Flowe Trexler	
Barnwell County Economic Development Commission	
Trevor Hamilton	
Barnwell School District 45	
Valenda Black	
Beatty, James N.	
Bechtel Savannah River, Inc.	
Thomas Ballweg	
Douglas Barclay	
Frank Berry	
Wayne Buxton	
Joseph Conway	
G. P. Crotwell	
Roger E. Davis	
Gary Feenstra	
Craig Hamilton	
Gordon A. Johnson	
Robin MadisonBechtel Savannah River, Inc.	
Zane Madtes	
Freddie McCrary	
Richard H. Moore, Sr.	
Victor Navarro	
Brenda Reed	
Isaac L. Rucker	
Paul Ryan	
Ronald M. Simpson	
Scott Valentine	
Steve Welch	
Bertsch, Lynn	
Black, John	
Blackville, Joan McDonald	
BNFL, Inc.	
Brent Daugherty	
Stuart A. Kidson	
Richard Seaborn	
Boettinger, William	
Booher, Sam W.	
Brown, Larry	
Brownawell, Jerry	
Buding, Tam	
Camiser Corporation	
Bryan Kane	
Campaign for a Prosperous Georgia	
Rita Kilpatrick	
Campbell, Jean	
Chem-Nuclear Systems	
Francis Flynn	
James Latham	
Cherry, Dorothy	
Christman, Wayne	
Citizens for Nuclear Technology Awareness	
Michael Butler	
Arthur S. Greer	
John Lindsay	
William C. Reinig	
Clemson Extension Service	
Terrell S. Smith	
Clyburn, William	
Collins, Bennie	
Collins, Willie C.	
CSRA Community Foundation	
R. Lee Smith Jr.	
Cude, Bonnie	
Denmark Technical College	
Ambrish Lavanic	
Department of Social Services	
Wade Delle S. Moody	
Duane, John	
Duke Energy Corporation	
Robert Van Namen	
Duke Engineering and Services	
Christy Phillips	
Robert Sharpe	
Dukes, Michael	
DuPont Savannah River Plant	
Harold M. Kelley	
E. Blackburn Construction Co., Inc.	
Ernie Blackburn	
Ebra, Martha	
Economic Development Partnership	
Ernie Chaput	
Edward Jones & Co.	
Chuck Smith	
Ehrhardt, William Edinger	
EXCESS Facilities	
Tim Holloway	
Fenstermacher, David K.	
Floyd, Greg	
Food Not Bombs	
Budd North	
Foster, William	
Fowke, James	
Frontroth, Ronald	
Geddes, Danny	
Geddes, Catherine	
Geddes, Richard L.	
Gilbert, Lee	
Gilkison, Joseph M.	
Goetzman, Rudy	
Graham, Lindsey	
Gray, Peter	
Green's Christian Bookstore	
Levi Green	
Grosso, Vincent	
GSUGANE	
David McBride	
Harbour, John	
Hatcher, Martha	
Haynes, Benjamin	
Haynes, Alice A.	
Hensley, Sr., George A.	
Herrera, Ruth	
Herrera, Henry	
Herrmann, Jack	
HJG, Inc.	
Harry Groh	
Holcomb, Perry	
Holtzscheiter, Bill	

Table 1–7. Public Hearing Attendees by Location (Continued)

Affiliation/Attendees	Page

August 13, 1998—North Augusta, South Carolina (Savannah River Site)

Afternoon Session (Continued)

Howard Lumber Company
William Fair
Chuck Renfro
Ed Selby

Howell, Lee

Hudspeth, Jan

IBEW Local Union 1579
Mike Greene

International Union of Operating Engineers
Russell N. Britt

JHW International Corporation
John H. Walker

Johns, John

Johnston, Dean Campbell

Jones, John

Jones, Paul B.

Kvartek, Ed

Laborers International Union of North America
Clayton L. Plemmons

Law Office of Maria Reichmanis
Maria Reichmanis

Lawrence Livermore National Laboratory
Thomas Gould

League of Woman Voters
Robert Kelly
Mary T. Kelly

Local 283 Carpenter and Millwright
Thomas H. Jenkins

Los Alamos National Laboratory
Thomas J. Farish

Madison, Michael

Mason, Rudy

Metro Augusta Chamber of Commerce
David Bell
James West

Metropolitan Spirit
Brian Neill

Milnes, Michael

Moliassa, Richard

Moore, Jacqueline

Moore, Ann F.

Morin, Annette

Murray, Alice

NAC International
John Patterson

Nations Bank
Mark Wills

Noah, Christopher

Norris, Jan

North Augusta
Deloris Bodie
Lark Jones
Charles B. Martin
Ken McDowell

North Augusta Chamber of Commerce
Lisa McElmurray
Briton Williams

Olson, Charles

ORA
John Felak

Overman, Robert F.

Paisley, Colleen Ackles

Patton, Sonya

People Sentinel
Victor Hill

Polar Refrigeration
Shannon Bohanan

Power Reactor and Nuclear Fuel Development Corporation
Hironobu

Randall, Bill

Randall, III, Boyd D.

Reda, Louis

Rice, Maurice

Richmond County Health Department
Danny Starling

Roberts, John

Rogers, Bernice

Rudisill, Tracy

Sadowski, Ed

Savannah River Diversification Initiative
Lewis C. Attardo

SCANA
Keith Coones

Schumpert, Marty

Sconyers, Honorable Larry

SDT
Henry Dingfelder

Shedrow, Clayton

Silver Leaf Construction
Dave Zimmerman

Small Business
Robert Moody

Snelling, Honorable Elbert T.
Moore

Snyder, Terri

Software Solutions
John Gravelle

Somers, Edward

Sonnenberg, Les

South Carolina Department of Health and Environmental Control
Sandra

South Carolina House of Representatives
Honorable Wilbur Cave

South Carolina Senate
Honorable Brad Hutto
Honorable W. Greg Ryberg
Honorable J. Roland Smith

South Carolina State Treasurers Office
Richard Eckstrom

Spiker, Dyrke L.

SRP Federal Credit Union
Gloria Greer

SRS Citizens Advisory Board
Thomas W. Costikyan
Suzanne Matthews
Lane Parker

Table 1–7. Public Meeting Attendees by Location (Continued)

Affiliation/Attendees	Page

August 13, 1998—North Augusta, South Carolina (Savannah River Site)

Afternoon Session (Continued)

SRS Retiree Board of Directors
Dannie F. Walker

Stephens, Kenneth W.

Stone, Rick

Stone & Webster Engineering Corporation
Carl A. Mazzola

Street, Gary H.

Sumner, Wallace

Sun Trust Bank
Bill Thompson

SWD, Bruce Saxman

SWM, Ralph Poling

Terrell, George

The Advertizer Herald
Jerry Dugan

Thomas, Steven

Thomas, Susan

Tri-County Alliance
Gretchen Birt
Donnie Delk
Jim Kearse
Carl L. Kilgus
Calvin McHon
Clarence Wright

Tritium Maintenance DP
Stacey Towner

Unitarian Universities Fellowship of Columbia, SC
Susan Corbett

United Way of the CSRA, Inc.
Keith Benson

U.S. Department of Energy, Federal Energy Technology Center
Jason Lewis

U.S. Department of Energy, Savannah River Operations Office
Jose Blanco
Sonita Blanco
Francis A. Bolton
Craig Czuchna
Dave Hepner
Sherry Southern
Zaddie R. Wilkins

U.S. Senate, Honorable Max Cleland's Office
Scott MacGregor

U.S. Senate, Honorable Paul Coverdell's Office
Donald R. Stewart

Vaneman, Nancy

Vargo, Michael S.

Verenes, John C.

Walter, Steven

Westinghouse Savannah River Company
Lance Abbott
Gary Abell
Frederick Adams
Frances Alston
Joseph Amari
Trent Andes
Ken Ashman
Kirsten Aylward
Richard Balser
Jeff Barnes
Dewey E. Barnes
James Barry
Carol Barry
Patricia Baughman
Douglas Bevard
Prakash Bhende
A. Bruce Bieling
Linda Blackston
Richard Blaine
Allen L. Blancett
Lynn Bouknight
Keith M. Boyle
Carl Bradford
Toni Brantley
Linda Bridgmon
Robert Bromley
Brad Brooks
James Broome
Douglas Brown
David Brown
Cindy G. Brown
Rodney Brown
Wes Bryan
Willie J. Bryant
James Buchanan
James Bukovitz
Michael Burch
Paul Burket
Esther Burnham
Charles Burp
Alan Busby
David Busch
Sheryl Bush
William Busser
Tom Butcher
Charles Camino
Michael Carlson
Muriel B. Carter
Randall Cash
Diane Cato
Terry Chalk
Randolph M. Clarke
Dan Clayton
Carl E. Cliche
Joseph Cohen
Barry L. Coleman
Mary Coleman
Robert Collins
Sally Comer
Calvin L. Cooks
Barry Cooper
Ed Corley
Hank Cormany
George Cox
Phillip Croll
Benjamin J. Cross
Steve Crossland
Andy Cwalina
James Davis
Harendra G. Desai
John Dickenson
Pat Dominey
John P. Duane
Erich Duhn
Kenneth M. Dukes
Charles R. Dynarski
Eddie Eddins
Roger Elmgreen
Richard Emerson
Debbie Etheridge
John Fertic
Dennis A. Fludd
Lynn Forrester
Victor Franklin
Derriel E. Frazier

Table 1–7. Public Hearing Attendees by Location (Continued)

Affiliation/Attendees	Page
August 13, 1998—North Augusta, South Carolina (Savannah River Site)	
Afternoon Session (Continued)	
Westinghouse Savannah River Company (Continued)	
Lawrene G. Frelin	
Marsha Furness	
Jennifer Garvin	
Wilbur R. Gay Jr.	
Melanie Gibson	
Brian Givens	
John Gladden	
Charles R. Goergen	
Wayne Good	
Talmadge H. Goodwin Jr.	
Susan Grant	
Ashley Griffis	
David Grimes	
John Gunther	
Mary A. Gunther	
Steve Haines	
Jerry C. Hair	
C.G. Hardin Jr.	
Mike Harrell	
Gordon Hart	
Charles F. Hatcher	
Monte Hawkins	
Ava Hawkins	
Dawn Haygood	
Julianna U. Hearn	
Ellen Heavner	
James T. Herrin	
Garth Hewlett	
Richard Hodson	
Robert Holler	
Rosemary Holley	
Laurie J. Hollick	
Charlotte Holly	
Robert Hotter	
Mark Hubbard	
Raymond Hunnicutt	
Kevin R. Jones	
Robert Jones	
Clay Jones	
Timothy M. Jones	
Gregory Jones	
Larry R. Jones	
John Jordan	
Wanda Joyce	
Jim Junker	
Charles Kearse	
Joseph Kelley	
Phillip Kenhlen	
James R. Kramer	
Ronald Kuhn	
Malcolm Kyle	
James Lander	
Kenneth Lane	
Barry Langford	
Bruce Lawrence	
Mark Lindholm	
Stanley Lipman	
Steve Losgar	
Christopher Lwesi	
Sharon Lybrand	
E. Paul Maddux	
Robert Maher	
Jerry O. Marshall	
Craig L. Martin	
Kenneth Martin	
Lynn Martin	
William Martin	
Charles Mastromonico	
Glenn Mathues	
R.S. Matthews	
Susan H. Maxwell	
Edward Mayo	
Walter J. McCain	
Dan McCurry	
David D. McGee	
J. Malvyn McKibben	
Duane McLane	
Donald L. McWhorter	
Robert Meadors	
Jon Meier	
Don Miller	
Larry Milton	
Robert Minnick	
Lani Miyoshi	
Rod Mohammadi	
Mark A. Moody	
Jackson Moohy	
Pat Morgan	
Richard M. Morris	
Allen J. Morris	
James Morris	
Stephen Mundy	
Ted A. Myers	
Edie Nicholson	
Charles Nickell	
A.W. Nutt	
Jerry O'Leary	
Mike O'Rourke	
Ron Oprea	
Eric Oser	
Constance M. Paino	
Brenda Pearson	
Wayne Peltay, III	
Ted Pennington	
R.S. Peters	
Furman Peters	
John M. Phillips	
Terry Pifer	
Thomas P. Powell	
Timothy H. Pratt	
Lessie B. Price	
Donald A. Pushman	
Bob Rabun	
Margaret Rackliffe	
Terry Rahm	
Cleo Raiford	
Thomas Riedl	
Napoleon Roberson	
Cheryl Robinson	
Anil Rode	
Philip Rodwell	
Michael Roper	
David Rose	
Shamain Rosenberg	
Dennis Rote	
Linda Rudd	
John Runnels	
Rick Runnels	
Ronald M. Schroder	
Austin B. Scott	
Betty Scott	
John R. Sessions	
Thomas F. Severynse	
Blake R. Seward	
Deborah Shedrow	
David Shiplett	
James F. Smith	
Jeffrey A. Smith	
Hugh E. Smith Jr.	
William K. Sokolo	
William Stevens	
Renee Stewart	
Charles Strain	
Eugene Strycula	
Kent Sullivan	
Michael Swain	

Table 1–7. Public Meeting Attendees by Location (Continued)

Affiliation/Attendees	Page

August 13, 1998—North Augusta, South Carolina (Savannah River Site)

Afternoon Session (Continued)

Westinghouse Savannah River Company (Continued)
- Richard R. Tansky
- Dennis Taylor
- C. W. Thiessen
- Liz Thomas
- Perry Thomas
- Dennis Thompson
- Donna Tipton
- Frank Utsch
- William B. Van Pelt
- Ike Vaneman
- John P. Veldman
- Donna Waddington
- Robert Walker
- Don Waters
- L. C. Watson
- Don Weathersbee
- Donna Moore Wesby
- Quitman White
- Valerie Whitehead
- Thomas L. Williams
- Fran Williams
- Dean Williams
- Robert Williamson
- Steve Willingham
- David Wilson
- Walter Wilson
- Steve Wilson
- Calvin D. Wilson III
- Clinton Wolfe
- Jerry Wood
- Gary Zimmerman

Weymond, Henry C.

Whitmire, Dan

Williams Farm & Garden Center, Inc.
- Frank Williams

Williston
- Michael Benjamin
- Richard Neely
- Thomas R. Rivers

Windsor
- Frank Mizell

Witters, John M.

Wood, Don E.

WSMS
- Jay Thompson

Zehr, Carl W.

Zigelman, David

Evening Session

Adkins, Doug

Aiken
- Michael Anaclerio

Aiken Chamber of Commerce
- June Murff

Aiken County Council
- Ronnie Young

Aiken County Council District 5
- Dale Stephens

Aiken County Tax Assessor
- Ida M. Jenkins

Aiken Electric Cooperative, Inc.
- Barry Glover

Aiken International Club
- George Clare

Aiken Regional Medical Centers
- Richard Satcher

Armitage, Charles

Asbestos Workers
- Raymond Storey

Ashworth, G. J.

Augusta-Richmond Co.
- Moses Todd

Ballweg, Gearin

Beaumier, Cynthia

Beaumier, Glenn

Beaumier, Katherine

Bechtel Savannah River, Inc.
- Douglas Barclay
- Cassandra Bayer
- Gerry Blume
- John C. Chatten
- Marie Coleman
- Willie Dominguez
- Cecil Faircloth
- James Fay
- Randall Forty
- Mansoor M. Ghassem
- Tony Green
- Gregory Grenier
- Herbert L. Jackson Jr.
- Louis Jones Jr.
- Richard E. Lackey
- Mike Lewis
- Ed Manning
- Terry McNew
- Steve Miller
- Bill Miller
- Sheryl Neal
- Kathryn Norman
- Babubhai Patel
- Wilburn C. Sanders
- James Shaver
- Charles Smith
- P. A. Smith
- Ricky Smith
- David Sullivan
- Denis Thomas
- Keith Thomas
- Lee Wade
- George Walden
- Ronald Walker
- John Wall
- Clary Williamson
- Kevin Wilson, Sr.
- Ted Wineteer
- Roger and Darlene Yancey

BNFL, Inc.
- Pamela DelCastilho
- John Rovansek

Bowman, Tommie

Boyd, Robbie

Brigham, Patricia

Brigham Properties LLLP
- Lee Brigham

Brigham Properties, Inc.
- William B. Brigham

Burns, Dan

Burrus, George

Table 1–7. Public Hearing Attendees by Location (Continued)

Affiliation/Attendees	Page
August 13, 1998—North Augusta, South Carolina (Savannah River Site)	
Evening Session (Continued)	

Citizens for Nuclear Technology Awareness
Susan Cathey
Vincent C. Minardi
John W. Paveglio

Colclough, Wes

Cook, Rich

Coral, Barbara

Cordani, Robert

Dabrowski, Jan

Daniels, Janice

Drown, Wayne

Duke Energy Corporation
Robert Van Namen

Duke Engineering and Services
Christy Phillips
Robert Sharpe

Edenfield, Nancy

Edward Jones & Co.
Chuck Smith

Elkins, Bill

Elkins, Susan

Eubanks, Carnell

Fernandez Consulting
LeVerne P. Fernandez

Fields, Betty

Flora, David

Flora, Mary

Geddes, Danny

General Physics
David E. Neal

Gilkison, Joseph M.

Goldman, Barry M.

Goldman, James

Gouker, Larry L.

Grefenstette, Paul

GTS Duratek
James Pope

Hall, Joe

Harrington, Cathy

Heffner, James

Holmes, Frank W.

Howard Lumber Company
Donna H. Montgomery

Hozey, Melanie

Hyde Park & Aragon Park Improvement Committee, Inc.
Charles N. Utley
Demetria Utley

Hyde Park Committee
Melvin Stewart

IBEW Local Union 1579
Morris Beard
Samuel Blythe
Richard Brown
Johnny Drake
Edward Dukes
Rodney Dye
Danny Fincher
Mike Greene
Stanley Hampton
Henry A. Hayden
Johnny L. Jones
Curtis A. Lockamy Jr.
Raven V. Mason
James Rowell
Anthony Ruvo
William Shoaf
Jay Veal
Annette Veal
Thomas S. Yarbrough

Ihnen, Menard

Ingham, Robert

International Association of Heat and Frost Insulation
Dale R. Cullum

International Brotherhood of Teamsters
Marion Davis

International Union of Operating Engineers
Russell N. Britt

Jenkins, Arthur

Johnson, Tommie

Kay, Virginia

Kellner, Cindy

Khan, Ibrahim

King, Henry

King, Sue

Knick, Joseph

Kohl, Marilyn

Kohl, James A.

Laborers International Union of North America
Edward E. Floyd

Lex, Thomas

Local Union 1137
Moses Dumm
Lillie Mae Jones

Local Union 1137 (Laborers Training Center)
Fred V. Truitt

Local Union 283
Don Solki

Los Alamos National Laboratory
Thomas J. Farish

Lower Savannah Council of Governments
Eric P. Thompson

Lowry, Nancy

Lowry, Greg

Maiden City LLC
Chris Baker

Malloy, Sondra

Martinez Elementary School
Lauren B. Williams

Matthews, Bob

McDaniel, Jeanne

McQuinn, Mary

McQuinn, R.L.

Medical University of South Carolina
Seymour Baron

Messick, Russ

Miles, Frankie

Miller, Ralph S.

Miller, Judi

Table 1–7. Public Meeting Attendees by Location (Continued)

Affiliation/Attendees	Page
August 13, 1998—North Augusta, South Carolina (Savannah River Site)	
Evening Session (Continued)	
Miller, Charles	
Mitchell, Joyce W.	
Murphy, Edward	
National Science Center, Fort Discovery David L. Keel	
Nuclear Regulatory Commission Heather Astwood	
Olson, Herbert	
Patterson, Karen	
Pedde, Robert A.	
Perrett, Edward	
Piccolo, Steve	
Plyler, Dianna	
Poe, Jr., William Lee	
Power Reactor and Nuclear Fuel Development Corporation Hironobu	
Project Control Services Marc N. Peel	
Quantum Grafix Jeremiah Strack	
Randall, Bill	
Randall, Pat	
Rankin, D. Thomas	
Ray, Megan	
Raytheon William Lenz	
Raytheon Engineers & Constructors Roger Alley	
RCS Corporation Carlos Garcia	
Roberts, Elaine	
Robertson, Sterling J.	
Rueter, Ruth	
SDMS Jane Faircloth	
Shaver, Norma	
Silverton Apartments Juanita Goldman	
Smith, Lorilyn	
South Carolina AFL/CIO Donna Dewitt	
South Carolina Department of Health & Environmental Control Crystal Shelly	
Spiker, A. H.	
SRP Federal Credit Union Gloria Greer	
SRS Citizens Advisory Board Suzanne Matthews P. K. Smith Wade H. Waters	
State of South Carolina T. Scott Beck Ed Buzen	
Stejskal, Gerry	
Stevens Creek Elementary Carla Friel	
Tanner, Bobby	
Terrell, George	
Tetra-tech NUS William R. McDonell	
Thomas, Allen	
Torreyson, Anne	
U.S. Department of Energy, Savannah River Operations Office Jay Bilyer Donald N. Bridges Christina Edwards Robert E. Edwards Leonard C. Sjostrom	
U.S. House of Representatives Honorable Bob Inglis	
USCA Maria Chandler	
Utley, Anthony	
Verenes, John C.	
Vest, Bobby L.	
Vichare, Raam	
Villasor, Angel	
Wade, Wanda	
Wade, Lola B.	
Walter, Johnson	
WDQA Odus Francis	
Westinghouse Savannah River Company Dolores (Dee) Adkins Denis J. Altman Jimmy Angelos James Arflin Michael Baker James Barber Donald Barfield Robert Bayer Dan Becker Robert Boatwright Terri Bolton W. Brent Boore Ken Boucher David Broaden George Brodie Helen Brooks Marilyn Bryce-Schanhals Mel R. Buckner William M. Burroughs Bruce Cadotte Ronald M. Campbell Gary Cannell Michael Chandler Tim Chandler Dennis Cheeks David P. Chew Carl E. Cliche John Cook Virginia Cordova Daniel Cox Brent Craft Richard Crafton Kenneth W. Crase Charles Crawford Thomas Crouse Paul d'Entremont Vince Daly Jerry R. Daniels Paul T. Deason R. A. DelCastilho William Dill Walt Dyke James P. Elliot Steve Epperson	

Table 1–7. Public Hearing Attendees by Location (Continued)

Affiliation/Attendees			Page
August 13, 1998—North Augusta, South Carolina (Savannah River Site)			
Evening Session (Continued)			
Westinghouse Savannah River Company (Continued)	Donald Johnson	John Mealing	
William D. Erwin	Edward F. Johnson	Suzanne Messick	
J. Stuart Evans	Michael D. Johnson	Larry Milton	
Scott Federman	Patricia Johnson	Mose Mims Jr.	
James Ferrell	Stephen A. Johnson	William T. Mitchell	
Glenn Fields	Todd Jones	R. Mike Mobley	
Tim Flake	Robert Jones	Andy Mock	
Sam Formby	Calvin Jones Jr.	Tim Moore	
Thomas Foster	Jim Jordan	Jerome Morin	
Geoffrey Fountain	Kirit Joshi	Richard M. Morris	
Kenneth Franklin	Michael Kaplan	James D. Moss	
Thomas J. Friel	Asa Kelley	David M. Mutos	
Richard Frushour	Robert Kellner	Audrey Ogletree	
Steve Glover	Albert Kennedy	Ted Padezanin	
Charlene Goodman	John Keyes	Patricia Padezanin	
Susan Goodwin	Stephen King	A. N. Padgett	
Al Goodwyn	Paul Korinko	Marvin Peake	
Donald Gordon	Ki Kwon	Steven Pinion	
John Greenquist	Edward Kyser	C. J. Plummer-Wooley	
Phillip Griffith	Charles Lampley	Peggy L. Plyler	
Freddie Grimm	Susan Lance	Carol Polson	
Joel Guilherme	Larry G. Lawson Jr.	David Poss	
Surendra K. Gupta	Daniel Leduc	Dave Potocik	
Apjinder Guram	Edward Leibfarth	Bill Poulson	
Elizabeth Hackney	Andrew Lesko	Ken Powell	
Donnie Hall	Karen Lesko	Chandra Prakash	
Gary C. Hamm	David B. Little	Harriet Priester	
Harvey Handfinger	Susie Littrell	Richard Proctor	
Hextonia Harden	Carla Loffin	Harry Pund	
James L. Hardin	Doug Lowry	Rodney Rabon	
C.G. Hardin Jr.	Chris R. Loyal	Kenneth L. Ramsey	
Archie Hargett	Larry D. MacLean	Brent Rankin	
Tim Harrington	Irwin Magerkurth	Robert & Betty Rapp	
Robert Harris	Gerald Malloy	Alan Reed	
Larry Harrison	Sharon Marra	Donald Reese	
Tim Hasty	James Marra	William Rigot	
Barbara Headrick	Hollis L. Martin	Thomas F. Ritt	
Bruce Hewett	William H. Martin	Jerry D. Roberts	
James O, Hightower	Lynn Martin	Johnny Robertson	
Carl Hirst	Matthew Maryak	Thomas C. Robinson	
Cynthia Holding-Smith	Robert C. Mason	George C. Rodrigues	
Charlotte Holly	R.S. Matthews	Doris Rouse	
Claudette P. Hopkins	William Mattocks	Kenneth Rueter	
Richard Hopkins	Teresa A. Mayfield	Ed Russell	
William Huiet	James McClard	Nader Sadri	
Francis T. Iwuc	Martin McCrom	Charles Sanders	
Al R. Jeffront	Terry McLane	Roland W. Sasser III	
Jerrel Jernigan	Dwain G. McMullin	Mark Schmitz	
Alfred T. Johnson	Donald L. McWhorter	Al Scott	
	Betty Meadows	Patricia Scott	

Table 1–7. Public Meeting Attendees by Location (Continued)

Affiliation/Attendees	Page

August 13, 1998—North Augusta, South Carolina (Savannah River Site)

Evening Session (Continued)

Westinghouse Savannah River Company (Continued)
- Charles Sessions
- Blake R. Seward
- Mike Shah
- Vinay Sharma
- David Simpson
- Ray Skwarek
- Keith Slaughter
- Bobby D. Smith
- Eric Smith
- Kevin Smith
- Paul Smock
- Ron Sprayberry
- Roger Staten
- Pete Stevens
- August Stopf
- John Strack
- Jimmie Stuberfield
- Kent Sullivan
- Randall W. Tatum
- Gregory D. Teese
- Kevin Tietze
- Stacey J. Timmerman
- Leonard L. Trasko
- Michelle Trill
- Dave W. Tuttel
- Tom Varallo
- Clarence Ward
- Clyde Ward
- Woodrow Ware
- Marilyn Ware
- William F. Ware
- John R. Wehr
- Roger M. White
- Anatia Whittenburg
- Patricia Wiley
- Lester Wiley Jr.
- Steve Wilkerson
- Fran Williams
- David Williams
- Robert Wilson
- James Wong
- Keith Wood
- Susan Wood
- G. Todd Wright
- Henry I. Yamamoto
- Reuben Yon
- Robert M. Young
- Robin Young
- George Zachmann
- James Zumwalt

Yarbrough, Helen

August 18, 1998—Portland, Oregon (Hanford Site).....3–1279

Afternoon Session

Anttila, Everett

Bechtel
- Les Davenport

Boston University/Portland State University
- Victor Nguyen

Broderick, John

Cobo, Ted

Crackerjacks Marketing
- David Milholland

Don't Waste Oregon
- Lynn Sims

Germond, Norma Jean

Gray Panthers
- Gerri Peck

Hanford Watch
- William Bires

Heart of America Northwest
- Paige Leven

Lodwick, R.

Oregon Office of Energy
- Michael Grainey
- Steven Sautter

Pierce, Allen

Supply System
- Joe Burn

U.S. Department of Energy, Chicago Operations Office
- Bob Selby

Evening Session

Bechtel
- Les Davenport

Butz, Andrew

Butz, Nathan

Currie, Ruth O.

Dean, Alison

Demaria, Gregg

Dim, Everett

Don't Waste Oregon
- Kathryn "Cherie" Holenstein

Ferguson, Roger

Grubmil, Ffej

Hanford Action of Oregon
- Terry Hammond
- Chuck Johnson
- Robin Klein

Hanford Advisory Board
- Dick Belsey

Hanford Watch
- James Baldwine
- Owen Lindsay
- Lynn Porter
- David Reif

Hansen, Robert

Hysko, David

Juergens, Kathleen

King, Jame

Laughing Horse Collective
- Rayner Ward

Lichtenwald, Daniel

Markowitz, Sally

McAdams, Paul

McCarty, Mary

Table 1–7. Public Hearing Attendees by Location (Continued)

Affiliation/Attendees	Page

August 18, 1998—Portland, Oregon (Hanford Site)

Evening Session (Continued)

McLoughlin, Maura

Mitchell, Phil

Muller, Patricia

Murray-Hanson, Sheryl

Nickum, Helen

Norton, Patrick

Oregon Office of Energy
Dirk Dunning
Douglas Huston

Oregon Peaceworks
Claire Closmann

Peterson, Don

Playford, Kristin

Portland Cable Access TCI
Carolyn Brunett

Portland Critical Mass
Aaron VanDerlip
Catherine Ward

Priebe, Millie

Public Safety Resources Agency
W.P. Mead

Rainbow Family of Light and Love

Riggs, Doug

Robindottir, Jody

Russell, Robert

Scott, Courtney

U.S. Department of Energy, Chicago Operations Office
Bob Selby

U.S. House of Representatives, Honorable Elizabeth Furse's Office
Ann Richardson

Whitney, Holly

Wilkins, David

Woman's International League for Peace and Freedom
Barbara Drageaux
Betty June Marsh

August 20, 1998—Idaho Falls, Idaho (Idaho National Engineering and Environmental Laboratory) 3–1323

Afternoon Session

Argonne National Laboratory-West
Roger D. Haga
Richard Lindsay
Grant C. McClellan

Bacca, J. Paul

Coalition 21
George Freund
Richard Kenney

Coalition 21 and American Nuclear Society
John C. Commander

Fritz, Mary Jane

Institute for Energy and Environmental Research
Hisham Zerriffi

Jensen, Aroid

Jobe, Lowell

Lawrence Livermore National Laboratory
Melvin S. Coops

Lockheed Martin Idaho Technology Company
Roger Henry
Julie Merrill

Los Alamos Technical Associates
Roger Mayes

Rickards, Peter

Snake River Alliance
Beatrice Brailsford

University of Idaho
Maxine Dakins

U.S. Department of Energy, Chicago Operations Office
William A. Parmley

U.S. Department of Energy, Idaho Operations Office
William H. Thielbahr

Watanabe, Theodore

Evening Session

Coalition 21
George Freund

Darnell, G. Ross

Duke Engineering and Services,
Toney Mathews

Hampson, Walt

Jobe, Lowell

SAIC
J. D. Atkinson
Jerry Hardin

U.S. Department of Energy, Chicago Operations Office
William A. Parmley

Westinghouse Savannah River Co.
Jerry Hardin

Table 1–8. Organization and Individual Commentors as Part of a Campaign

Commentors	Page
Letter Expressing Support for the Disassembly and Conversion of Nuclear Weapons Plutonium Components at the Pantex Plant	3–1347
PIA Insurance Agency, Inc. R. N. Burks Pat Conley Al Cunningham Maxey Dodson Gram Smith	
Letter Expressing Reasons for Not Supporting Plutonium Processing at the Pantex Plant	3–1349
Abell, Jane Anonymous Artho, Edward and Virginia Atkerson, J. B. Barclay, Gary L. Berg, Ruth Ann Berry, Rick Black, Carla Charless, Jr., Addis Clark, Robert A. Clopton, Jim Cole, Leslie Cook, Jeanne W. Doyle, Christella W. Duncan, Dorothy Egbert, Lawrence Everett, Mike Garcia, Danna and Bennie Gramstorff, Jeanne B. Hajeh, Linda Helms, Pat G. Hoffman, Kirby Hollingsworth, Dale Keevan, Marcia A. Kriedeman, Eddie Jean Kroeger, Janet Lebow, M. Lebow, Sherri Lippmann, Otto Locke, J. Mathern-Jacobson, Scott Miller, Genevieve O. Miller, Virginia M. Murphrey, David Murphy, J. Neusch, Gayle Newburg, Madonna E. Newell, Virginia M. Office of the Americas Blasé Bonpane Owen, Weslie B. Peace Farm Mary J. Nicholson Pluhar, Darwin and Jennifer Recycled Country Sunshine Penni E. Clark Rireley, Mary Benton Rogers, Erin Rudd, Mysti Schlegel, Norbert Seewald, Katherine Seewald, William Hughes Shennum, Mary L. Smith, Doris B. Smith, Ernestine Smith, Greg and Michelle Smith, Phillip South Dakota Peace and Justice Center Jeanne Koster Stein, Janie Sull, Mary The Center for Legal and Social Justice Tadeo Spike Zywiski Torczon, Mary Jo Wadley, Robert Burns Wancura, Marianne S. Warden, Dolly Warrick, J. E. White, Jack W. and Betty E. Wiedebush and Company Jeri Wiedebush Williams, Jim I.	
Letter Expressing Reasons Why the Fuels and Materials Examination Facility at the Hanford Site Should Be Selected to Disposition U.S. Surplus Plutonium	3–1353
Burk, Linda Burk, Robert Johnston, Daniel C. Mensinger, Debbie L.	
Letter Expressing Support for Immobilizing All Surplus Plutonium and Rejection of the Mixed Oxide Fuel Option	3–1355
Abell, Jane Artho, Edward and Virginia Atkerson, J. B. Barclay, Gary L. Barfield, Ellen Beardall, Jr., William H. Berg, Ruth Ann Berry, Rick Bieri, Alvenia Black, Carla Breeding, Paula F. Charless, Jr., Addis Clark, Robert A. Clopton, Jim Cole, Leslie	

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

Commentors	Page

Letter Expressing Support for Immobilizing All Surplus Plutonium and Rejection of the Mixed Oxide Fuel Option (Continued)

Doyle, John
Duncan, Dorothy
Egbert, Lawrence
Everett, Mike
Garcia, Danna and Bennie
Gramstorff, Jeanne B.
Helms, Pat G.
Hoffman, Rosemarie
Hollingsworth, Dale
Keevan, Marcia A.
Kroeger, Janet
Lebow, M.
Lebow, Sherri
Lippmann, Otto
Mathern-Jacobson, Reba
Micon, Rastz
Miller, Dion O.
Miller, Virginia M.
Moran, John
Murphrey, David
Neusch, Gayle
Newburg, Madonna E.
Newell, Virginia M.
Office of the Americas
  Blasé Bonpane
Owen, Weslie B.
Peace Farm
  Mary J. Nicholson
Pluhar, Darwin and Jennifer
Recycled Country Sunshine
  Penni E. Clark
Rireley, Mary Benton
Rogers, Erin
Rudd, Mysti
Schlegel, Norbert
Seewald, Katherine
Seewald, William Hughes
Shennum, Mary L.
Smith, Doris B.
Smith, Greg and Michelle
South Dakota Peace and Justice Center
  Jeanne Koster
Spear, Gale
Stein, Janie
Torczon, Mary Jo
Wadley, Robert Burns
Warden, Dolly
Warrick, J. E.
White, Jack W. and Betty E.
Wiedebush and Company
  Jeri Wiedebush
Williams, Jim I.

Letter Expressing Support for Locating Disassembly and Conversion of Nuclear Weapons Plutonium Components at the Pantex Plant 3–1361

Adams, Dave
Adams, Jo
Alend, J. D.
Aleroyd, Rita
Alexander, Ray
Almange, Kathryn
Alpha Pavement Technology, Inc.
  Glen Bards
  Jimmy Gonzales
  Scott Kit
Amarillo National Resource Center for Plutonium
  Elda D. Zounar-Harbour
Amus, Joseph
Armstrong, Barbara
Arnold, Steven D.
Austin, Steven J.
Baggett, Tony
Bailey, David
Bailey, Laura
Baker, Danni Jenkins
Baldwin, Kathy
Baldwin Distribution Services, Ltd.
  Dudley Baldwin
Band, Lawrence
Bankhead, Herbert
Barnett, Roger
Barrett, Glenda
Bass, Bob
Bass, Othelia
Beasley, Corinne
Beasley, Matthew
Beck, E. J.
Beldo, Dean
Bend, D.
Bentley, Penni F.
Berner, Steve
Beyers, Kay
Bigler, Christy K.
Black, Brian
Bonjour, Gail
Borchardt, Paula
Boyd, Ron
Bradshaw, Lew
Bradshaw, Lisa A.
Bret, Joe
Briarodt, Randy
Brinkley, Tina
Brooks, Virginia
Brooks, William E.
Brown, Dennis
Brown, Jeanne
Brown, Joanne
Brown, Penny
Brown, Samuel
Bryant, M. D.
Burd, Alan S.
Burk, Norman
Burkham, Todd
Burkholz, Janice K.
Burnett, Blaine
Bush, Jr., Billy T.
Bylee, John
Bythany, Jr., H. R.

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

Commentors	Page
Letter Expressing Support for Locating Disassembly and Conversion of Nuclear Weapons Plutonium Components at the Pantex Plant (Continued)	
C. D. Baldwin Trucking	
Charles D. Baldwin	
Campbell, Carl	
Campbell, Chris	
Campbell, Jane	
Campbell, Lyna R.	
Campbell, Shimika	
Canmour, Carl	
Cantii, Mike	
Carflell, Samuel H.	
Carrol, Lewis	
Cash, Douglas	
Cash, Linda	
Casias, Beverly	
Caulehey, Chris	
Chaires, Sefina	
Chapmon, Garland B.	
Chernick, B. M.	
Chez, Charles E.	
Chieders, Miles	
Childers, G. L.	
Christain, Chris	
Christain, Randy	
Coker, Johnny L.	
Collert, Brian	
Collins, Bryan H.	
Comer & Fielding Custom Builders and Designers, Inc.	
Mickey Comer	
Pebbie Comer	
Rod Fielding	
Alison R. Love	
Benona Love	
Cooper, Roberta	
Couture, Celeste	
Craule, Marcus	
Crawford, Aundria	
Creden, Jr., Deward	
Creil, Mitch	
Crook, Tresa A.	
Curtis, Don T.	
Dalrymple, S.	
Dan, Stuart	
Davey, Beverly	
David V. Eck and Associates, P.C.	
David V. Eck	
Davis, Karen	
Davis, R. T.	
Deal, Patricia	
Dockery, Lori	
Dunditt, R. L.	
Duyman, John	
Dyer, Richard	
Dyson, Bettye	
Dyson, Hershel	
Eaton, Paul W.	
Edmond Denton and Stephens, Inc.	
Leann Cox	
Edmond Denton	
Donald Galbraith	
Joann O.	
Jackie Reeves	
Charissa Young	
Edmondon, Ronald	
Edmondson, Richard	
Elliot, Ronald	
Ellis, Brandi	
Elm, Paul H.	
Elms, Harvey	
Elms, Mrs. Harvey	
Everitt, Stephen	
Fansler, Krystal	
Fasano, Lupe	
Fassa, Helen Jewell	
Ferguson, M. Clay	
Fine, James	
Firoff, Stacey	
Flippo, Cindy	
Floyd, Shirley	
Foster III, E. R.	
Fouphy, Cesar M.	
Fowler, Jana	
Frislice, Sylvia	
Frouth, Bob	
Fugett, Neda	
Fyfe, Taylor D.	
Gage, Belle	
Gaison, Gabe	
Ganeg, Etasi G.	
Garcia, Lucy	
Garrett, Jennifer	
Gez, Bruce	
Giles, Jr., Thomas A.	
Gofertto, Sharon	
Golden, Tommy	
Gosulck, Jack	
Gowery, Elizabeth	
Graham, Jerry	
Grant, David	
Gray, Steve	
Greear, Kenneth E.	
Green, Edith	
Gross, Don	
Grove, Donald	
Gunnels, Susan	
Hactis, Willie	
Haddock, James K.	
Hain, Joel	
Halek, Alice	
Hall, James	
Harlan, Jane	
Harmon, Todd	
Harrington Regional Medical Center	
Linda D. Borden	
Bernard Cohen	
Stephen Gens	
Harris, Lisa	
Hartness, J. M.	
Harz, Kelly	
Hather, Jill	
Haws, Stan B.	
Haynes, Amelia	
Haynes, Carl	
Heidelberg, Jerry	
Hellberg, Jeffrey W.	
Hepoy, Ronald D.	
Hernandez, Tobias A.	
Herr, Jim	

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Hilbert, Christy	
Hines, S. D.	
Hintz, Jacque	
Holb, Fontroy	
Holloway, F.	
Holloway, Marty	
Hooker, Vicki	
Hotmann, Mark	
Howell, Joe K.	
Illegible (36)	
Imie, Russell	
Inez, Gary E.	
Ison, Dale	
Jackson, Chris	
Jackson, Donald E.	
Jackson, Mike	
Jagler, Jann	
Jalori, Brian	
James, Lendal	
Janes, Randy	
Jobe, Alfred	
Johnson, Jim	
Jones, Robert	
K.E.W.	
Kay, John	
Keene, Marilyn	
Keene, Richard	
Keene, Tammy	
Kidd, Don E.	
Kimbell, Iretta	
King, Grady	
King, James B.	
Kite, David A.	
Knight, Stacy	
Kongdan, Seth T.	
Kuking, Matt	
Lacer, Lorene	
Lane, Dennis	
Lane, Dot	
Lane, Joe	
Lane, Kim	
Latte, Ray	
Lawdermilk, Rocky	
Ledbetter, Clyde	
Lewis, Chris M.	
Lewis, D.	
Lindsey, Clifford	
Loeb, Jack	
Lomoria, Abel	
Lonalo, Brian	
Lopez, Becky	
Lovett, Brock W.	
Lyons, Bobby	
Madden, Nita	
Maddox, Donna E.	
Maeder, D. R.	
Magen, Gina	
Magowik, Beverly	
Magowik, Sharon	
Mahan, Cindy	
Malone, Heather	
Malone, Wes	
Manning, Susan	
Marer, P.	
Markus, Jeanine	
Martin, Devich	
Martin, Sergio	
Martin, William B.	
Martinez, Brenda J.	
Martinez, W.	
Massey, Charles	
Matheson, Pam	
Mato, Michael L.	
Mayfield, Todd	
McAfoos, Paula	
McAfoos, Rob	
McCoffree, Robert	
McCormick, Wayne	
McDawell, Jenn M.	
McDonald, Lyle	
McElroy, Jimmy	
McGee, Charlie	
McGregor, Kay	
McGuire, Dusty	
McKee, April	
McKeen, Sherry	
McNeill, Sharon	
McWilliams, Barbara	
Meadows, Sharon	
Meer, Karen	
Meier, Jim	
Michaels, Anne	
Mille, Rich	
Mitchell, Cray	
Mitchell, Stephanie	
Molberg, Paula	
Molberg, S.	
Mraclley, John	
Mudroch, J.	
Muygu, Dawn	
Myer, Joanne	
Naraneta, John	
Navaj, Raymond	
NcNabb, Patrick	
Neal, Veronica	
Newton, G.	
Nicholson, Brad	
Nicholson, Jr., Robert	
Nixon, Dolores	
Nodogil, Seth	
Nuikodid, Darko	
Opitz, Lise Kin	
Ortiz, Melisa M.	
Ortiz, Willie	
Otthengren, Karen R.	
Page, Sherry	
Palmer, Kelly	
Parker, Rebecca	
Parker, S. F.	
Patrick, Connie L.	
Patrick, Kathleen	
Patrick, Michael H.	
Peters, Therese G.	
Pinkham, Amy	
Plates, Mary	

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Prather, Linda	
Prather, Pam	
Preston, Heronie	
Preston, Kenneth	
Preston, Robero E.	
Price, Sharon	
Propes, Mike	
Prudential/Ada Realtors Sue Lawrence	
Puryear, Mandy	
Rankin, Elizabeth E.	
Rascoe, Joe F.	
Reagh, J. W.	
Reardon, Jane	
Reece, Doyle	
Reed, Carrie	
Reed, Peggy	
Reeves, Aileen	
Reid, Anne	
Reid, Don R.	
Reynolds, Amy	
Rhea, Donna	
Richardson, Linda	
Riechen, L.	
Riley, Karen	
Rinale, Wendell	
Ritox, Steve	
Rivera, Shannen	
Roads, Alethea	
Roads, Paul E.	
Robinson, Kelly	
Rodrignez, Marsella	
Rogers, David L.	
Roland, Jennifer L.	
Ross, Raul	
Ross, Sam E.	
Rowell, V. Nadene	
Rudder, Anita L.	
Rudledge, Nellie	
Sabel, Jerry	
Sabs, Jane L.	
Salzmann, Christina	
Sanchez, Louie	
Sand, Danyell	
Sanders, Don	
Sanders, Sherm	
Sanders, Susan	
Satterwhite, Chemayne	
Savage, Tim	
Schecht, Nancy L.	
Schooler, Jim	
Scott, E. C.	
Scott, Jane	
Seales, Ada L.	
Sechrest, Sabrina	
Selman, Lucille	
Serf, Tricia L.	
Shackelford, Jerry	
Shafer, Jim	
Shortell, Kenneth J.	
Shumate, Carrie A.	
Shwartz, Bruce	
Silk, Ron	
Simmons, Arlene	
Sims, Sophia D.	
Skelton, Ronald	
Slether, Gary	
Smith, James B.	
Smith, Mary S.	
Snyder, Sherry	
Souels, Mark	
Southern, Leo	
Spiker, Maxine	
Stalcup, Larry	
Stanley, Thomas J.	
Stein, Oliver	
Stephens, Chris	
Storage, Joe	
Stouseth, Barbara	
Strader, Robert S.	
Street, Joe	
Stubben, D. J.	
Sunnam, Brenda	
Switzer, Mita	
Taylor, Mandy	
Taylor, Nick	
Terry, Mike	
Teugh, John W.	
Thompson, Troy	
Thornberry, Jennie	
Tidmore, Jeff	
Tiel, Robert	
Todd, Frank	
Tucker, Tersa	
Tyler, Earl	
Ulalf, Lou Ann	
Valdez, John	
Vib, C.	
Vincent, Dianne	
Vogler, J. Mark	
Walker, Charles D.	
Wallace, Kelly	
Walsh, Angie	
Ward, Gary	
Ward, Jason	
Ward, Susie	
Washburn, Melissa	
Wath, J. L.	
Watson, Darian	
Weatherly, M. L.	
Weatherly, Sharon A.	
West, Linda	
White, Teri	
Wilfong, Richard R.	
Wilkinson, Michael D.	
Williams, Tammy	
Williamson, Sylvia	
Willinghour, C. G.	
Wilpent, Bobby	
Wilson, Betty	
Wilson, Valerie	
Wilson, Wayburn D.	
Wjae, Stan	
Woodruff, Jerry	
Wright, Carol	

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Abeane, Kathy	Blay, Dorina	Coleman, Allison
Adams, Mary	Blotshy, Kimberly	Coleman, Marsha
Adams, Mary G.	Bohs, Sally T.	Coleman, Melissa
Ady, Linda	Bond, Janice H.	Colo, Joan M.
Ady, Steve	Bostwick, Cynthia	Conner, John
Aiken, Sandee	Boven, Ron	Cook, Barbara
Alison, Thomas	Bradley, Sherry	Cousins, Helen
Allen, J.	Breining, Craig	Cowhy, Jack
Allen, Rex	Brettin, Rhett	Cowhy, James
Allen, Terry	Brickey, Ted	Crimmins, Joan
Ameel, Sally	Bright, Marilyn J.	Cumbow, Kathy F.
Anderson, Jean	Brown, Denise	Curie, Cmily
Appleger, Jennifer L.	Brown, Dennis	Dahl, J.
Applely, Barbara	Brown, Lola	Darezy, Mary
Ardigo, Ann M.	Bryant, Janice	Davis, Kelly L.
Arkins, Rob	Buckhanon, Colleen	Davis, Mary
Arnold, Bernard G.	Bulanda, Catherine	Davis, Sandra L.
Arnold, Tilda	Burg, Dawn	DeBell, Connie
Bachmann, Anne M.	Burg, Thomas	Dei, Patricia M.
Bachus, Jr., Orval	Burke, Genevieve	DelPelsmaeker, Kim
Baillod, Jude	Burns, May	DeMaray, Sheri
Baker, Debra P.	Butler, Alice R.	Dennis, John R.
Barbier, Katherine	Cachean, Robert	Dennis, Linda
Barnes, Linda	Campbell, Elizabeth	DeVeicht, Kathryn
Basrai, Mary	Cantlin, Wayne	DeVought, Jerry
Bauer, George	Capanda, Michele	Dickey, Bartlett C.
Bearden, Patrick	Card, Suzen	Dinkel, Ilah
Beebe, Jan	Cargo, Louise	Donaghy, Carolyn
Behnke, Bob	Carmichael, Patricia	Dortman, Mary J.
Beller, Francis	Carreer, Samantha	Downing, Rodney L.
Bendall, Lori	Chapdelaine, Jean	Droesch, Louis
Bennett, Deanna	Charjot, Judy	Duffy, Mary Ann
Berardo, Norma Frances	Chiesa, Charole	Dugowolski, Patricia M.
Biernot, Marilyn	Chiesa, Maria	Duping, Charles R.
Biernot Kinna, Michele	Clark, Gretta M.	Easton, Gerry
Binna, Lee R.	Cline, Louie	Easton, Patricia M.
Bitzinger, Nancy P.	Cluney, Sheila	Eckert, Ben
Blair, Mark	Cochran, Jean	Edgerton, Jeffrey

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Edie, Bob	
Edie, Connie	
Edwards, Robert	
Ehervier, Margaret	
Ernst, Anne Marie	
Evans, Scott	
Eveningred, Steven	
Everhart, Joycelyn	
Falk, Leou	
Feil, Louis	
Feil, Sandra W.	
Fisher, Dorothy	
Fisher, Linda	
Fisher, Robert	
Forest, Carrie	
Fretenborough, Norman R.	
Frumveller, Billie	
Gaffey, Chester B.	
Gaffey, Thomas J.	
Ganhs, Rose M.	
Gersky, Deborah L.	
Gilbert, Pam	
Good, Judy	
Graham, Donald	
Gromek, Felice	
Haar, Lois	
Hack, Shannon	
Hall, Janice	
Hall, Kimberly	
Hampton, Jason	
Hancock, Barbara	
Hannon, Lori	
Harady, J.	
Harrington, Jeff	
Harris, Norma	
Hartel, John	
Hartley, John	
Hartley, Ken	
Haviland, Bruce	
Hayeden Nixon, Karyn	
Hayedon, Jeffry D.	
Hayes, Becky	
Hazelman, Elmer	
Heath, Daniel L.	
Held, Rose Marie	
Henricks, Rita	
Hering, Kurt	
Herlih, Florence	
Hiehn, Pam	
Hildebiand, Arbutus	
Hinter, Melissa	
Hock, Gary R.	
Holmstrom, Holly K.	
Hopper, Mary Elaine	
Horan, Carol	
Hoskey, Phyllis	
Houghton, C. W.	
Hoyel, Andree Le	
Hunt, Stacy	
Huntington, Janice	
Hurley, Nanon	
Illegible (9)	
Irish, Cindy	
Israel, Anna M.	
Itsata, Gerald	
Jamison, Elizabeth	
Janicki, Jessica	
Joseph, John	
Jury, Bob	
Kammer, Cynthia	
Kandler, Patricia M.	
Karthals, Tammy	
Kaufman, Lou Anne	
Kean, Owen	
Kercher, Chris	
Keyworth, Hannah Mary	
Keyworth, Howard F.	
King, Lorna	
Kinish, Jerry	
Kipp, Deanna	
Kirstine, Lori	
Klaas, David	
Knoll, Sandra	
Kornieck, Rose Marie	
Kotermanksi, Chris	
Kovalcik, Christopher	
Kramer, Mino	
Krammer, Cindy	
Lachance, Monique	
LaPeire, Iva	
Leonard, Rich	
Lesuer, Sally	
Lewinski, Daniel	
Lewinski, Michelle	
Lieder, Keri	
Lieder, Matthew	
Line, Robert	
Litogat, Genevieve	
Lock, Sharron	
Long, Lee	
Lyon, Steven R.	
Machwski, Constance	
MacIntyre, Barbara Lee	
Mackay, Jeanne	
Marcellin, Joe	
Markham, John	
McCarthy, Michael J.	
McClelland, Jennifer	
McConnell, Jamie L.	
McConnell, Timothy	
McCormick, Bill	
McDonald, Dave	
McDowell, Ginethea	
McFadden, Gloria	
McFadden, Wesley	
McFran, Sharon	
McKeon, John	
McKeon, Merisa	
McLane, Eileen	
McPharlin, Mary Gale	
McQuistin, M. E.	
Meier, Shannon	
Meikle, Lori J.	
Miodowski, Lori	
Mitch, Dean	

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Moeller, Eugene	
Molloy, Thomas	
Molosky, Carol K.	
Morton, Harold	
Moshrak, Larry	
Motte, Nancy	
Mueller, Deanna	
Murphy, Sr., Jerry	
Myron, Harland E.	
Noetzel, Emily	
Noetzel, Eric	
Noetzel, Kathy	
Norton, Patti	
Norwicki, Patricia	
Nuernberg, Melody J.	
Nuezkiewicz, Ruth	
O'Barsky, Staci	
O'Barsky, Thom	
O'Brien, Beverly J.	
O'Connor, Kim	
O'Mally, Pat	
Oden, Laurie Ann	
Older, Mark	
Oliver, William	
Olshove, Amy	
On, Melissa	
Osborne, Anne	
Parent, Jeff	
Parent, Judy	
Parker, Jessica Lee	
Paterson, Grace F.	
Patnales, Gregg	
Pedigo, Charles	
Pedigo, Dorothy	
Peltier, Patricia	
Pemberton, Patricia L.	
Petit, Mike	
Petz, Nate	
Phillips, Judy	
Pitts, Roger	
Plant, Sheri	
Pontack, Suzanne T.	
Porrett, Dorothy L.	
Price, Gary	
Prieskorn, Juanita	
R., Lorraine	
Ragan, David	
Ralston, Margaret	
Raludue, Debra H.	
Ramsey, Carl	
Rathje, Pat	
Ravin, Val Jean	
Rayman, Pam	
Raziel, Mike	
Renno, Marian	
Retito, Nichole	
Rick, Sharon	
Rinker, Elene	
Ritter, Jacqueline	
Robb, Stacey	
Roberson, Diane M.	
Roberts, Beverly	
Roberts, Patricia A.	
Robertson, Marie	
Robertson, Mary Ann	
Robinson, Pauline	
Rogalski, Dawn S.	
Rolls, Robert	
Rorihe, Johnu	
Roy, Karen	
Ruby, Kathy	
Ruedisuili, James C.	
Runyer, Penelope	
Ruxey, John	
Ryan, Gary D.	
Ryan, Mike	
Sabb, LaDon	
Sadlowski, Kelle	
Saolowski, Richard	
Schafer, Heidi	
Schef, Betty	
Schef, Daniel F.	
Schef, John	
Schef, Nora	
Schieke, Gerald	
Schmitt, Amy	
Schneider, Jeff	
Schott, Paula	
Schreiber, Sheila	
Schumacher, Ed	
Schweihofer, Sue	
Schweihofer, Tom	
Scott, David	
Scott, Helen	
Seely-Rajnay, Sandy	
Senart, K.	
Setter, Lillian Jean	
Sharpe, Diane	
Sharrow, Timothy	
Shell, Phyllis	
Shirkey, Susan	
Shonk, Paul N.	
Shouk, Kim	
Shovan, Alice I.	
Siewort, Virginia J.	
Sigle, Donna	
Skunuce, Chris	
Smeltzer, Marsha	
Smith, Aurie S.	
Smith, Marcia B.	
Smith, Robert A.	
Smith, Ronald W.	
Snuggs, Amy	
Spezia, Matt	
Starkey, Margie	
Starkey, Robert E.	
Steece, Cheryl	
Steece, Kenny	
Steinhaus, Mary Jane	
Stephenson, Kim	
Stocking, Margaret A.	
Stocks, Elaine	
Stump, Clara	
Sturges, Frances M.	
Sutton, Margaret C.	

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Sweeks, Marjorie	Vircnocke, Joan	Winzer, Frederick	
Sweet, Brenda	Wagenschutz, Susan	Wirth, Kurth	
Sweet, Gloria K.	Wajciechowski, Janet	Wiseley, Duane	
Swowitz, Arnold	Walker, Beverly J.	Woock, Mary L.	
Sylla, Sammye Kaye	Ward, E.	Wood, Dana	
Taylor, Eleanor	Ward, Gary	Woycinski, Irene	
Taylor, George	Watson, David	Yeashuvich, Joyce	
Tenyer, Rosemary	Watza, Charles J.	Young, Pauline M.	
Thomas, Frances L.	Watza, M. Noreen	Young, Roberta	
Thompson, Amanda	Wegner, Carol	Young, Thomas	
Thompson, Dawn	Wenzel, Nancy	Zambelli, Karen	
Thompson, Katherine	Wesbrook, Carolyn	Ziegler, Herbert	
Thompson, William	Westrick, Nickie	Zimmerman, Stan	
Townsend, Wendy	White, Ben	Zwiernik, Julie	
Trombley, Denice	White, Chuck	Zwiernik, Susan	
Tyson, Gordon	White, Phyllis		
Van Brande, Brenda	Whitesell, Jessie		
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A., Carol K.	Ayold, Karly	Berum, H. S.	
A., Dawayne	B., D.	Biddle, John	
Acker, Sherri	B., N. J.	Biggs, Tony	
Ackin, Judy	B., Rollin	Black, Sheila K.	
Ahson, Joe	B., S.	Blum, Mike	
Alexander, Brian G.	Backus, Brandee	Boar, Michael	
Altman, Douglas	Backus, Larry	Boese, Connie	
Altman, Mattie	Bailey, Laura	Boone, Randy	
Altschwager, Carl F.	Baker, Kimberly	Booth, Alan	
Amos, Martin	Banientez, Juan	Bostick, Debbi	
Anders, Johnny	Barket, Ronald	Boudreau, Renee	
Anderson, Bennie	Barrett, Patti	Bowman, W.A.	
Anderson, Fred G.	Barrings, Ernest	Boyn, Larry E.	
Anthony, F. W.	Barta, A. S.	Bradstreet, Dustin	
Anthony, T.	Bartlett, Ronda J.	Bremer, Carol	
Anton, Richard	Barton, Blaine	Briggs, Bettye S.	
Arney, Dennis	Baucom, Kaye	Bright, Al	
Asbury, Donnell	Bauera, Gloria	Broggley, Jim	
Ash, Tom	Bell, Doyla	Brooks, Anthony	
Ashlort, Gary	Benner, Helen S.	Brookshire, Doug	

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Brown, David	Chairs, Selina	Darrah, Bill	
Brown, George	Charley., John	Daves, Jimmy	
Brown, Mickey	Chavez, Jesica	Daves, Marilyn	
Brown, Randy	Chavez, Robert	Daves, Marilyn	
Buchanan, J.	Chuley, John T.	Davis, Danny	
Bull, Cristie	Clark, Clifford	Davis, Dolores F.	
Bullington, W. S.	Clark, J.C.	Davis, James N.	
Bullock, Robert A.	Clark, Janice	Day, Helen Charlene	
Burk, Judith L.	Clark, Joseph	De Los Santos, Sofia	
Burows, Doug	Clift, Earl	Deicer, Randy	
Butten, Clifton	Clilbers, Jay	Dell, Steve L.	
Butten, Susan R.	Clinton, Charles	Demeison, Carolyn	
C., Jay	Cochrell, Gary D.	Demerser, Carolyn	
C., Jimmy	Cockerell, Jr., Glenn	Dennis, Melina	
C., Rick	Cockrell, Glenn C.	Denny, L. O.	
Cabello, Lurie	Coffee, Vicky Lynn	Denton, Tammy	
Caldwell, K. J.	Collier, Edgar J.	Diaz, Anna R.	
Call, John R.	Collins, Bettye	Dickerman, Carey	
Callen, Christi	Collins, Larry	Dillaha, Bobby D.	
Camaurt, Ramon	Conklin, Woody	Does, Donald	
Campbell, Betsy	Conn, Ken	Doreba, J.	
Campbell, Bruce	Connally, Doug	Dossett, Bernard	
Campbell, Charles A.	Cook, Ken	Dreny, A.	
Campbell, Cledel	Cookran, D.	Dresch, Shane	
Campbell, Don	Cookroy, A. E.	Dressler, Shane	
Campbell, Helen	Coppinger, J. W.	Druilar, Genny R.	
Campbell, Scott	Coppinger, Linda	Duggan, James F.	
Candera, Johnny	Cotney, B. K.	Duggan, Rowena	
Capp, A.	Covell, Carol O.	Duncan, Glenn K.	
Carlson, J. R.	Cox, Larry	Durham, Denise	
Carnes, Rodney D.	Crosslin, Gracie	Dye, Lisa	
Carrillo, R.	Crumley, Martha	E., Jannie	
Carrole, R.	Crutchnor, Jim	E., Mark	
Carte, Troy	Culwell, K.	E., R.	
Cartellason, L.	Curtis, Roy E.	Eddleman, Alvin	
Carter, Sharon	D., Allen	Edinert, Michael S.	
Cartwright, Pam	D., Ray	Egoodkin, Alan	
Cash, Wilham	D., S.	Egoodkin, L.	
Cash, William	D., Sarah	Elliott, Shon	
Casper, Sid	D., Tracy	Elvin, Paul H.	
Castlebury, Duane	Daniel, Deborah	Emery, U.	

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Erven, Inez	Gass, Kathy	Henderson, B.	
Eseamilla, Al	George, Jr., F. W.	Herbert, Cliff	
Estes, Virgil	Gilbreth, Cynthia	Hernon, Donald M.	
Evans, Edwin	Gilmore, Sandy	Herrera, John J.	
Evenson, Kim	Glager, Dan	Hicks, Alma A.	
Fadlock, Janey	Gooden, Ruthie	Hileman, Beau	
Faggan, Zani	Goodin, Glen	Hill, Charles	
Fajardo, Maria	Grant, Stacy	Hill, David	
Fansler, Sarah	Gray, David	Hill, Randy	
Fansley, Tony	Green, E. J.	Hilley, K.	
Farley, Robert	Griffin, Kathyrn	Himm, Tedd	
Feng, J.	Griffin, Ronald S.	Hintar, Terry	
Fergeson, Monte	Griffis, James	Hinter, J. D.	
Fergeson, Jr., Warren D.	Grimes, Gary	Holliday, Michael C.	
Findley, Gerald	Gritten, Clifton	Holz, Jeb	
Fingh, Jerry	Gublere, Van	Hoogson, Lisa	
Fjatland, Barbara	H., D.	Hooper, Harvey	
Flores, Lias	H., Damian	Houser, Denise L.	
Fogg, Karen	H., Dan	Houson, Lorie	
Ford, Kim	H., Josi M.	Howry, Jr., Emmitt	
Ford, Patrice B.	H., William R.	Huffer, Earl	
Ford, Teri A.	Habi, Jim L.	Huffer, Emil	
Foreman, Dinh	Hacketz, Margerette	Hulquist, R.	
Forseythe, W. H.	Haggard, Randall S.	Hunt, Tim	
Foster, Michael	Halford, Larry D.	Hurst, Sleria	
Frasier, Sammy	Hall, Beverly	Hutam, R. L.	
Freeman, E. Renae	Hall, J. D.	Huxsly, Art	
Fry, Dustin	Haller, Fred	Illegible (55)	
Fuller, Rodney	Halliday, Debra	Irons, Daniel	
Gadiman, Lucille	Halsted, Phillip	Irwin, Joe	
Gadman, David	Hancock, Dayton	J., Art	
Gage, Belle	Hancock, Jeff	J., Bob	
Gaine, Roberto	Hanson, Walter	, James	
Galloday, S. E.	Harbin, Ann	Janbrano, Louis	
Gamel, Bill	Harrelson, Misti	Janer, Terry G.	
Ganor, Annette	Harry, Russell	Jasper, Sid	
Ganor, Richard	Hartzer, Charlene	Jergenson, Monte	
Gantor, Joseph	Hatfield, Donna	Jigel, Mary	
Garcia, Frank	Hatfield, Roger	Jinney, Dennis	
Garcia, Josi O.	Hefley, Teresa	Johannsen, Paula	
Garett, Donnie	Hefner, M.	Johnny, Furser	

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

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Johnson, Deborah	Larken, Tully	Mares, Bob	
Johnson, Jack	Larsen, Steve	Mares, Susie	
Johnson, L. H.	Lassiter, Laquita	Marick, Aranelle	
Johnson, Larry J.	Lateem, Eddie	Marin, Glenda	
Johnson, Nicky	Laughten, Elmer	Marsh, Donna	
Johnson, R. C.	Laur, Tommy	Martin, D.	
Johnson, S.	Lawle, Terry	Martin, Daniel	
Johnson, Warren	Leake, Tommy	Martin, Jerome B.	
Jones, Francis	Leasure, Lanette	Mask, Kay	
Jones, Melissa	Leather, Doyle	Massey, Tracy	
Jung, Susie	Lede, Tim	Matlock, Harold	
K., Michael	Lee, Clifton	Matz, L. M.	
K., Rusty	Lemming, Sandy	Maury, Leon	
Kaczmaule, Doug	Letto, Bing	Maxey, A. Kevin	
Kahn, Martin D.	Lewis, Ernest	Maxey, R.	
Kaper, Lomo	Lichte, S.	McAdams, R. M.	
Keating, Michael D.	Lill, Terry	McBride, Dave	
Keenan, R. W.	Limoger, Francis	McBride, Elizabeth	
Kennedy, Scott	Lincoln, Louie	McCleung, Donald	
Kenney, George	Locke, J.	McFather, Jayne	
Kenney, Heidi	Lockwood, Jeannine	McFather, Shane	
Kenyon, Bena	Lofka, Janelle	McLaughlin, Suzie	
Kephe, Mark	Lolet, Larry	McMintz, Ley	
Keths, J.	Long, DeAnn	McNabb, Angela K.	
Kiester, Daniel M.	Lopez, D'Ann	McSelf, M.	
King, Donnie	Lovelady, Curtis	McWilliams, Mark	
Kinnison, Danny	Lowe, Lea	Mern, David	
Kinnison, Don	Lowrey, Michael	Merriweather, Ken	
Klahr, Pam	Lucas, Roger	Mesa, Cindy	
Knight, Alexis	Lucero, Penny	Meyer, David	
Knight, Jess	Lundberg, Janice	Meyer, Kenneth	
Knight, Stacy	Lyles, Brandy	Meyer, Mary M.	
Koply, Mark	Lyles, Chris	Miller, Justin	
Korel, Robert	Lyn, Thomas C.	Miller, Russell	
Krizan, Charles E.	Lyons, Trisha	Mills, L.	
Kuehl, Rick	Lyons, Tristin	Mitchell, Cristal	
L., Jerry	M., C.	Mitchell, Danny	
L., John F.	M., Donald B.	Mitchell, Erma	
Lair, Mike R.	Malone, Robert	Mogart, Kip	
Lan, M. R.	Mann, Johnny	Moglia, Steven P.	
Lanier, Scott	Manning, Ann	Monroe, Willie	

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

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Petition Expressing Support for Siting the Pit Disassembly and Conversion Facility at the Pantex Plant (Continued)			
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Montano, Robert	Phillips, Casey	Roberts, Allen J.	
Moore, Billy J.	Phillips, Herman	Roberts, Jay C.	
Moore, Jerry K.	Phillips, Katrina	Robinson, Johnnie	
Moore, Mike	Pickett, Don	Rodriguez, Elizabeth	
Moore, Steve	Pickett, Donald	Rodriguez, Roger	
Morgan, Mille	Pierce, LaDena	Rogers, Gayle	
Moronun, Carolyn	Pierson, Mark	Rogers, Jimmy C.	
Morris, Clayton	Pierson, Maurice	Rosalin, Michael	
Morrison, John A.	Pinkston, Jane	Rossiter, Len	
Moser, Colin	Pollard, Vicky	Roudtof, Robert	
Myers, Bill	Polley, Les	Round, Gerald E.	
Nakayama, Melinda	Polvado, C. K.	Rowe, Robert	
Nall, Cathie	Pompa, Paul	Ruiz, D.	
Neeley, Ken	Pope, Linda	Russell, Shelly	
Nelson, Pam	Potters, Juan	Ruzi, Bobby	
Nixon, Leta	Prathe, Dennis	Ryan, Mike	
Nolan, Richard	Pratt, Kay	Ryes, Caroline	
Norwood, Bill	Proffitt, Gary	S., David	
Nuney, Karen	Prosser, Cathy	S., David C.	
Nymeyer, Jr., F.M.	Pryor, Jack	S., Edward Dean	
O'Brien, Inge	Ptashine, Leslie	S., Jesse	
O., John	Ptashine, Paul	S., L.	
O., T.	Quillen, Rodney	S., Mark	
Onyaryl, A.W.	Quinta, Al	S., Michael	
P., C.	Quyade, Tony	S., Patrick	
P., John	Quyulen, Tony	S., Rachelle	
Painter, John	R., Artur	Sain, Elvis	
Papp, A. G.	R., L. A.	Salazar, Esther	
Parker, Don	R., Nadine	Sale, Daniel	
Parker, Dudley	Ramirez, F. B.	Salen, Scott	
Pate, Rich	Ranch, Melvin	San, Cenny	
Pate, Thomas E.	Rank, Kay	Sanchez, Vera	
Patterson, Doug	Raum, Margie	Sar, Robert	
Patterson, Ed	Redeener, Wanda	Sarah, Lynn	
Patterson, Pat	Reever, Leslie	Sarrah, Richard	
Patterson, Steve	Renilla, Joseph T.	Savage, L. Faye	
Payne, Mike	Reyls, Carol	Schapp, Ellis Dale	
Payne, Ronnie	Reynolds, Gloria	Schmidt, Nick	
Pearson, Susie	Rhoten, Mark	Scott, Betty	
Perea, Norma	Rice, Roma	Scott, Sharon	
Perreff, Chris A.	Richardson, Erin B.	Sena, Danny	

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Session, Hugh	
Shafer, K. M.	
Shaw, Paul A.	
Shelton, David	
Shelton, J. S.	
Shinah, Dan	
Shumaker, Donald E.	
Sihl, Vickie	
Sims, Carol A.	
Skinner, Randall	
Smart, David	
Smith, Carol M.	
Soper, Mike	
Sottile, Lucy	
Spands, Darlene	
Spaner, Jon	
Spangler, Mike	
Spears, Belinda	
Speck, Paul	
Srygley, Jeff	
Stallings, Tom	
Stark, Mark	
Steen, Susan	
Stickrod, Anna	
Stoltz, April	
Stout, J. Dale	
Stratton, Don	
Struckland, Ered	
Stultz, Bob	
Summers, Cynthia	
Summers, Harold	
Surser, Christi	
Swingle, Anna C.	
Taylor, Bill	
Taylor, James	
Taylor, Jeny	
Taylor, Stacey	
Terly, Julie	
Teter, Annette	
Teter, Kevin	
Thaggart, Carol	
Thompson, J.	
Thompson, L. O'Brien	
Thompson, Marzella	
Thompson, Prissilla J.	
Tolby, Robert	
Tomlinson, Leon E.	
Trevino, Edward	
Trevino, Lisa A.	
Triny, Susie	
Tucker, Bill	
Tucker, Lynette	
Tyler, Chris	
Tyler, Ken	
V., Barbara	
V., J.	
Valdez, Johnny	
Vann, Candy	
Vaughn, Glenn	
Velasquez, Chuck	
Velasquez, Filbert	
Venhaus, Bernard	
Vereto, David	
Vickers, L. D.	
Vickers, Lisa	
Vigil, Nick	
Villceeso, M.	
Vincent, Russell W.	
Vincent, Tammy	
W., M.	
W., W. Scott	
Walsh, Daniel R.	
Walsh, Dave	
Walsh, Patricia	
Ward, Robert M.	
Watkins, Sandra G.	
Watson, Gary H.	
Weatherby, Nancy A.	
Welch, Gregory W.	
Welch, Linda	
Whalen, David	
Whaley, Jan	
Whicker, Lawrence	
Whilett, Russell	
Whitney, RussellC.	
Willard, Pete	
Williams, Dennis	
Williams, Jerry	
Williams, Ken	
Williams, Lee	
Williams, Leroy	
Williams, Linda	
Williams, Toni	
Winters, Gary E.	
Wodson, J.	
Wood, Flint	
Woodberry, Lorenza	
Woods, Angela	
Woodward, Larry	
Wooland, Dwayne	
Y., Dave	
Yaryl, John	
Yeger, James A.	
Yeger, M.	
Yokum, Nell	
Young, Kelly	
Yuger, Sandy	
Z., Donald	
Zamora, Frank S.	
Zamora, Gilbert	
Zamora, Lois	
Zerm, Darla	
Zerm, R. W.	
Zuniga, Sal	
Zuniga, Terri	

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Allison, Pam
Breeding, Paula
Comb, Cory
Goucher, Martha
Donelson, Mary
Donelson, Mary Margaret
Donelson, Rusty
Finegold, Allen
Locke, Joyce C.
Mills, Robin
Pale, John
Peck, Karen
N., Trish
Seewald, Carl

Postcard Citing Savings From Consolidating All of DOE's Plutonium Disposition Missions at the Savannah River Site 3–1371

Adams, Beverly
Adams, Doris T.
Adams, Monica
Addis, Robert
Aden, Jr., Henry E.
Aiken, Christopher S.
Aiken School District
  Constance K. Fevell
Aimes, Carol
Albrett, Fred
Allen, Becky
Allen, Bobbie B.
Allen, III, Quince
Alvin, Stanley
Ameinan, Joy H.
Anderson, B. J.
Anderson, Robert
Anderson, T.
Atipp, Randy H.
Atkinson, Jr., John T.
Augusta Telephone
  Sharon Martin
Ayer, Dennis L.
Ayers, Hazel Leigh
Bacon, Debi
Bailey, Dwayne E.
Bailey, John E.
Bailey, Wendy
Baker, Jenena P.
Bamberg, Edna C.
Banks, Jr., Wayne E.
Barnes, Rachel K.
Barry, Carol S.
Bater, Jacqueline C.
Bates, Alfred
Bates, Cora
Baugh, Cindy
Bayles, Pamela
Becker, Dan
Belie, Mosley B.
Bell, Gregg L.
Bell, Kathlene M.
Ben, Alex U.
Benehof, William A.
Bergstrom, David
Berry, F. B.
Berry, Judy
Berry, Marie S.
Bishop, Sandra H.
Blackburn, Ernie M.
Blake, Benett L.
Bloom, Richard C.
Boggswel, R. W.
Bolholz, Stacy
Boyd, Jr., Norman
Boyds, Earl L.
Brantley, Sed S.
Bresser, Sr., C. W.
Brewer, Joseph
Brimke, Harald P.
Brinkley, Jamie
Brock, Wallace T.
Bronze, Deborah B.
Brosbris, Willie R.
Brown, Gloria
Brown, Sylvia E.
Bryant, Jr., Laivtan
Buchanan, Brian P.
Buchholtz, Anthony J.
Buchwater, Donald S.
Buenastro, Amy
Buir, Randel A.
Burdette, David P.
Burnett, Pamele
Burnham, April L.
Burns, Corey S.
Burns, Sandra S.
Busch, Vernon L.
Busser, Bert H.
Bustler, Ben
Butter, Pam
Byrd, Earl L.
Calkey, John L.
Campbell, Hazel P.
Campbell, Jim R.
Campbell, Sarah E.
Carroll, Carol W.
Carter, Helen T.
Carter, Lillie W.
Cayne, Shelds
Chain, Regina O.
Chamber of Commerce
  Richard Lamar
Chapman, Michael
Chauwind, Richard
Chester, Dan
Childer, Wallie
Chriswell, Kim
Citizens for Nuclear Technology Awareness
  Michael Britte
  Fred L. Davison
  Illegible
  William H. Martin
  A. Mause

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Citizens for Nuclear Technology Awareness (Continued)	
John W. Paveglio	
Frank E. Wise	
Clark, Dalisa	
Clark, Dorothy	
Clark, Tammy M.	
Clifford, R. Priscilla	
Clothine, Ruthie L.	
Coach, Kim	
Cole, Judy	
Collins, Monica J.	
Collins, Mozella	
Collins, Sara	
Conway, Dick	
Cooper, Tanya	
Corly-Stone, Edie	
Cortledge, Sara	
Counts, Betty B.	
Crawford, Beatrice A.	
Crawford, Rene	
Cruz, Counne R.	
Curry, Lepone	
Curry, Wanda	
Dais, Freddie L.	
Darnell, Addie E.	
Davis, Rita	
Davis, Sean	
Denney, Bobby	
Dewey, Howard R.	
Dion, B. Ralph	
Domain, Carol	
Dominey, Patricia R.	
Donava, Neal	
Dowdy, J. W.	
Drefus, Chris	
Druig, A. W.	
DuBose, Lillie	
Dunbar, Carl A.	
Dunn, Elizabeth	
Ed, Melinda G.	
Edwards, II, Robert Allen	
Eggesman, H.	
Eichen, Mark	
Eigle, Ronald K.	
Esuri, Marl	
Fail, Shelly	
Fay, A.	
Felak, John M.	
Felder, Alesia D.	
Fell, Rick	
Ferrell, C. A.	
Ferrell, Ronnie F.	
Fields, Donald	
Fing, Bobby H.	
Flores, George R.	
Floyd, Joe	
Foger, Lorie O.	
Forest, Mary Jane	
Foster, Edda M.	
Foster, Stephen G.	
Foulks, James F.	
Franklin, Elizabeth	
Franklin, Tony E.	
Frazie, Pamela	
Freeman, Thomas R.	
Fritz, Jill	
Fuhner, Terry	
Fulghun, Wayne	
Fulmer, Glenda T.	
Futner, Betsy C.	
Gaffiney, Timothy	
Gaines, Amanda	
Gallon, John	
Gartrell, Dean D.	
Gay, H. R.	
Gay, Mark J.	
Gaylord, Cathy	
Gaylord, James F.	
Geay, Peter L.	
Geddes, Catherine	
Geldston, W. J.	
Gidson, Jesse	
Glover, M. B.	
Goff, Cyrus B.	
Goodwin, Lois	
Goodwin, Phefhi	
Goodwin, Sr., Haskell	
Gooker, Laura E.	
Grant, T. W.	
Graves, Authur J.	
Gray, Penny	
Graybeal, Michelle	
Graybill, W. R.	
Grayhill, Barbara	
Green, Daniel W.	
Green, Steven H.	
Green, William	
Greenaway, Paul R.	
Griffin, Denise	
Gromade, R.	
Grubbs, Richard	
Haggard, Rick	
Hall, Bill	
Hall, Julie C.	
Hall, Sondra A.	
Hallman, R. L.	
Harkless, Dixie	
Harris, M. A.	
Hart, D. C.	
Harter, F. M.	
Hasty, Donna M.	
Haust, Susan B.	
Hawkins, Cade E.	
Hawkins, Madeline	
Hawkins, Tony	
Heard, Tammy S.	
Hechles, Bob	
Heklek, Jonathan	
Henderson, Kenya	
Henderson, Patricia	
Henely, Sr., George A.	
Hentger, Regina H.	
Hess, Bert	
Hett, Dana H.	
Hetzel, Christine L.	

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Hicks, Rally	
Hicks, Susan	
Hickson, Kimberly S.	
Hickson, Lee T.	
Hightowen, Gregory L.	
Hightower, Willie	
Hightown, Barbara H.	
Hill, Donald L.	
Hillary, Melba L.	
Holgate, Shirley G.	
Holland, Dianne	
Holland, Mary R.	
Holland, Michael K.	
Holley, Deborah L.	
Holliday, Kim	
Hollyfield, Ellison	
Holmes, Patricia A.	
Holz, Charlotte D.	
Hooper, Ruth H.	
Hophers, Karen A.	
Huff, Stephanie	
Hughes, M. B.	
Hutto, Jr., Howard J.	
Illegible (27)	
Iye, Sandy R.	
Izlen, Kathy	
Jackson, M.	
Jackson, Oscar	
Jaller, Mel	
Jamison, William T.	
Jee, Bauer K.	
Jeer, Aaron M.	
Jeff, Jerad A.	
Jenkins, Linda H.	
Jerard, Mike	
Jewell, Erin	
John, Katherine L.	
John, Reginald L.	
Johns, Roxanne	
Johnson, B.	
Johnson, Brolura	
Johnson, Earline	
Johnson, Larry	
Johnson, Patrick	
Johnson, R. Charmaine	
Jone, Albert B.	
Jones, Debra A.	
Jones, Kevin	
Jones, Mary W.	
Jorden, Michael	
Juger, U. S.	
Keenan, Marie	
Kelch, Brenda J.	
Key, Shelley	
Kiernan, John A.	
Kiernan, Pamela S.	
Kimbrell, Rebecca	
Kingery, Andy	
Kip, Susan M.	
Kirkpatrick, Scott	
Kissice, Stephanie R.	
Kopeck, Seathe	
Krist, Fred	
Kropp, Charlie W.	
Kruel, Richard E.	
Lamb, Angela	
Lamb, R. Marshall	
Landum, Alexis M.	
Lariseey, David	
Leaphil, Kathryn	
Lertz, David W.	
Leutes, Theresa A.	
Lewis, Brian K.	
Lewis, Joseph	
Linyard, Pam	
Long, Anne	
Long, Charles C.	
Long, Franklin A.	
Long, Karin J.	
Long, Sharma R.	
Lord, Teresa	
Lows, E. Roger	
Lupiznek, Kelley	
Luton, Merrie L.	
Lynn, K. R.	
Lynn, Sharon	
MacCruny, Cheryl I.	
Maddux, E. Paul	
Malizia, Jennifer E.	
Malloy, Sondra R.	
Martin, David	
Martin, Delores	
Martin, Michael	
Martin, Ruth	
Martinez, William P.	
Mathews, James E.	
Mathis, Karen J.	
Mathis, Leah D.	
Matthews, A. C.	
Mayor, Brenda	
McCain, Mary	
McClair, Sharon	
McGee, Garrett	
McKie, Vicki L.	
McKinney, S. J.	
Meadows, Vince	
Meahling, Joyce	
Mechs, Terry L.	
Medlin, Ricky	
Medlock, Robert	
Merriweather, Tonya F.	
Miller, Kendall E.	
Mizzell, Tammy L.	
MKR Martha K. Register	
Morris, Christie	
Morris, R. M.	
Moseley, Edith	
Moser, Stephen	
Moth, Gary S.	
Moton, Raymond	
Mryline, James D.	
Mullen, Carrie	
Munwell, A. H.	
Musolf, Matthew M.	

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Nguyen, J.	
Nier, Kristen L.	
Norman, Alixe W.	
Norris, Jay	
Novak, Raymond N.	
Odon, Klayhena K.	
Oglresly, Dennis	
Olson, John	
Owen, III, Manson T.	
Owens, Chris	
Owens, Michael K.	
Padgett, Christal	
Palmetto Federal Savings Employee Jacqueline P. Ramsey	
Parker, Charles L.	
Parker, William Andrew	
Parks, Arthur	
Patterson, Maurice	
Pearson, Jennifer	
Pearson, Mary	
Pension, Maude K.	
Perella, Chuck R.	
Perico, Shannon H.	
Peter, R. S.	
Peterson, Fred	
Phelip, Donald	
Phelps, Robert E.	
Pickett, Denise L.	
Pierce, Willie	
Piston, Amanda	
Plexico, J. Sam	
Plouffer, Bonnie	
Pnell, Robert	
Powell, Susan	
Preriucci, M. R.	
Prescott, Phillip N.	
Pressley, Francener	
Price, Jennine	
Prister, Charlene	
Pritz, Shirley F.	
Prothers, Brandon	
Ramsey, Thomas A.	
Randall, Sallie F.	
Reynolds, Amanda C.	
Reynolds, Linde B.	
Rhodes, Heather R.	
Rich, David H.	
Richards, Donnie	
Rizzenhut, Frank	
Robert, Julian Wayne	
Robinson, Tiffany	
Roddy, Ashley	
Rodgers, Jeremy	
Rogers, Elaine	
Rogers, Paula	
Rogers, Thomas E.	
Rose, David B.	
Ross, Anne B.	
Ryder, Alan	
Ryder, Bruce	
Ryder, Mavis	
Ryder, Wanda	
Ryolff, Pete	
Sally, Tyrone G.	
Salter, Cheryl J.	
Sanders, Nana D.	
Sanders, Richard D.	
Saul, Stephanie	
Savannah River Ecology Lab, University of Georgia Donald R. Mover	
Scott, Elizabeth	
Scott, Johnny G.	
Scott, Tamieke	
Segafoes, Ronald E.	
Segler, Peter	
Shane, Jerome H.	
Sharpe, Samantha Kay	
Simmons, Billy	
Sims, Jamie B.	
Sipes, Colette	
Sites, Randy	
Skinner, Donald	
Slone, Willie	
Smalls, Shakim	
Smith, A. J.	
Smith, B. R.	
Smith, E.	
Smith, Gisela	
Smith, Keshi	
Smith, Lora	
Smith, Mary A.	
Smith, Peggy	
Smith, S.	
Snuter, Constance F.	
Soper, Robert	
Spam, T. R.	
Spiney, Gwen	
Stage, Shirley D.	
Stevenson, Ernestine	
Steward, James M.	
Stewart, J. W.	
Stewart, Pamela	
Stewart, Virginia W.	
Sullivan, Kathy L.	
Sullivan, Lane A.	
Sullivan, Linda	
Swancey, Melissa	
Swing, Eric L.	
Tarrart, James	
Taubinger, Richard	
Taylor, Cindy	
Taylor, Clark W.	
Terenice, Charles E.	
Terry, James	
Teryone, Pam	
Tesenor, Nelinda T.	
Thomas, Charles	
Thomas, James	
Thomas, P. Shane	
Thompson, Derek	
Thompson, Lillian	
Thompson, William R.	
Thurston, David R.	
Tomlin, Laura	

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Tonce, Michelle
Turner, Annie
Tutt, Ida B.
Tyler, Linda A.
Underwood, L. R.
Usey, F. Michelle
Valentine, Lisa
Valeti, David T.
Vauner, Denny
Veal, Joan Renvo
Voegtlen, JoAnne M.
Voychak, Deborah
Wade, Jamiel K.
Wader, Kim M.
Waters, Amy
Weeks, Clinton M.
Welch, Dennis F.
Wenall, Paul
Wertz, Tim
West, Joe E.
Westinghouse Savannah River Company
  George E. Bellemy, Jr.
  Denise G. Blackwell
  Gayle S. Bumgarner
Westover, Betsy L.
Westover, Justin M.
White, Larry
Wie, Bobbie J.
Wilburn, Tiffany
Wiley, Pat
Williams, April
Williams, Brad
Williams, Clifford
Williams, Darcy
Williams, Delinda L.
Williams, Jeffrey
Williams, Robin
Williams, Tonia
Williams, W.
Williams, Jr., Clemon
Williamson, Daisy G.
Williamson, Shirley
Willis, Marlane
Wilson, Marrion C.
Wimmee, J. F.
Wise, Robert A.
Wolfgamott, M. Lee
Wood, Carol
Wood, Thomas
Woodward, Chad
Woodward, Jr., James E.
Wooley, Charlotte J. Deane
Wooodward, Lisa D.
Wright, Colleen L.
Wyatt, Roger
Young, Barry C.
Young, Herbert S.
Zieliski, Walter
Zimmerman, Leo

Postcard Citing Cost Savings and Support for Consolidating DOE's Plutonium Disposition Missions at the Savannah River Site 3–1373

Aiken Chamber of Commerce
  Cindy Bolton
Bean, R.W.
Bishopp, Earle C.
Bripen, Christopher
Drester, Charmaine L.
Ethedge, A. Stewart
Illegible (2)
Justice, Jennifer
Keisler, H. E.
Kight, Raquel
Lockridge, F.
Mance, Kurtina
Moody, Michelle
Park, Kaley
Peters, Bonnie
Ridgeway, Hazel S.
Sillian, Katrice
Simmons, Sharon
Tronier, Patty
Trowel, Natasha S.
Tyler, Swanzetta
Warner, Jean L.
Witter, Oleen R.
Young, Nancy

Postcard Expressing Opposition to Plutonium Processing in the Texas Panhandle and Converting Military Plutonium for Use in Mixed Oxide Fuel 3–1375

Abbott, Kathleen
Abell, Jane
Anderson, L. Marian
Anonymous (3)
Artho, Edward
Artho, Virginia
Atkerson, Ann
Atkerson, Jerry B.
Bailey, Susan
Ball, Ysleta
Bandy, Bill
Bandy, Mary
Banks, Arnold
Barfield, Ellen
Beardall, William
Bell, James
Bell, Mary Lynn
Berg, Joe David
Berg, Ruth Ann
Berry, Rick

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

Commentors	Page
Postcard Expressing Opposition to Plutonium Processing in the Texas Panhandle and Converting Military Plutonium for Use in Mixed Oxide Fuel (Continued)	
Black, Carla	
Blankenship, Sidney	
Bonner, Patrick	
Boone, Ric	
Brackman, Selma	
Brewer, Bernice	
Brewer, Farris L.	
Brister, Bob	
Bunten, Erline	
Bunting, Dorelen	
Bush, Jim	
Bush, Michele	
Caldwell, Harrison and Addie	
Campbell, G. G.	
Carrnona, Connie	
Cathern, Bonnie M.	
Ceuale, Ron M.	
Christman, Rebecca M.	
Citizens Alert, M. Lee Davy	
Clark, Penni E.	
Clark, Robert A.	
Clark, Willis N.	
Clopton, Jim	
Cole, Leslie	
Cominos, Nicholas H.	
Cooney, Don and Peggy	
Coots, Lou	
Cox, Jean H.	
Crawford, Gus and Inez	
Cummins, Irene	
Daniel, Stanley M.	
Davis, Lloyd J.	
Dawson, Ed	
Dawson, Norma C.	
Dawson, Jr., R. B.	
DeLong, Mary and Richard	
Detten, Bernice	
Detten, Danny	
Detten, Tonya D.	
Detton, Evelyn	
Dixon, Billie M.	
Dixon, David W.	
Dolley, John	
Doyle, Chris	
Doyle, John	
Ducey, Maria	
Duderhoeffer, Marilyn	
Duderhoeffer, Mike	
Dunbin, Betty	
Duran, Geraldine	
Dyer, Bobbe	
Earl, Lewis H.	
Edelson, Elihu	
Egbert, Lawrence	
Elill, W.C.	
Elsik, M.L.	
Everett, Mike	
Everett, Reyna	
FDTN MI CASA International Manuel Porras Juana M. Rojas Edgard R. Tolentino	
Fellowship of Reconciliation Lee Loe	
Finnerty, Anne	
Floro, Martha	
Force, Ronald C.	
Fuller, Jr., H. S.	
Garcia, Bennie R.	
Garcia, Danna	
Golding, Bert	
Gramstorff, Jeanne	
Graves, Harold C.	
Graves, Kathryn J.	
Hajeh, Linda	
Hampton, Kaye	
Hardt, Brenda	
Harris, Richard S.	
Hatfield, Bobby	
Hedgecoler, S.	
Helms, Pat G.	
Hoffel, P. J.	
Hoffman, Kirby	
Hoffman, Rosemarie	
Hollingsworth, Dale	
Hollingsworth, Jean	
Hubbard, James	
Hummert, Victor	
Illegible (12)	
International Action Center Anonymous	
Keevan, Gordon	
Keevan, Heath	
Kellam, Shelley	
Kemper, William A. and Marcia B.	
King, Carl F.	
Kleugensmith, Mary	
Kleushem, Tonya	
Kleuskens, Carl	
Kleuskens, Helen	
Kluegensmith, William	
Korwek, Gina	
Kroeger, Janet	
Kroeger, Rollie	
Lewis, Marvin	
Lhueider, Jawba J.	
Lifshutz, Yvonne S.	
Lihs, Harriet A.	
Lippmann, Otto	
Locke, J.	
Loe, Claire	
Lott, Linda	
Lott, Marshall	
Lowerr, Richard	
Malduf, Melody	
Malech, Christina	
Marsh, Wendy and Stanley	
Martin, Ardis	
Martindale, Jim	
Martindale, Julie	
Maryknoll Fathers & Brothers Anonymous	
Mathern-Jacobson, Reba	
Mathern-Jacobson, Scott	
Matthews, Craig	
McCathern, Gerald	

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McDaniel, Rita	
McKinney, Ethel May	
McManus, Philip	
Meder, Jodi	
Melsha, Robert	
Micou, Cassandra	
Mier, Joe	
Miller, Dion O.	
Miller, Genevieve O.	
Miller, Virginia M.	
Minatra, Sandra	
Miner, Robin	
Mohr, Nick and Nancy	
Monnot, Connie	
Morrissette, Elizabeth	
Morrissette, Shirlyn B.	
Mote, Joe Wood and Mildred	
Moytabin, Ann Grace	
Murphrey, David	
Murphy, J.	
Narzak, Sargita	
Neusch, Gayle	
Neusch, Kevin	
Newburg, Madonna E.	
Newell, Virginia M.	
Nicholson, Mary J.	
Norris, Clarra A.	
O'Brien, Jay	
Office of the Americas Blasé Bonpane	
Oliver, Gary	
Oppermann, Bobbie J.	
Osborne, James W.	
Osborne, Jeri R.	
Osborne, Mike	
Oser, Wendy	
Owen, Maryvida G.	
Owen, Weslie B.	
Palson, Theodore E.	
Peace Farm Anonymous	
Phillips, Karinia	
Phillyn, Thomas J.	
Plubar, Jennifer	
Podson, Ted	
Porter, Dana O.	
Porter, Penelope	
Raizen, Ben	
Randall-Cash, George	
Ratliff, Gail	
Ratliff, George	
Recycled Country Sunshine Penni E. Clark	
Rekdal, Sheila	
Ricketts, Cathy	
Ricketts, Doug	
Ridgley, Patricia	
Rireley, Mary B.	
Rivers, Henry V.	
Robbin, Dan	
Robbins, Paul	
Robertson, Pauline D.	
Robertson, R. L.	
Rogers, Erin	
Rokobarb, Arline	
Rossignol, Steve	
Runkle, A.	
Schlegel, Norba	
Schlegel, Norbert	
SD Peace Justice Center Jeanne Koster	
Seall, Nancy Y.	
Seewald, Katherine	
Seewald, William Hughes	
Shadid, Patrice	
Shennum, Mary	
Shutt, Jed C.	
Shutt, Susan L.	
Sierra Club Silas Townsend	
Singleton, Betsy	
Sisters, Franciscan	
Smith, Doris	
Smith, Marshall	
Smith, Michelle M.	
Smith, Phillip	
Solomon, Henry L.	
Solomon, Jo	
Sould, Randy	
Southurd, Edwin R.	
Spear, Gale	
Spikes-Volz, Fostrene	
Sprunger-Froese, Peter	
STAND Teresa McFaul	
Stansbury, Linda	
Stein, Janie	
Stein, Jerry	
Stein, Paul	
Stonstuny, Fred	
Stoy, Mary M.	
Strafuss, Carl	
Strafuss, Joan	
Swallow, Shirley	
Swann, Joe	
Swann, Lila	
Syofd, J.	
Syofd, V.	
Taebel, Kay	
Taylor, Donna	
Thomas, Greg	
Thomas, Kathy	
Thomas Merton Center Molly Rush	
Thompson, Donald L.	
Thompson, Sally Alice	
Todds, John	
Torczon, Mary Jo	
Townsend, Silas	
Treichel, Judy	
Treichel, Zean	
Trigg, Elizabeth M.	
Ubelocker, Judy	
Uier, Kille Louar	
Underwood, Oiiran Chung	
Uphoff, I. A.	

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

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Postcard Expressing Opposition to Plutonium Processing in the Texas Panhandle and Converting Military Plutonium for Use in Mixed Oxide Fuel (Continued)			
Vaughn, Joanna and Larry	Wendel, Jeannine P.	Winner, Fred M.	
Vureih, Jennifer O.	Westerly, Suzanne	Womble, Benny	
Wadley, Robert Burns	White, Betty E.	Womble, Joan	
Walter, P.	White, Jack W.	Woodriz, Ruthy	
Wancura, Marianne S.	Whitfield-Bell, Elmerine Allen	Young, Terri	
Water Information Network, Anonymous Lila Sust	Wiedebush, Dianne	Younger, Cole	
Weber, Roserita	Wiedebush, Jeri	Zack, W. Meron	
Wendel, David	Williams, Jim I. and Fran	Zoltan, Paul S.	
	Wilson, Nancy	Zywicki, Thaddeus S.	
	Winner, Frankie R.		
Postcard Expressing Support for DOE's Plutonium Disposition Missions at the Savannah River Site and View That Excess Plutonium Can Be Converted into Mixed Oxide Fuel to Help Meet U.S. Electrical Energy Needs			3–1377
A., Tony	Arego, Earlene	Bates, Camilla	
Adams, D. G.	Arlaugh, Shirley	Bates, Jamie	
Adams, Dennis	Arleaush, Alisa	Bauer, R. D.	
Adams, Kelly N.	Asbestos Worker Union #92 Raymond E. Story	Baxey, Jacqueline	
Adams, Monique S.	Ashe, Geraldine B.	Baxter, Claude	
Adams, Sabrina R.	Atkin, Dion L.	Bayer, Cassandra	
Adams, Tempie L.	Atkins, Saminic	Baynard, Norma	
Aifej, L. Lefand	Atkinson, Linda E.	Bean, Lemar L.	
Aikron, Jason T.	Atkinson, Mary H.	Beans, Sharon	
Albrite, Oscar	Auderce, John B.	Beard, Kut U.	
Ale, Todd	Austiz, Brian	Bearden, Kim	
Allardice, Judith A.	Ayer, Richard	Beasley, Nell	
Alling, Jamie	Bagwell, Martha	Beatty, Jr., James N.	
Alt, S. D.	Bailey, Pame	Beeland, Kihe	
Anderson, Adam	Bailey, Sara	Begnill, Dale L.	
Anderson, Muyrille	Baker, Anthony T.	Beinberg, Coleen F.	
Anderson, Rod	Baker, Naomi A.	Belcher, P.	
Anderson, Sue	Ballard, William	Bell, Allan	
Angelos, Christine C.	Balodi, Jean	Bell, B.	
Angelos, J. G.	Banke, Jacquel L.	Bell, Brenda J.	
Anonymous (4)	Bantley, Kathy	Bell, Brenda T.	
Anrt, Timothie E.	Bargera, Allison	Bell, Brian K.	
Ansley, Leslie	Bargerson, Diane	Bell, Robin	
Antts, Joe S.	Barnett, Cassandra R.	Bell, Sherry	
Aplez, M.	Barry, Jim	Beller, Ben H.	
Arbaugh, Donna	Barton, Rosalyn W.	Belon, Justin	
Arbaugh, Jimmy	Baston, Wanda	Belton, Elaine W.	
Ardis, Kelly		Benet, John T.	

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Benjamin, Karen	Bowers, John W.	Bryant, Heather	
Bennett, Lori	Boyd, Ann	Buchant, J. E.	
Benze, Harold L.	Boyd, Carl D.	Buck, Lemad	
Bern, E.	Boyd, Dante	Buck, Jr., Leonard	
Berry, Web	Boyd, Joanne	Budentin, L. A.	
Berser, Robert T.	Boyd, Roy	Burch, Barry	
Bert, Antonette	Boykin, Danette	Burdette, Clayton	
Bert, Paul Q.	Boyles, Myranda	Burk, Elliott	
Bessong, Jr., W. T.	Boza, Josh	Burton, Debra	
Betts, David	Brackett, Virginia L.	Busbee, Delmas	
Beut, Freddie S.	Bradley, Len	Busbee, Pat	
Billings, T.	Brady, Misty M.	Busch, Christian J.	
Birdseye, James H.	Braid, Pam	Busch, David A.	
Birdseye, Scott G.	Braun, Heidi	Busch, Jr., Finace	
Bishop, Grace	Bredolson, G. S.	Bush, Denise	
Bishop, Nancy	Brice, Laura S.	Bussell, Chris	
Bishop, Susan	Brichof, Jerald A.	Buts, Lori A.	
Black, Beth	Britt, Russell	Byer, Bill	
Black, Gregory J.	Britt, Jr., James H.	Cadiere, Robin L.	
Black, Lynette M.	Brittany, Jr., T. Lee	Calhaun, Angela	
Blackman, Jenny	Brooks, Marie	Call, Thomas Ray	
Blackmon, Tina M.	Brott, M. L.	Calloway, Judy	
Blanchard, Betty T.	Brown, Angela M.	Camp, David	
Blanchard, Elizabeth	Brown, Ariel	Campbell, Mary	
Bland, Evelyn B.	Brown, Dianne S.	Campbell, Pat	
Blessings, Don	Brown, Emory	Caneck, Harry E.	
Bligreldon, Glenda C.	Brown, Gay	Car, Christa	
Blyth, Cory	Brown, Joe	Carleress, Edwin Geae	
Boason, Cliff	Brown, Kelly	Carr, Art M.	
Bodie, Laurie	Brown, Kerealsa C.	Carter, Patricia A.	
Bodie, Paige F.	Brown, Linda	Carthedge, Troy	
Boerstler, Kris	Brown, Nicole	Caulegh, E.	
Boggs, Gerline	Brown, R. B.	Cauley, Genia	
Bolan, Denise	Brown, Richard W.	Caverness, Mamie J.	
Bolangia, Erika R.	Brown, S.	Ceiuris, Delauri	
Bonnell, Bonita Y.	Brown, Shirle R.	Cender, A. B.	
Boseman, Fran	Brown, Steven M.	Chabous, Jr., Walter	
Bossing, A. I. C	Brown, Thomas B.	Chandler, Lou	
Botter, J. C.	Brumbolow, James L.	Chandler, Thelma	
Bourne, Ruth	Bryan, Ronnie	Chang, Paul	
Bowcutt, Tamera A.	Bryant, G. C.	Chaplin, Casey	

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

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Chastain, Jr., Marshal	
Chattin, Janice	
Cheatham, Annette	
Cherry, Lacey	
Chewy, Shane	
Chin, C. K.	
Chin, Susan	
Chrisco, Hugh E.	
Citizens for Nuclear Technology Awareness	
F. G. Aoulso	
Lawrence Breder Jr.	
J. G. Call	
Susan S. Calley	
R. A. Caulan	
F. B. Davis	
Paul Grefenstette	
Michael S. Guild	
Illegible	
Laura U. Jordan	
Teresa Mikie	
Pamela P. Plunkett	
Keith Wood	
Susan Wood	
Clair, Andrew	
Clarck, Laurie	
Clark, Adria Leal	
Clark, Brad	
Clark, Jerry	
Clark, Preston	
Clay, Caroline B.	
Clayflower, Sr., T. C.	
Clegg, Trey	
Clement, Michael A.	
Cleveland, Rocky	
Cliett, Rosemarie	
Cline, Teresa C.	
Cobb, Katrina N.	
Coburn, C. David	
Coburn, Cindy	
Cockrell, Jenny	
Coen, Jr., James W.	
Cohen, Byron D.	
Cohen, Sharon V.	
Cole, Charles W.	
Coleman, Darice	
Coleman, Kimberly	
Collins, Carol B.	
Collins, Pat A.	
Conart, Erin O.	
Conlon, Bill	
Connely, M. E.	
Conner, Jr., George	
Cook, Carl M.	
Cook, Cheryl	
Cook, Daisy M.	
Cook, Dora S.	
Cox, Sam	
Craig, Elizabeth	
Craig, Jonathon J.	
Craig, Michelle L.	
Craig, Tammy H.	
Crain, V. G.	
Crawford, Cindy	
Crocker, Kelly	
Crode, Patricia	
Croetyme, Lynda O.	
Cromer, Patsey J.	
Cromer, Jr., Guy L.	
Crook, Becky	
Crowell, Linda	
Cruiz, Ramon	
CSRA, B. C. Paly	
Cude, Bonnie W.	
Culin, Larry	
Culler, Terry	
Culllugyn, K. C.	
Cullum, T. B.	
Cummings, Gary A.	
Cunningham, Alfon I.	
Cunningham, Jeff T.	
Cunningham, Shawna	
Curry, Bettina	
Cyle, J.	
Cyreff, Pete V.	
Dabber, Penny	
Dahlheimer, Connie	
Dailey, Jeffery O.	
Danekso, Terisa	
Daniel, David F.	
Daniels, Denise	
Daniels, Ruth	
Danner, Becky	
Dardner, Jr., James W.	
DaShickey, Kamal	
Data, Jr., Robert A.	
Dauben, Rovert J.	
David, Audrey	
David, Kurt	
Davidson, Jon	
Davis, Craig	
Davis, Harold W.	
Davis, Jennifer	
Davis, Karen	
Day, Daniel J.	
Deal, Dewayne	
Deal, Myrtle	
Deal, Willie	
Derming, Richard	
Derr, Pam	
Diair, Ay	
Dickerson, Todd	
Digley, Laura	
Dixon, Amanda	
Dixon, Barbara A.	
Dixon, Ginger	
Dixon, Holli	
Dixon, Janet	
Dixon, Jillian	
Dixon, Joseph	
Dixon, Michael	
Dixon, Richard	
Dixon, Tanja	
Dome, Shannon L.	
Donahue, Jeannie	

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Postcard Expressing Support for DOE's Plutonium Disposition Missions at the Savannah River Site and View That Excess Plutonium Can Be Converted into Mixed Oxide Fuel to Help Meet U.S. Electrical Energy Needs (Continued)	
Doolittle, Debra	
Doolittle, William	
Dorfin, Howard L.	
Downs, Gregory S.	
Drayer, Brenda	
Drayer, William	
Drummy, Jacqueline	
DuBoise, Glenn	
Dudley, Jay L.	
Dukes, James E.	
Dukes, Ryan	
Dunbar, Christopher	
Dunbar, Nicole	
Duncan, Ellen F.	
Dundley, Roger	
Duquette, Darald S.	
Durban, Harriett	
Dye, Mike	
Dyers, Christopher D.	
Dynarshi, C. R.	
Dzaugis, M. F.	
E & T, Michael Cooler	
Eaves, Debby	
Eaves, Terrel	
Edwards, Barry O.	
Edwards, Chadwick	
Edwards, Faye	
Edwards, Suzette R.	
Eichstedt, Susan C.	
Ein, Matt K.	
Eines, Kimberly	
Ekleeg, L.	
Eldridge, Carol	
Eldridge, Sarah	
Ellenberg, Sonia E.	
Ellis, Joe D.	
Ellis, Julia	
Enleson, Kathi	
Esbriard, Susan	
Eubale, Joe	
Eubans, M.	
Evans, Betty	
Faas, Maiya	
Falk, Doris J.	
Falking, Robert	
Falls, Linda A.	
Fant, Collean	
Farris, Michelle T.	
Fedrick, John V.	
Feelgham, Virginia	
Felak, Frances	
Felak, Thomas	
Felder, Arthur	
Felds, Kellie	
Fenning, Robert T.	
Fergurson, Randall	
Ferguson, Lynn	
Fernandez, Rita S.	
Fethringer, Joel	
Fields, Marcus	
Fields, Michelle	
Finley, A. Kathleen	
Fisk, Terrie	
Flanagan, Dayna	
Fleetwood, Andrew S.	
Fleetwood, Brenda A.	
Flolherz, Shelley	
Floyd, Edwards E.	
Floyd, Korinya L.	
Flythe, Linda J.	
Ford, Willie	
Foreman, Shirley	
Forum, T.	
Foster, Lois J.	
Foster, Melinda	
Foster, William C.	
Foust, Tami M.	
Franklin, D. M.	
Frasure, Ruby N.	
Frazer, Cora R.	
Freeman, Jamie T.	
Freeman, Shalanda	
Frelin, Norma J.	
Frey, Jr., William A.	
Frost, Kenneth	
Fryer, Larry A.	
Fuller, Ricky	
Funk, Tamara	
Furtick, Stacy J.	
Gaelibo, George	
Gaines, Dominique D.	
Gallwen, James	
Galten, Angela	
Gantt, Carlo	
Gardner, Christy	
Garman, Amanda	
Garnelt, Joe A.	
Garrett, Patrick	
Gates, Kristina	
Gay, Susan	
Geason, Paul T.	
Geblion, David S.	
Gede, Sony	
Geit, Louise	
Gelder, Bethany	
Gelder, Rachel	
General Physics Corporation Richard D. Kelley	
Genster, Gail	
Georgia, Isabel	
Geotz, John	
Geralaime, Andrew J.	
Gette, Charles G.	
Gewin, Franklin L.	
Gibson, Jacqueline	
Gibson, Jerome	
Gilbert, D. M.	
Glenn, Patricia	
Glover, Barry L.	
Glover, Randy	
Goben, Ramona	
Godluir, Danny	
Golden, Bo	

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Postcard Expressing Support for DOE's Plutonium Disposition Missions at the Savannah River Site and View That Excess Plutonium Can Be Converted into Mixed Oxide Fuel to Help Meet U.S. Electrical Energy Needs (Continued)			
Gonzales, Maria S.	Hamson, Jamie	Hevel, Catherine M.	
Gonzalez, Mario G.	Hardin, Jamie	Hewel, Stephen D.	
Goodman, Charlene	Hardin, Monica	Hewlett, Robert D.	
Goodwin, Betty	Hardin, Yolanda	Hezlett, Susanne	
Goodwin, Daryl R.	Harmon, Mariam	Hiermer, Ron	
Goodwin, R. C.	Harper, David T.	Hilhite, Rachel A.	
Goodwin, Stan	Harper, Jewille P.	Hillis, Jean	
Gorden, Kenneth	Harris, Chris	Hitts, Mike T.	
Gordon, Bob	Harris, John	Hiwuh, Datcha K.	
Gordon, Don	Harris, Kyle D.	Hixson, Joshua	
Gossard, Terry	Harris, Marlene D.	Hodges, Jennifer	
Graham, John	Harris, Melrose	Hodges, Margaret M.	
Grailing, James L.	Harrison, Amy	Hoel, Doris D.	
Grant, Hazel Y.	Harrison, Brandi	Hoetzaschute, E. W.	
Green, Frances	Hart, Felecia	Hogan, Jason	
Green, Levi	Hart, Fred	Hogston, Debra J.	
Green, Michelle	Hartless, Susan D.	Hogston, Robbye	
Green, S.	Harvey, Sonya L.	Holcomb, George B.	
Grekorvic, Vivian	Harwel, Charles	Holland, Artie	
Grier, Jeremy	Hathaway, Amy C.	Holles, Nadijah	
Griffin, Carlene	Hathcex, Jennifer	Holley, Debbie	
Griffin, Jo Erin	Hathcox, Crystal	Hollowell, Todd	
Griffin, Tonya	Hawthorne, R.	Holmes, Christopher M.	
Groomes, Brenda	Haynie, Lisa	Home, Sherry	
Growell, Whitney	Hearn, Jamie H.	Hood, Dana	
Gunter, II, Chester G.	Heath, Jerry	Horner, Harry P.	
Hale, Kristie S.	Heath, Shawn	Horton, Nancy L.	
Halebard, Diane	Heats, L.	Hotrizer, Anthony W.	
Hall, Daisey M.	Hedges, J. Michelle	House, Linda	
Hall, F. Lydia	Helms, Eric M.	Howard, R.	
Hall, K.	Henderson, Lisa	Howard, II, M.	
Hall, Lynn I.	Henderson, Robert L.	Howell, Robert L.	
Hall, Sondra A.	Hendirx, W. R.	Hower, Donna	
Hall, Yvonne	Hendrick, Kevin E.	Hudson, Billy	
Hallimor, Richard	Henzik, Judith A.	Hudson, Ray S.	
Halling, Jr., Shawn M.	Herren, Franklin	Huelos, Ian M.	
Hamilton, Catherine S.	Herrison, Summer	Huggins, Artis S.	
Hamilton, Tyrone	Herron, Delores	Hunnett, Stanley	
Hammond, Ruleia B.	Herron, Rhonda	Hurt, Jennifer L.	
Hampton, Kelvin	Hess, Michael	Husand, Jason	
Hamrock, Debbie	Hess, Norman J.	Hustead, Jeffery	

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Hutchins, Laramie A.	
Hutke, Leslie S.	
Hyers, Franklin	
Iethan, Kathleen	
Illegible (77)	
Intel, Lane	
IUOE	
Michael M. Gallie	
Irwin, B. J.	
Itome, T. J.	
IUOE, Local 470	
Shelia Morris	
Lane D. Parker	
Eddy L. Smith	
Jackson, Celia	
Jackson, Dreue	
Jackson, H. L.	
Jackson, Kitie	
Jackson, Lesa M.	
Jackson, Maretta	
Jackson, Roger	
Jackson, Sheila	
Jackson, Terry	
Jaier, David A.	
James, Rhonda	
Jefferson, Sheldon	
Jenkins, Allison	
Jennings, Melody	
Jennings, Sylvia	
Jennison, Jr., A. E.	
Jernigan, Carolyn	
Jessi, Jr., Oscar	
Jimery, Juan	
Johnson, Anna	
Johnson, Bridgette M.	
Johnson, Dustin	
Johnson, Jim	
Johnson, Keith	
Johnson, Linda D.	
Johnson, Nicole	
Johnson, Pat	
Johnson, Sarah	
Johnson, Shannon	
Johnson, Stephen A.	
Jold, Weby Dillard	
Jolnes, Frank W.	
Jones, Anna	
Jones, Anne B.	
Jones, Cathie	
Jones, Cheri	
Jones, Clifford E.	
Jones, Crystal C.	
Jones, Erica	
Jones, Ernie M.	
Jones, James H.	
Jones, Jay	
Jones, Michelle Y.	
Jones, Willie L.	
Jordan, Aletha	
Jorden, Kari	
Jowers, Deborah M.	
Jurmnes, Joseph	
Kanarapatakis, L. K.	
Kaney, Katherine	
Karananedge, Mobe	
Kay, D. A.	
Kearse, Jim	
Keller, R.	
Kelley, Norma	
Kellum, Cindy	
Kelly, Joann	
Kelly, Michelle D.	
Kelly, Jr., Alfred	
Kenbolk, Lelian	
Kenison, David S.	
Key, C. A.	
Key, Willie	
Kieren, Jason A.	
Kimpel, Joseph	
King, Donna	
King, Sam J.	
Kinsey, Kristine C.	
Kirk, Emery	
Kirkendohl, Sam J.	
Kirley, Cathy	
Kitchings, Vernetta J.	
Knopf, Jeremy	
Knox, Daris V.	
Krist, G.	
Kroft, David	
Labute, Allen	
LaFavre, III, Al D.	
Lamar, J.	
Lamar, Sharma	
Lambert, Ardeen	
Lamie, Leisa	
Lance, K.	
Land, Jr., William S.	
Landers, Mary	
Langford, Patricia	
Lanz, Laura	
Larescz, Connie	
Lark, Laverne	
Laswell, Candra Dawn	
Lathimer, H.	
Laurson, Jimmie	
Lawrence, Debra A.	
Lawrence, Gloria M.	
Lawrence, Vernon	
Lawson, James	
Lay, Catherine	
Lazarky, Frank	
Lee, Donna A.	
Leonard, Michael J.	
Leonard, Nelma S.	
Levens, Terry	
Lever, Ray	
Leverett, Monica	
Levey, Michael	
Lewis, Chris	
Lewis, Julie	
Lewis, Makeisha	
Lewis, Robert M.	
Lewis, S. B.	

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

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Lewisinky, Carey	May, B.	Miller, Audrey R.	
Lipen, Pat	McAlhamy, Sachi W.	Miller, Brian	
Lipton, Aaron	McBitler, William	Miller, Mamie	
Lipton, Donna J.	McBride, Joey	Miller, Shirley T.	
Litesz, J. M.	McBride, Kurt	Milton, K.	
LIUNA, Warren Hills, Sr.	McCall, Homer C.	Mins, Roxie	
Livingston, Chris	McCall, Steven	Mitchell, Donna W.	
Lloyd, Dorothy O.	McCaukey, Maryln L.	Mitter, Adam R.	
Lloyd, Glenda	McClendon, Dhashida	Mitts, Antonia	
Lloyd, Sr., W.	McClesheg, Carol P.	Mobly, George R.	
Lnop, Brian	McConnell, Avery	Moeney, Oliver W.	
Local 1283, Wayne Persinger	McCoy, Mary	Mollo, Victoria	
Loudria, Jr., Frankie	McDahee, Carlo	Momentiller, Kevin	
Lovett, Chris	McDanell, William R.	Montgomery, George W.	
Loy, Deanne H.	McDaniel, Tanya	Moody, Alonzo	
Lu, Gregory	McDonald, Teresa K.	Moody, Barbara B.	
Lubell, Art	McDuffie, Sterling	Moody, William	
Ludler, Diane	MCG, Judith Fay	Moon, Connie	
Luxmore, Lori	McGlue, Ashley	Moor, Ralph L.	
Lyduand, E. A.	McGregor, Timothy	Moore, Andrea	
Lynn, Judy	McIvers, Kay	Moore, James F.	
MacCrumin, Archie N.	McKey, Loretta V.	Moore, Jason	
Mack, Lloyd	McLaren, Donny	Moore, Jessica J.	
Maguire, Dora Jane	McLaughlin, Kathryn	Moore, Leah	
Mahoney, Palmeria	McNeal, Crystal	Moore, Margaret	
Maiday, Michelle S.	Mead, R. E.	Moore, Renia R.	
Maier, James B.	Mealing, Tony J.	Morales, Jr., Alfonso	
Majer, Tyler L.	Meekes, Phil	Morals, Shannes	
Makoho, Linda	Meiler, Mark J.	Moran, Kelly	
Mamae, Eli T.	Melissa	Morgan, Louis	
Mangeldorf, J.	Melvin, Linda A.	Morgan, Pammie J.	
Manuel, Pat	Meriweather, Kimberly C.	Morgan, William N.	
Marine, Gail H.	Merriweather, Delores	Morris, Claudia D.	
Marris, Mary J.	Merse, Cleveland	Morris, H. A.	
Martin, Jean R.	Messich, Linda	Morris, H. J.	
Martiniz, Frank	Meyer, Perry L.	Morris, Hal W.	
Mathews, B. H.	Michifeldi, Pete	Morris, Leslie	
Mathis, Melissa K.	Mider, June M.	Morris, Robert G.	
Matson, Paula	Midland Valley Chambers Datory Waymen	Mosley, John L.	
Mauft, Buck		Mosley, W. L.	
Mausur, E. J.	Milledge, Bettie K.	Moss, Amanda	

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

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Moss, Beverly G.	
Moster, A. B.	
Moyer, Anne	
Muehelar, W.	
Muhlean, Sr., Raymond B.	
Mulleirs, Ernie W.	
Mullikin, Sandy	
Mullis, Debra S.	
Murff, W. C.	
Mutarielli, Mary	
Muza, Tracie	
Myer, Barry	
Myers, Richard S.	
Nallen, Roger M.	
Naz, Diane M.	
Neal, Margie	
Nealious, Joseph	
Neely, Pamela	
Neil, Peggy	
Nelson, Frank E.	
Nelson, Guretu B.	
Nelson, Michael A.	
Neuken, Vincent	
Newkirl, Charlene	
Newlhirt, Jessica	
Newman, Monica	
Newman, Vicky	
Newsome, C. N.	
Newsome, Deborah	
Nichelson, Rosa	
Nichols, Tiffany E.	
Nicholson, Angela	
Nickols, Charles P.	
Niell, Mieley R.	
Nix, Debbie B.	
Nixon, David W.	
Nob, Burke	
Norma, Joe L.	
North Augusta City Administration Charles B. Marten	
North Augusta City Council J. Kent Sullivan	
Nue, Michelle	
O'Bannen, Donna	
Odo, Cyndy	
Odom, Beverly	
Ogeth, Walter	
Ohioka, Delores	
Oliphane, Willie R.	
Oliver, Jeanette	
Oliver, Joeh W.	
Olsen, Rebecca E.	
Olum, Moses	
Oring, Jason	
Orlando, Robert	
Ortega, Carmila	
Ostunds, Gerald W.	
Owen, Frederick B.	
Owen, Michael	
Owens, Donald W.	
Owens, Sabrina	
Owens, Terry	
Pafel, Dirk D.	
Pagett, R. S.	
Parcelli, Peter V.	
Parker, Deloris	
Parker, Kristie	
Parry, George	
Partain, Bobbie	
Patrick, Jacki	
Patterson, Marion	
Paure, Lisa	
Payne, W. L.	
Peak, Cheryl W.	
Pearson, Kari M.	
Pearson, Kimberly	
Peebeet, Connie	
Peek, Kriesty	
Peek, L. E.	
Peek, L. M.	
Peel, Francis K.	
Peel, Margie	
Pelc, Sue	
Pellard, Anne	
Petterson, Joseph G.	
Peure, Chuck	
Phillips, Diane	
Phillips, Jamie	
Phillips, Stanton J.	
Pike, Jr., Walter L.	
Pines, David	
Plenter, Margaret	
Poeser, Sammie	
Polding, M.	
Polite, Carl F.	
Polite, Debra	
Pollard, Barbara	
Poole, Sara	
Pope, W. O.	
Porcelli, G. M.	
Postos, Marlin	
Powell, Samuel H.	
Price, Bill	
Price, Caroline	
Price, Rebecca S.	
Priester, Lucille	
Priester, Michael B.	
Prince, Bill	
Proctor, Eileen	
Purltard, Brian	
Quarles, Stephanie L.	
Quhaley, L. H.	
Quiyim, Ifraj T.	
Raber, Wallace	
Radduck, Danny	
Rafoth, Abby	
Rammon, Clark	
Ramsay, Phillip	
Randall, Linda	
Rannarie, Sheldon	
Raudle, G.	
Rawiel, Caleb	
Ray, Ailene B.	

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

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Ray, Joyce A.	
Receuh, Teresa	
Reed, Priscilla	
Reeve, Arnold P.	
Reforth, Robert J.	
Reid, Dhemietris	
Reneu, C.	
Reyer, Ester A.	
Rice, Patti	
Ricesnue, Marmi	
Richmond City 118th H. Harold	
Righ, Thomas F.	
Ritchie, Donald E.	
Roberson, L. Seche	
Roberson, Lonnie	
Roberson, Rebecca	
Roberson, Toby	
Roberts, Alison L.	
Robin, Paul	
Robinette, Jim	
Robinette, Sarah L.	
Robinson, Ebony	
Robinson, Georgina	
Robinson, Shirley	
Rogers, David	
Rogers, Kathryn	
Rolland, Gwendolyn	
Romaine, Jr., Gerald J.	
Rorinler, Bill	
Rose, Karen	
Rose, Mary Anne	
Rosenkrantz, Melissa	
Ross, Addie O.	
Ross, Cary	
Ross, Erin A.	
Ross, Sr., L. M.	
Rothine, S.	
Rouse, Angela	
Rowell, Joy	
Roy, James C.	
Rucker, M. J.	
Rudd, Nell O.	
Ruffins, Helen R.	
Runne, J. L.	
Rurtraus, Rocky	
Rutlan, William L.	
Ryan, A.	
Ryberg, W. Grieg	
Safford, Emma	
Saita, Ronald P.	
Salyer, Linda	
Sampson, Barbara S.	
Sampson, John R.	
Sampson, Jr., Edwin M.	
Sanders, Bernard	
Sanders, James F.	
Sanders, Karl	
Sanders, Kenneth	
Sandri, Karlene B.	
Sandri, Nader F.	
Santos, Annie I.	
Sapp, Thomas M.	
Sareely, Leta	
Saugh, Robert A.	
Saunders, Carla	
Savannah River Technical Center Margaret J. Schwanker	
Sawcutt, Marilyn	
Sawyer, Gloria	
Scales, Josh	
Schmidt, James A.	
Schmitt, James C.	
Schneider, David	
Schreiber, Barbara	
Schultz, Jr., Richard E.	
Scott, Hugh A.	
Sedder, Roland S.	
Sein, Christina	
Selder, Mather	
Seles, Patrick	
Sestanich, James R.	
Sethi, B.	
Sewearing, Sandra	
Shade, Connie H.	
Shane, Jason A.	
Sharpe, Martha	
Shaw, John	
Sheets, Laura L.	
Sherron, Jane	
Shogren, Dotti	
Shores, Rebecca N.	
Shuferl, Jerry	
Sides, Karen	
Signon, Stephen S.	
Simmons, Tonya A.	
Simms, Tori J.	
Simpson, Annie B.	
Simpson, Jr., John E.	
Sinclair, Jerry	
Sizemore, Gail	
Skinner, Harriett F.	
Smith, Brenda	
Smith, Bryan	
Smith, C.	
Smith, Corrine	
Smith, Daniel R.	
Smith, Darie C.	
Smith, Davan	
Smith, Debbie	
Smith, Ernest W.	
Smith, Frank	
Smith, Helen	
Smith, James A.	
Smith, James T.	
Smith, Kelly	
Smith, Lein A.	
Smith, Markus L.	
Smith, Mildred	
Smith, Norma N.	
Smith, Richard B.	
Smith, Susan H.	
Sosa, Jennifer	

Table 1–8. Organization and Individual Commentors as Part of a Campaign (Continued)

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Spade, Phillip	
Sparks, Edwards	
Spears, T. J.	
Spivey, Dennis	
Spradler, Joey	
Stallings, Adrenea M.	
Stallings, Jay L.	
Stalworth, Robert	
Standefer, Ray	
Stanley, Allison N.	
Stanley, III, Walter G.	
Stanton, Richard M.	
Stapleton, Suzanne	
Starleys, Dargreline	
Steadman, Leanne	
Stealey, John	
Stephen, D. L.	
Stevens, Karen	
Stewart, Cynthia	
Stewart, Myrtle	
Stiheling, C. E.	
Still, Patricia	
Still, Stephanie A.	
Stills, R.	
Stoker, N. A.	
Stone, Lesa E.	
Stovall, James	
Stratlin, Jr., Charles H.	
Strickland, Steve	
Sutphin, Shannon M.	
Sviha, Diane	
Swan, Dianne	
Swerker, J. Suellen	
Taber, Quentin E.	
Talbert, Gregory F.	
Talbet, Ginger	
Talbet, Larry	
Tanner, Julius	
Tanner, Mary	
Tate, Elaine	
Tater, Joseph	
Taylor, Clint	
Taylor, John C.	
Taylor, Mary	
Teahell, Julie	
Temple, Grady Ronald	
Teriyle, Linda P.	
Thaury, Rusty	
The Journal Walt Inabinet	
Therigh, J.	
Thibault, Jeffery	
Thomas, Bob	
Thomas, Candice	
Thomas, Dennis	
Thomas, Jermia H.	
Thomas, Patricia P.	
Thomas, Stephanie	
Thomas, Troy T.	
Thomas, Veronica	
Thompson, Josiah C.	
Thompson, Kay R.	
Thompson, Renee	
Thompson, Shanta R.	
Thurnell, Ted	
Tobell, Matt	
Trapp, Andrew	
Tuekes, Regina	
Tuely, Susan S.	
Tuntarella, Nick	
Turner, Carman A.	
Turner, Gloria	
Turner, Jason	
Turner, Jennie	
Turner, Jermel O.	
Turner, T. J.	
Turner, Todd	
Tyler, R.	
Unison, Jr., Thomas	
Utley, Sue	
Vafade, Karan	
Van Haastrecht, Katrina	
Vann, Miriam	
Vaughn, J.	
Vaun, Gregory	
Veren, Natalia	
Veres, C.	
Vernon, Bradley	
Vert, Jason	
Void, Deborah C.	
Voss, Austin J.	
Wade, Jeon	
WAGT-TV, NBC News Illegible	
Waken, Patience F.	
Waldron, Helen L.	
Waldron, Sr., Jams E.	
Walh, Angie M.	
Walker, Debbie	
Walker, Geraldine	
Walker, Harrison	
Walker, Michael	
Walker, Stephanie	
Walker, Tracy	
Wallace, Lenora S.	
Wallace, Mary	
Walling, Elaine S.	
Walpile, Douglas L.	
Walpole, H.	
Walsh, Brian	
Walters, Will C.	
Ward, Mike	
Ware, Holly A.	
Warming, R.	
Warner, Milton E.	
Wash, Norman L.	
Wash, Ramona K.	
Washington, Glenn R.	
Washington, Jareth	
Waters, Daniel G.	
Waters, James J.	
Waters, Jennifer	

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Waufon, Todd V.	White, Michell	Wing, F. W.	
Wead, Rich	White, Thomas	Wingate, Rath C.	
Weaver, Paul A.	Whitefield, John W.	Winn, Leslie	
Weegians, Debra	Whitlock, Jessica L.	Winters, Kenneth R.	
Wells, Keli	Wilburn, Be Anna	Wollua, J.	
Wells, Rodriaguz	William, Gary	Wood, Angela	
Wells, Jr., Willie L.	William, Gregory	Wood, Kathy L.	
Wemut, R. H.	William, Helen P.	Woodard, Inez	
Wenger, Melissa	Williams, Allen	Woodrow, A.	
West, David A.	Williams, Cathy	Woods, W. T.	
West, William L.	Williams, David	Woodward, Richard D.	
Westinghouse Savannah River Company	Williams, Flora P.	Worthy, Samatha L.	
Margy Beckmeyer	Williams, John L.	Wright, Castella E.	
John Stephen Bellany	Williams, Mae	Wright, David L.	
Jeffrey M. Bollibon	Williams, Michael	Wright, Donald	
John A. Burnett	Williams, S. M.	Wright, Mikeia	
L. G. Call	Williams, Theresa Lee	Yanger, Ana M.	
Robert T. Hess	Williams, Timothy B.	Yanze, Noah	
Illegible	Williams, Twame	Yarbrough, Robin M.	
Lucas Jackson	Williams, Vivian J.	Young, M. C.	
Reginald Jerdun	Williams, Walter	Youngblood, Janice F.	
Robert Kellner	Williford, Nicole	Youngblood, W. Lewis	
Warren C. Lucas	Willyha, Katrina	Zilhite, C.	
Lessier B. Price	Wilson, Emily	Zipper, Jerry	
Patricia B. Smith	Wilson, Erinn	Zniddleton, Latoya	
Wetter, Herbert P.	Wilson, J. N.		
White, A.			
White, Deborah S.			
Questionnaire–Hanford Action			3–1379
Chantler, Joan	Grubmil, Ffei	Peauxa, John	
Demaria, Gregg	Holenstein, Kathryn Cherie	Reif, David	
Drageaux, Barbara	Low, Ian and Aiko		
Ferguson, Ken	Pearson, Christine		
Questionnaire–Hanford Action of Oregon			3–1383
Allen, Roderick M.	Burge, Lori	CIIBRI	
Anonymous	Callison, Liz	Frank Gearhart	
Barry, Tricia	Carley, Laura	Clinger, Sebastian	
Beyer, Jim and Pat	Carley, Randie	Copeland, Edward	
Boese, Bill	Case, Rhonda	Crawford, Marge	
Bortnick, Rick	Charneski, Christine	Dafoe, Vera L.	

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Dunn, Sherry K.	
Ennis, Sara	
Ettlin, Lauren	
Frazier, Bruce	
Fredrich, Ruth O.	
Freeborn, Johnni	
Gayek, Alexandra	
Giddings, Rochelle	
Greenfield, Lou and Del	
Grossman, Charles M.	
Hair, Anne E.	
Hammond, Terry	
Hartford, Susan R.	
Hines, Maxine	
Honke, Michael	
Israel, Adar	
Israel, Tabiah	
Janzon, Gretchen	
Jayne, Victoria	
Johnson, Chuck	
Jones, Mary V.	
Joslin, Rose Mary	
Juergens, Kathleen	
Klein, Robin	
Koski, Elizabeth	
Lack, Larry	
Lee, Sharon	
Lettowmaer, Margaret	
Leveque Ph.D, Phillip	
Lichtenwald, Daniel	
Liptan, Sherry and Tom	
Marbet, Lloyd	
Marsh, Betty Jane	
McGehee, Marian	
McLoughlin, Maura	
McMurry-Smith, Wanda Lee	
McNary, Janet	
Meyers, Marcia	
Monarch Software Anonymous	
Norton, Elias	
Norton, Patrick W.	
Nussbaum, Rudi and Laureen	
Oakley, J. A.	
Pairo, Rill	
Penfield, Janet	
Pfeffer, John	
Piippo, Laurel	
Richardson, Ann	
Robinson, Bob	
Schimpf, Amy	
Seborer, Robert	
Sims, Lynn	
Southworth, Laurie P.	
Starr, Charles	
Starr, George and Irene	
Tinemen, Charles	
Tracy, Nancy Lou	
Ullom, Richard L.	
Walicki, Joe	
Ward, Lee Ann	
Ward, Rayner	
Weibel, Emma Lee	
Wheeler, Dori and Rollin	
Wilson, Dave	
Wolter, Pamela	
Woods, Crystal	

Table 1–9. Issue Categories

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Dale Nesbitt	
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Louis A. Zeller

CACTUS
Denise Lee

Crawford, Sidney

Defense Nuclear Facilities Safety Board
Roy Kasdorf

Duke Energy Corporation
Steven P. Nesbit

Economic Development Partnership
Ernest S. Chaput

Exchange/Monitor Publications
Daniel Horner

Inside Energy
Tarun Reddy

Institute for Energy & Environmental Research
Lisa Ludwidge

Joseph D. LaFleur, Inc.
Joseph D. LaFleur

Los Alamos National Laboratory
Faris Badwan

Mills, Robin

Morgan, Lewis & Bockius
Gaylea Shultz

NAC International
Kristian Kunert

Nuclear Control Institute
Tom Clements

Nuclear Information and Resource Service
Mary Olson

Numark Associates, Inc.
Jon R. Chase

Physicians for Social Responsibility
Kathryn Crandall
Curt Wozniak

Prisoners of Our Homes
Geneva Johnson

Safe Energy Communication Counsel
Linda Gunter

States News Service
Mary Shaffrey

Stone & Webster Engineering Corporation
Paola Rozzi

The Nation
Alex Bolton

U.S. Department of Energy,Chicago Operations Office
Rich Freeman
Bob Selby

U.S. Department of Energy, Federal Energy Technology Center
Harold Chambers

U.S. Department of Energy, NEPA Policy and Assistance
Brad Morse

U.S. Department of Energy, Office of Declassification
Bruce W. Bremer

U.S. Environmental Protection Agency
Mary E. Clark

U.S. Environmental Protection Agency, Office for Federal Activities
Susan Absher

Women's Action for New Directions
Ann Ober

Afternoon Session

20/20 Vision
Cari-Ann LaGrassa

Bengelsdorf, McGoldrick and Associates
Harold Bengelsdorf

Blue Ridge Environmental Defense League
Janet Marsh Zeller
Louis A. Zeller

BNFL, Inc.
Malcolm Bolten

Center for International Nuclear and Radiation Safety
Ed Purvis

Clavel, Guy

COGEMA, Incorporated
Vijay K. Sazawal

Embassy of Australia
Matthew Quint

Embassy of the Russian Federation
Aleksander Khlunov

Environmental Coalition on Nuclear Power
Judith Johnsrud

JUPITER Corporation
April Marcy

Kinnelly Associates
Francis Kinnelly

LMITCO
Jan Forsythe
Chris Moller

MACTEC, Inc.
Roxanne Fournier

Magnus Associates
D.K. Magnus

Neuhold, Robert J.

Nuclear Control Institute
Steven Dolley

Nuclear Energy Institute
Felix Killar

Nuclear Information and Resource Service
Mary Olson

Physicians for Social Responsibility
Kathryn Crandall

Safe Energy Communication Counsel
Linda Gunter

Stevens, Barbara

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Chapter 2
Summary of Major Issues Identified During the Comment Periods and Changes to the SPD Draft EIS

The following paragraphs highlight comments and, issues that the public raised concerning information provided in the SPD Draft EIS. These comments were collected during the two separate public comment periods for the SPD Draft EIS and the *Supplement*. Changes made to this SPD EIS in response to a comment are described.

2.1 Summary of Major Issues Raised on the SPD Draft EIS During the Public Comment Period

Russian Disposition Program. A number of commentors expressed concern over Russian disposition activities and tying U.S. activities to Russian activities. The United States and Russia recently made progress in the management and disposition of plutonium. In July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. In September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain disposition activities in order to encourage the Russians and set an international example. DOE has updated this SPD EIS to reflect the agreement and statement of principles and included copies in Appendix A of Volume II.

Site Selection. A large number of comments were received advocating one candidate site over another for various reasons, including the presence of existing facilities that could prove beneficial to plutonium disposition, skilled workers, safety records, reduced transportation, and perceived economic benefits. DOE has chosen SRS as its preferred site for the three surplus plutonium disposition facilities, as outlined in Section 1.6.

Approach to Plutonium Disposition. A number of commentors protested DOE's preference for the hybrid approach and the use of MOX fuel for surplus plutonium disposition. Among the comments received on this issue were many advocating the use of the immobilization approach for all of the surplus plutonium. Commentors argued that the immobilization approach was safer, cheaper, and faster. They also pointed out that the immobilization approach resulted in less transportation. Because specific reactors in North Carolina, South Carolina, and Virginia have been proposed for plutonium disposition, the transportation requirements associated with several hybrid alternatives that include the MOX facility at SRS and Pantex have decreased (because the proposed reactors are closer to these sites than the 4,000-km [2,500-mi] bounding distance analyzed in the SPD Draft EIS). As a result, these hybrid alternatives would require less transportation than some of the 50-t (55-ton) immobilization alternatives. Other commentors viewed the MOX approach as a Federal Government subsidy of the commercial nuclear power industry. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard.[1]

Safety and Health. Comments were received that questioned the safety and health aspects of operating the surplus plutonium disposition facilities. Commentors pointed out that DOE's safety record at other nuclear facilities had been poor in the past and questioned DOE's ability to safely operate the disposition facilities. The health and safety of workers and the public is a priority of the surplus plutonium disposition program, regardless

[1] "Spent Fuel Standard" is a term coined by the National Academy of Sciences (NAS, 1994, *Management and Disposition of Excess Weapons Plutonium*, National Academy Press, Washington, D.C., pg. 12) and modified by DOE (glossary from Office of Fissile Materials Disposition Web site at http://www.doe-md.com) denoting the main objective of alternatives for the disposition of surplus plutonium: that such plutonium be made roughly as inaccessible and unattractive for weapons use as the much larger and growing stock of plutonium in civilian spent nuclear fuel.

of which approach is chosen. Operation of the disposition facilities would comply with applicable Federal, State, and local laws and regulations governing radiological and hazardous chemical releases. Within these limits, DOE believes that the radiation exposure and the level of contamination should be kept as low as is reasonably achievable.

Aqueous Processing of Plutonium. Some commentors questioned DOE's ability to produce clean plutonium dioxide that could be used in MOX fuel using the dry process proposed in the SPD Draft EIS. Questions were raised about the ability of this process to remove gallium and other pit materials from the plutonium before it is fabricated into MOX fuel. On the basis of public comments received on the SPD Draft EIS and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing (a small-scale aqueous process) as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N (which addressed plutonium polishing in the SPD Draft EIS) was deleted from this SPD Final EIS, and the impacts discussed therein were included in the impacts presented for the MOX facility in Chapter 4 of Volume I. Section 2.4.3 was also revised to include a discussion of plutonium polishing.

No attempt was made to evaluate the use of DOE's existing aqueous processing lines capable of dissolving pits, as advocated by some commentors. DOE determined that such aqueous processing, while a proven technology, is not a reasonable alternative for pit conversion because current aqueous processes using existing facilities would produce significant amounts of waste, and aqueous processing would complicate international inspection regimes because of classification issues.

Reprocessing. Several comments were received related to the reprocessing of plutonium and the civilian use of plutonium. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing. The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium that was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. At the end of the useful life of the facility, DOE would evaluate options for D&D or reuse of the facility for other purposes.

Inclusion of Generic Reactor Information in the SPD Draft EIS. Many comments were received on the inclusion of generic reactor information in the SPD Draft EIS. At the time the SPD Draft EIS was released, DOE did not know which specific reactors would be proposed for the MOX program. Subsequently, the Catawba, McGuire, and North Anna reactors were chosen as part of the contractor team that would implement the MOX option should the decision be made in the SPD EIS ROD to go forward with the hybrid approach (i.e., both immobilization and MOX). Specific reactor information provided as part of the procurement process was evaluated by DOE in an Environmental Critique in accordance with DOE's NEPA regulations at 10 CFR 1021.216. The Environmental Critique was considered by DOE before awarding the contract. An Environmental Synopsis based on the Environmental Critique was prepared and released to the public for comment in the *Supplement*. The comments received on the *Supplement* are summarized and responded to in Volume III, Chapter 4, of the Comment Response Document. An opportunity for public comment will also likely be provided by NRC during the reactor operating license amendment process.

Transportation Concerns. Commentors raised concerns about the transportation involved with moving the surplus plutonium from storage locations to disposition sites and, in some cases, MOX fuel to reactor sites. Requests were made to limit the transportation where possible, to present the transportation information in a more understandable manner, and to ensure that the transportation was conducted as safely as possible. Additional information has been added to Chapter 2 of Volume I, of this SPD Final EIS, which shows the total transportation associated with each alternative and gives a graphic depiction of the transportation needed for each disposition

approach (immobilization and MOX). As discussed in this SPD EIS, safe transportation is a major concern of DOE. All shipments of surplus plutonium would be accomplished using the safe, secure trailer/SafeGuards Transport (SST/SGT) system.[2] Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents that resulted in a fatality or release of radioactive material.

Cost of Plutonium Disposition. Many commentors focused on the cost of various surplus plutonium disposition facilities. Because cost issues are beyond the scope of this SPD EIS, commentors are referred to DOE's *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) and *Plutonium Disposition Life Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999). Comments concerning the basis for DOE's cost estimates or requesting cost information were forwarded to DOE's cost analysis team.

2.2 Summary of Major Issues Raised on the *Supplement to the SPD Draft EIS* During the Public Comment Period

Frequency of Reactor Accidents in Reactors Using MOX Fuel. A number of comments argued that the frequency of reactor accidents would be greater due to the use of MOX fuel. As reflected in the accident analysis included in Section 4.28, the consequences of a beyond-design-basis accident using MOX fuel are generally higher than those expected in the same reactor using low-enriched uranium (LEU) fuel. However, there is no basis for concluding that the frequency of these accidents would increase due to the use of MOX fuel. During the base contract period, the contractor team would work with the utilities to confirm the characteristics of the MOX fuel and whether any design modifications are necessary to maintain safety margins. No change in the frequencies of reactor accidents due to the use of MOX fuel has been made in this SPD Final EIS.

Risk Associated With Reactors Using MOX Fuel. Many commentors were concerned that there is an increase in accident risk from reactors using MOX fuel and that the plutonium in MOX fuel makes a reactor accident more dangerous to human health. There are differences in the expected risk of reactor accidents from the use of MOX fuel. Some accidents would be expected to result in lower consequences to the surrounding population, and thus, lower risks, while others would be expected to result in higher consequences and higher risks. The largest estimated increase in risk to the surrounding population due to the use of MOX fuel is an estimated 14 percent increase in the risk of latent cancer fatalities associated with an interfacing systems loss-of-coolant at North Anna. The likelihood of this accident occurring at North Anna is estimated to be one chance in 4.2 million per year. Before any MOX fuel is used for plutonium disposition, NRC would perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications. Expected risk is discussed in Section 4.28 of this SPD EIS.

Environmental Impacts Associated With Using MOX Fuel Versus LEU Fuel. Comments were received expressing a concern that the SPD Draft EIS failed to recognize avoided environmental impacts associated with using MOX fuel versus LEU fuel in existing commercial reactors. While the consequences of a beyond-design basis accident might be higher (as discussed above), and a slight increase in spent fuel could be expected by using MOX fuel instead of LEU fuel, the impacts associated with mining, milling, and enriching uranium are avoided. Section 4.28.3 has been added to this SPD Final EIS to address this issue.

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[2] The SST/SGT is a specially designed component of an 18-wheel tractor-trailer vehicle. Although the details of the vehicle enhancements are classified, key characteristics are not, and include: enhanced structural supports and a highly reliable tie-down system to protect cargo from impact; heightened thermal resistance to protect the cargo in case of fire; deterrents to protect the unauthorized removal of cargo; couriers who are armed Federal officers and receive rigorous training and are closely monitored through DOE's Personnel Assurance Program; an armored tractor to protect the crew from attack; advanced communications equipment; specially designed escort vehicles containing advance communications and additional couriers; 24 hr-a-day real-time monitoring of the location and status of the vehicle; and significantly more stringent maintenance standards.

Low-Level Waste. Comments were received on the isotopic breakdown of the low-level waste (LLW) that would be generated at the reactors using MOX fuel and the effect of this waste on existing burial grounds. There are differences in fission product inventories and activation products between an LEU and MOX core during a fuel cycle. However, the only time significant quantities of fission products could be released to the environment or end up in LLW would be in the event of a large-scale fuel leak. In regard to normal operations, experience with fabricating MOX fuel indicates a leakage rate of less than one-tenth of one percent. The use of MOX fuel would not be expected to result in any additional LLW because the reactors would continue to operate on the same schedule as if they were using only LEU fuel.

Public Hearings. A number of comments were received regarding the need to hold public hearings near the proposed reactor locations. DOE's NEPA regulations require that at least one public hearing be held to receive comments on a draft EIS (10 CFR 1021.313[b]). A public hearing was held in Washington, D.C., to collect public comments on the *Supplement*. No additional hearings were held near the specific reactor sites, but comments were solicited in the areas surrounding the proposed reactors. The *Supplement* was sent to interested groups and individuals near each of the reactors and an informational meeting about the proposed use of MOX fuel, sponsored by a South Carolina State Senator, was attended by DOE during the comment period. The transcript of this meeting is presented as Appendix A of the Comment Response Document.

2.3 Changes to the SPD Draft EIS and the *Supplement*

DOE revised the SPD Draft EIS and its *Supplement* in response to comments received from other Federal agencies; tribal, State, and local governments; nongovernmental organizations; the general public; and DOE reviews. The text was changed to provide additional environmental baseline information, reflect new technical data, make editorial corrections, respond to comments, and clarify text. Some of these changes involved recalculations of the impacts discussed in Chapter 4 of Volume I. In addition, DOE updated information due to events or decisions made since the SPD Draft EIS and *Supplement* were provided for public comment. Sidebars are used throughout this SPD Final EIS to indicate where changes have been made. Below is a brief discussion of significant (e.g., noneditorial) changes.

Revised Preferred Alternative. In the SPD Draft EIS, DOE's preferred alternative for siting the proposed disposition facilities was identified as either Alternative 3 (the pit conversion, immobilization, and MOX facilities at SRS) or Alternative 5 (the pit conversion facility at Pantex and the immobilization and MOX facilities at SRS). Under either alternative, the hybrid approach (i.e., immobilization and MOX) was preferred with the immobilization technology being the can-in-canister approach. No preference was identified in the SPD Draft EIS for the lead assembly or postirradiation examination activities, nor were the specific reactors that would use MOX fuel identified.

The *Supplement* identified SRS as the preferred site for the construction and operation of the pit conversion, immobilization, and MOX facilities. The *Supplement* also identified LANL as the preferred site for lead assembly activities and ORNL as the preferred site for postirradiation examination activities. Section 1.6 of this SPD Final EIS now identifies Alternative 3 as DOE's preferred alternative. In addition, Section 2.1.3 now identifies the three reactor sites that have been named as candidates for using MOX fuel subject to NRC license amendment. They are the Catawba Nuclear Station in York County, South Carolina; the McGuire Nuclear Station in Mecklenburg County, North Carolina; and the North Anna Power Station in Louisa County, Virginia.

Changes to the Immobilization Facility. Since the issuance of the SPD Draft EIS and as described in the *Supplement*, DOE has developed a more detailed conceptual design for the can-in-canister immobilization facility. Changes in the size of the immobilization facility have been reflected in Volume I, Chapter 2, of this SPD Final EIS and the associated impact analyses throughout Chapter 4. No changes have been made to the

basic processes proposed in the SPD Draft EIS for immobilization, to the amount of material being considered for immobilization, or to the rate of throughput.

As stated in the *Supplement*, the eight alternatives that included using portions of Building 221–F at SRS for immobilization (SPD Draft EIS Alternatives 3B, 5B, 6C, 6D, 7B, 9B, 12B, and 12D) were eliminated. These alternatives are no longer reasonable because the amount of new construction required for the proposed immobilization facility is now nearly the same whether the facility is located entirely in a new building or uses a portion of Building 221–F. Thus, there is no longer any advantage associated with the use of Building 221–F at SRS.

Changes Resulting From the MOX Procurement Process. As stated in the *Supplement*, information provided as part of the MOX procurement process relating to the MOX facility, including the addition of a plutonium-polishing module to the front end of the MOX facility, was analyzed by DOE in an Environmental Critique and summarized in an Environmental Synopsis prepared pursuant to DOE's NEPA regulations in 10 CFR 1021.216. The Synopsis was included in the *Supplement* and has been added to this SPD Final EIS as Appendix P. Appendix N, *Plutonium Polishing*, has been deleted from this SPD Final EIS, with the information in Appendix N incorporated into the body of the EIS. A description of the polishing module has been added to Section 2.4.3, and the impacts analysis has been incorporated into Chapter 4 of Volume I. The polishing step is included in the MOX facility, so plutonium polishing is no longer considered as a contingency for the pit conversion facility.

As described in the *Supplement*, the size of the MOX facility has increased. The larger MOX facility is described in Volume I, Chapter 2, of this SPD Final EIS, and the associated environmental impacts are presented throughout Chapter 4. No changes have been made in the amount of material proposed to be made into MOX fuel, the facility's throughput, or in the overall process to be used to fabricate the fuel.

Information related to the affected environment for the specific domestic commercial reactors that would irradiate the MOX fuel was provided in the *Supplement* and has been added to this SPD Final EIS as a new Section 3.7. Environmental impacts analyzed for the actual reactor sites was also provided in the *Supplement* and has been added to Section 4.28 of this SPD Final EIS.

Possible Delay of the Construction of the Actinide Packaging and Storage Facility. As stated in the *Supplement*, the schedule for the Actinide Packaging and Storage Facility (APSF) is uncertain at this time, and therefore, the disposition facilities at SRS analyzed in this SPD Final EIS were modified to disregard any benefit to the proposed facilities as a result of APSF being present. Chapter 4 of Volume I presents the environmental impacts that would be associated with the construction and operation of surplus plutonium disposition facilities at SRS that are stand-alone and include no reliance on storage space or other functions at APSF. Throughout this SPD Final EIS, references to APSF have been qualified by the phrase "if built," and no credit has been taken in the environmental analyses for the presence of APSF.

Pit Repackaging Requirements. This SPD Final EIS was changed to reflect new decisions on the repackaging of pits at Pantex for long-term storage and the impacts of that decision on the need to repackage the pits for offsite transportation.

Pit repackaging for long-term storage. As discussed in the *Supplement*, work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 sealed insert (SI) container for long-term

storage,[3] as described in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This effort would be completed over 10 years, and the estimated dose to involved workers received from this repackaging activity would be about 104 person-rem. The SPD Draft EIS analyzed repackaging of the pits in an AT–400A container. The change to the AL–R8 SI changes the undisturbed long-term storage period for pits from 50 to 30 years because of the need to replace a seal in the container after 30 years; the AT–400A does not require that activity. This change has been incorporated into Chapter 4 of Volume I.

Pit repackaging for offsite transportation. The AL–R8 SI is not an offsite shipping container as was the AT–400A analyzed in the SPD Draft EIS. Therefore, if the decision were made to site the pit conversion facility at a site other than Pantex, the surplus pits would have to be taken out of the AL–R8 SI and placed in a shipping container.[4] This operation would also require the replacement of some pit-holding fixtures to meet transportation requirements. It is expected that this change would result in a total repackaging dose to involved workers of 208 person-rem. If the decision were made to locate the pit conversion facility at Pantex, then the pits could be moved from their storage location to the pit conversion facility in the AL–R8 SI using onsite transportation vehicles. Under this option, there would be no increased exposures due to repackaging. This change has been incorporated into Chapter 4 of Volume I.

Environmental Impacts Associated With MOX Fuel Versus LEU Fuel. Section 4.28.3 was added to this SPD Final EIS to address the impacts associated with using MOX fuel versus LEU fuel in existing commercial reactors.

Uranium Conversion Impacts. Section 4.30.10, Incremental Impacts Associated With Uranium Conversion, was added to address potential impacts of the conversion of depleted uranium hexafluoride to uranium dioxide. (See Sections 1.5, 2.4.4.2 and 2.4.4.3 for a discussion on conversion.)

New/Revised Documents and Changes to Cumulative Impacts. Section 1.7 of the SPD Draft EIS, Relationship to Other Actions and Programs, (Section 1.8 in this Final) was updated to reflect new or revised planning documents and related NEPA documents, such as the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment*, the *ROD for the Department of Energy's Waste Management Program: Treatment of Non-Wastewater Hazardous Waste*, the *Advanced Mixed Waste Treatment Project Final EIS* and ROD, and the *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site* and RODs. The information in the most recent and programmatic site documents has been used to update the discussion of cumulative impacts in Section 4.32 of this SPD Final EIS. In addition, cumulative impacts information has been added for LLNL and LANL (two candidate sites for lead assembly fabrication), ORNL (a candidate site for postirradiation examination), and the three reactor sites (Catawba, McGuire, and North Anna).

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[3] DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

[4] At the present time, DOE is using the FL container for the offsite shipment of pits. There are not enough of these containers to meet the plutonium disposition mission. No new FL containers can be manufactured because of certification restrictions. Further, the current FL containers cannot be certified for a specific type of surplus pit. The Defense Nuclear Facilities Safety Board, in its Recommendation 99–1 (August 1999), noted that there is no container suitable for shipping pits from Pantex. Should DOE make any decisions that would require shipment of pits from Pantex, DOE would ensure the availability of a certified shipping container in a timeframe that would support those decisions.

Affected Environment. Information on the affected environment for ORNL, a candidate site for postirradiation examination, has been added to Volume I, Chapter 3, of this SPD Final EIS.

Consultations. Appendix O was added to provide the correspondence related to ecological resources, cultural resources, and Native American consultations. Table 5–2 provides a summary of these consultations, and Section 4.26 discusses the results of the consultations.

Fast Flux Test Facility. Appendix D of the SPD Draft EIS was deleted. This SPD Final EIS does not address using the Fast Flux Test Facility (FFTF) because the current DOE proposals do not include the use of surplus plutonium as a fuel source for FFTF.

Comment Response. Volume III, the Comment Response Document, was added to this SPD Final EIS. The comments received during the two comment periods and their responses are presented in a side-by-side-format.

Chapter 3
Comment Documents and Responses on the SPD Draft EIS

This chapter presents scanned images or transcriptions of all written or oral comments submitted to DOE on the SPD Draft EIS, with the DOE responses. In most instances, the response appears on the same page as the corresponding comment. Where many comments appear on a single page, however, the responses may extend to succeeding pages. The comments and responses are presented in the following order:

- Comments from members of Congress and from Federal agencies. The comments are integrated alphabetically by State.
- Comments from State and local officials and agencies, special interest groups, organizations, companies, and individuals. The comments are integrated alphabetically by State.
- Oral comments recorded at the five public hearings.
- Campaign documents submitted by special interest groups, organizations, companies, and individuals.

MAX CLELAND
GEORGIA
WASHINGTON, DC 20510
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COMMITTEES:
ARMED SERVICES
GOVERNMENTAL AFFAIRS
SMALL BUSINESS

United States Senate

WASHINGTON, DC 20510-1005

August 6, 1998

The Honorable Bill Richardson
Secretary of Energy
1000 Independence Avenue, SW
Washington, D.C 20585

Dear Bill:

As you know, the Department of Energy Plutonium Disposition Program is one of our Nation's highest priority efforts to ensure national and international security. We should continue to provide world leadership in nuclear non-proliferation and I commend your Department for its work on this program.

The Savannah River Site (SRS) stands ready to accept all of the Plutonium Disposition missions and in my opinion, should be the site of choice to accomplish these missions. The existing infrastructure, experience, expertise, and demonstrated plutonium processing accomplishments are not found at any other site under consideration for the Plutonium Pit Disassembly and Conversion phase. The capabilities and advantages of SRS which resulted in its being selected as the preferred site for the Mixed Oxide Fuel Fabrication and Immobilization phases of the disposition program should make SRS the preferred site for Pit Disassembly and Conversion as well. 1

By consolidating all of the program phases at SRS, the taxpayers will save hundreds of millions of dollars. Avoiding the cost of duplicating the existing SRS nuclear infrastructure at another site to make that site capable of doing this work should be a major consideration in site selection.

This surrounding community fully supports SRS and the Plutonium Disposition Missions. To the best of my knowledge, you will not find that level of support at any other site in the DOE complex. Such local support is key to ensuring the complete and timely success of the of the Plutonium Disposition Program.

I believe that these and many other benefits strongly support SRS as the preferred site for Pit Disassembly and Conversion. I look forward to working with you and the people in your Department as the decision making process continues.

Most respectfully,

Max Cleland

Max Cleland
United States Senator

SCD46

SCD46–1 **Alternatives**

DOE acknowledges the Senator's support for the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

UNITED STATES SENATE
HONORABLE PAUL D. COVERDELL, GEORGIA
PAGE 1 OF 1

PAUL D. COVERDELL
GEORGIA

CONFERENCE SECRETARY

United States Senate
WASHINGTON, DC 20510–1004

CHAIRMAN
WESTERN HEMISPHERE SUBCOMMITTEE
FOREIGN RELATIONS COMMITTEE

CHAIRMAN
MARKETING, INSPECTION, AND PRODUCT
PROMOTION SUBCOMMITTEE
AGRICULTURE COMMITTEE

SMALL BUSINESS COMMITTEE

Representatives of the Department of Energy, guests and interested stakeholders: thank you for the opportunity to submit comments in support of future missions at the Savannah River Site.

As you are well aware, the Savannah River Site has played a key role in the security of our Nation and world over the past fifty years. During this time, our Nation has called upon the people and the community of the Central Savannah River Area to work efficiently and diligently for the betterment of our Nation. Not only have these citizens taken this upon themselves, but they have done so in a way that has made us all proud. I would like to take this opportunity to commend the people of the Savannah River Site who have successfully fulfilled and accomplished missions of the past, and will share in missions of the future.

I hope that by now, it is clear to DOE that the community support for the Savannah River Site is second to none within the DOE Complex. We are proud of this support and trust that you will weigh it heavily in your upcoming decision making process on Plutonium Pit Disassembly and Conversion.

Looking toward the future, we must continue to locate viable options for the Site. I found it only fitting that you selected SRS as the preferred site for the Mixed Oxide Fuel Facility and the Immobilization Process, but was not surprised. SRS has produced plutonium for the Department of Energy from its conception, and it is clear that SRS has the infrastructure and demonstrated experience and expertise to ensure the success of these missions. 1

With these same attributes and qualifications, SRS stands ready to accept the Plutonium Pit Disassembly and Conversion mission. Consolidation of all three missions of the Plutonium Disposition Program at SRS will save taxpayers of our Nation hundreds of millions of dollars in capital and operating costs.

Also, let us not forget the fact that SRS has the people that can fulfill this mission. A well trained and knowledgeable work force has been established at this site. This work force will meet or exceed any safety or efficiency standard.

In continuing our obligation to maintain national security for the people of the United States, it is imperative that we move forward with the Pit Disassembly and Conversion mission. I look forward to working with the Savannah River Site, the Department of Energy, and of course, the citizens of the area, to help establish this mission for the Site with the least amount of environmental impact.

I thank you for the opportunity to submit comments during this important program and site selection process.

SCD52

SCD52–1 **Alternatives**

DOE acknowledges the Senator's support for the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PAUL D. COVERDELL
GEORGIA

CHAIRMAN
WESTERN HEMISPHERE SUBCOMMITTEE
FOREIGN RELATIONS COMMITTEE

United States Senate
WASHINGTON, DC 20510–1004

Representatives of the Department of Energy, guests and interested stakeholders; thank you for the opportunity to submit comments to the Surplus Plutonium Disposition Environmental Impact Statement of the Department of Energy at the Savannah River Site.

As you are well aware, the Savannah River Site has played a key role in the security of our Nation and world over the past fifty years. During this time, our Nation has called upon the people and the Community of the Central Savannah River Area to work efficiently and diligently for the betterment of our nation. Not only have these citizens taken this upon themselves, but they have done so in a way that has made us all proud. I would like to take this opportunity to commend the people of the Savannah River Site who have successfully fulfilled and accomplished missions of the past and will share in missions of the future.

Looking toward the future, we must continue to locate viable options for the Site. One mission is Plutonium Disposition. I find it only fitting that we consider the Savannah River Site for this mission, as it was SRS who produced plutonium for the Department of Energy from its conception. It is my understanding that the Department of Energy is currently examining two possible methods of plutonium disposition at SRS, Mixed Oxide Fuel (MOX) fabrication and immobilization. I have been informed that both of these methods may require some purification of plutonium before they can be stored in their final form, and that SRS is the only Department of Energy site that can purify any significant quantity of these materials. If this is so, and as we in Congress continue to work to balance our Nation's budget, it appears that by selecting SRS the Department could save our country from unnecessary expenditures. 1

Furthermore, the current infrastructure at SRS would allow for these missions to be put in place with relative ease. The Site currently works on immobilization of spent nuclear fuel at its Defense Waste Processing Facility, and has facilities that could be made available for MOX fuel fabrication. By already having the infrastructure in place to accomplish this mission, SRS is one step ahead of its competitors.

Also, let us not forget the fact that SRS has the people that can fulfill this mission. A well trained and knowledgeable work force has been established at this site. This work force will meet or exceed any safety or efficiency standard.

In continuing our obligation to maintain national security for the people of the Untied States, it is imperative that we move forward in the disposition of certain amounts of plutonium. I look forward to working with the Savannah River Site, the Department of Energy, and of course, the citizens of the area, to help establish this mission for the Site with the least amount of environmental impact.

I thank you for the opportunity to submit comments during this meeting.

SCD106

SCD106–1 **Alternatives**

DOE acknowledges the Senator's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE CHARLIE NORWOOD, GEORGIA
PAGE 1 OF 3

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Sportsman's Caucus

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August 13, 1998

The Honorable Bill Richardson
Secretary
United States Department of Energy
Washington, DC 20585

Dear Mr. Secretary:

As you know, the citizens of the Central Savannah River Area take great pride in their association with the Savannah River Site (SRS). Unlike other field sites across the country, the support for future missions at SRS is unquestionable.

One such mission is plutonium disposition. Over the next several months, as you weigh all the options for siting this mission, I ask that you consider the following issues:

1. **Infrastructure**: the infrastructure at SRS would allow the dual-track approach of plutonium disposition to proceed with relative ease. Currently, the site works on immobilization of spent nuclear fuel at its Defense Waste Processing Facility. It also has facilities that would be made available for Mixed Oxide (MOX) Fuel Fabrication;
2. **Workforce:** SRS already has the qualified workforce that is needed to fulfill this mission. A well-trained and knowledgeable workforce will meet or exceed any safety or efficiency standard needed to fulfill the requirements of this mission; and, 1
3. **Community Support:** Through resolutions and letters of support from community leaders and citizens in both Georgia and South Carolina, it is clear that the Central Savannah River Area is eager to continue to lead the country toward meeting its obligation of maintaining the national security for the people of the United States.

While I applaud DOE's selection of SRS as the preferred site for the MOX and immobilization elements of this program, it is my understanding that consolidation of all three elements of the Plutonium Disposition Program at SRS would result in significant cost savings. It is also the most expeditious path to achieving the program objectives. The potential for hundreds of millions of dollars of savings to the taxpayers is something we must monitor and insist upon as the decision process evolves.
The Honorable Bill Richardson

SCD17

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SCD17–1 **Alternatives**

DOE acknowledges the Congressman's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Although existing facilities and processes at SRS could support the pit disassembly and conversion process, a new facility would be built. However, supporting infrastructure and complementary missions would be used to the extent possible. Further, as noted by the Congressman, SRS has a well trained and knowledgeable workforce and wide community support.

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

August 13, 1998
Page 2

One concern I do have with the Environmental Impact Statement (EIS) for the program is that it does not adequately address the existing facilities and processes at SRS – especially in the conversion of the plutonium pits to the oxide needed for MOX fuel or immobilization. Therefore, I encourage you to review this issue before the final decisions are made on pit disassembly and conversion. 1

Mr. Secretary, SRS has been a vital part of our community and a vital link to our nation's national security for over 40 years. Therefore, it is my hope that you will rely on this valuable resource as you site the plutonium disposition, as well as future DOE missions, throughout the remainder of your tenure at DOE.

Finally, I would personally like to invite you to visit the Site over the next few months as you adapt to your new role as the Secretary of Energy. I look forward to continuing our relationship on energy issues that began when we both served together on the House Commerce Committee.

Sincerely,

Charlie Norwood
Member of Congress

SCD17

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE CHARLIE NORWOOD, GEORGIA
PAGE 3 OF 3

Plutonium Disposition Talking Points
The Honorable Charlie Norwood
August 13, 1998

- In the Department of Energy Surplus Plutonium Disposition Draft Environmental Impact Statement issued in July 1998, DOE states a preference for locating immobilization and MOX fuel fabrication facilities at SRS. DOE also states a preference for a pit disassembly and conversion facility to be located at either SRS or Pantex in Amarillo, TX.

- SRS is the clear choice for all three disposition activities (immobilization, MOX, and pit disassembly and conversion) for technical and financial reasons. SRS has the supporting infrastructure, trained personnel, and a long history of safe operations.

- SRS is unique from all the other DOE field sites in that it has the unanimous support of the local community, state government, and local congressmen and senators.

- SRS has over 40 years of experience of receiving, handling, storing, dissolving, purifying, converting, stabilizing, packaging, monitoring, and shipping plutonium in various forms. The Defense Waste Processing Facility at SRS is a proven immobilization facility. The Pantex site in Texas only has experience in the disassembly and storage of sealed plutonium weapons components. 1

- DOE's own cost estimates cite that it is $60 million cheaper to build a pit disassembly and conversion facility at SRS than at Pantex. If politics didn't play a role here, this decision would be a no-brainer.

- DOE has failed to accurately reflect the cost savings of locating all three disposition activities at SRS, causing Senator Thurmond to request a GAO study a couple of weeks ago. This review ought to confirm the advantages of locating pit disassembly and conversion at SRS and hopefully provide a comprehensive cost savings to perform all of the work at SRS.

SCD17

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE CHARLIE NORWOOD, GEORGIA
PAGE 1 OF 1

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Sportsman's Caucus

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June 25, 1997

The Honorable Federico Pena
Secretary
United States Department of Energy
Washington, DC 20585

Dear Mr. Secretary:

As you know, the citizens of the Central Savannah River Area take great pride in their association with the Savannah River Site (SRS). Unlike other field sites across the country, the support for future missions at SRS is unquestionable.

One such mission is plutonium disposition. Within the next year, as you weigh all the options for siting this mission, I ask that you consider the following issues:

1. **Infrastructure:** the infrastructure at SRS would allow the dual-track approach of plutonium disposition to proceed with relative ease. Currently, the site works on immobilization of nuclear waste at its Defense Waste Processing Facility. It also has facilities that could be made available for Mixed Oxide (MOX) Fuel Fabrication;
2. **Workforce:** SRS already has the qualified workforce that is needed to fulfill this mission. A well-trained and knowledgeable workforce will meet or exceed any safety or efficiency standard needed to fulfill the requirements of this mission; and,
3. **Community Support:** Through resolutions and letters of support from community leaders and citizens in both Georgia and South Carolina, it is clear that the Central Savannah River Area is eager to continue to lead the country toward meeting its obligation of maintaining the national security for the people of the United States.

1

Mr. Secretary, SRS has been a vital part of our community and a vital link to our nation's national security for over 40 years. Therefore, it is my hope that you will rely on this valuable resource as you site the plutonium disposition, as well as future DOE missions, throughout the remainder of your tenure at DOE.

Sincerely,

Charlie Norwood
Member of Congress

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SCD76

SCD76–1 **Alternatives**

DOE acknowledges the Congressman's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE PETER DEFAZIO, OREGON
PAGE 1 OF 1

PETER A. DEFAZIO
4TH DISTRICT, OREGON
RESOURCES COMMITTEE
SUBCOMMITTEE:
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SUBCOMMITTEE:
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Congress of the United States
House of Representatives

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August 18, 1998

Mr. Howard R. Canter
Acting Director
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026

re: Comments on the Surplus Plutonium Disposition Draft Environmental Impact Statement

Dear Mr. Canter:

I want to thank the U.S. Department of Energy for holding this hearing in Oregon and for recognizing that Oregonians are significantly affected by actions at Hanford. I support the Secretary's decision in the SPD DEIS not to use any facilities at Hanford for mixed oxide fuel fabrication or fuel production. This decision should be maintained and affirmed in the Final EIS.

While I have grave misgivings about any use of mixed oxide fuel in nuclear reactors to dispose of surplus plutonium, I applaud the Secretary's recognition that Hanford's efforts must be focused on cleanup of its existing nuclear weapons wastes. The DEIS rightly recognizes that new missions that would create more waste at Hanford or contaminate buildings or facilities that have not previously been contaminated must not be allowed to occur. 1

I understand that the scope of the SPD DEIS does not address where mixed oxide fuel would be burned once it is fabricated and that the Department of Energy will address that issue iin a separate proceeding. Nevertheless, let me make it clear that the same logic that has compelled the Secretary to conclude that mixed oxide fuel should not be made at Hanford should also govern his decision regarding the site for burning mixed oxide fuel. Burning mixed oxide fuel at Hanford would create more waste and complicate the ongoing cleanup effort. 2

Hanford must have one mission and only one mission: to clean up the enormous amount of nuclear waste that already exists at the site. Hanford presents a threat to the people of Oregon and Washington. I have previously introduced legislation to make Hanford and other federal facilities comply with the requirements of the Clean Water Act. I will continue to work to make sure that the threat Hanford presents to the people of the Northwest is contained and safely cleaned up. 1

Sincerely,

PETER DeFAZIO
Member of Congress

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ORD04

ORD04–1 **Alternatives**

DOE acknowledges the Congressman's opposition to siting the MOX facility at Hanford and the MOX approach. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

ORD04–2 **MOX RFP**

As stated in this SPD EIS, the irradiation of MOX fuel would occur at domestic, commercial reactors. DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. As a result of this procurement process, DOE identified the reactors proposed to irradiate MOX fuel, the Catawba, McGuire, and North Anna nuclear stations, as part of the proposed action in this EIS. Section 4.28 was revised to discuss the potential environmental impacts of operating the selected reactors. Hanford is not a preferred site for either MOX fuel fabrication or irradiation.

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE ELIZABETH FURSE, OREGON
PAGE 1 OF 1

ELIZABETH FURSE
1ST DISTRICT, OREGON

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STATEMENT: HEARING with US DEPARTMENT OF ENERGY, Portland, OR
REGARDING SURPLUS PLUTONIUM DISPOSITION
August 18, 1998

Thank you for the opportunity to speak to you today. Tonight you will hear testimony from scientists, grassroots organizations and concerned citizens. It is essential that public participation remain an intregal part of decisions of the magnitude we are here today to discuss. 1

Hanford remains the most contaminated nuclear dump in the nation. Perched on the banks of the Columbia River it is the site with the greatest potential for disaster.

While I firmly support the reduction of the United States' stockpile of nuclear warheads, Hanford is not the site where the excess plutonium should be contained, let alone reprocessed into a mixed oxide fuel. Making plutonium into MOX ushers in a new era of nuclear proliferation. It does not make economic sense, environmental sense or humanitarian sense. 2

The only mission at Hanford should be containment and clean up and never, never the creation of more toxic waste.

ELIZABETH FURSE
Member of Congress

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ORD10

ORD10–1 **General SPD EIS and NEPA Process**

DOE agrees with the Congresswoman that public participation is an integral part of the decisionmaking process, and strives to provide as many means as possible for obtaining public input and participation.

ORD10–2 **Alternatives**

DOE acknowledges the Congresswoman's opposition to siting the proposed surplus plutonium disposition facilities at Hanford and the MOX approach. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

UNITED STATES SENATE, HONORABLE STROM THURMOND AND HONORABLE ERNEST F. HOLLINGS
UNITED STATES HOUSE OF REPRESENTATIVES, HONORABLE JAMES E. CLYBURN, LINDSEY O. GRAHAM, BOB INGLIS, MARK SANFORD, FLOYD D. SPENCE, AND JOHN M. SPRATT, JR., SOUTH CAROLINA
PAGE 1 OF 3

Strom Thurmond
U. S. Senator South Carolina
Press Release

Contact: John DeCrosta
Press Secretary

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For Immediate Release

DoE Must Take Next Step at SRS

Washington, June 23, 1998—In a letter hand delivered today to Secretary of Energy Federico Pena, Senator Strom Thurmond (R-SC) said that the Department of Energy needs to decide where the pit disassembly mission should go, and that the only logical place for this operation is at the Savannah River Site.

Thurmond outlined his position in a delegation letter he authored and had delivered to Pena this afternoon. Specifically, Thurmond said that the Department was on the right track in deciding to locate two of three vital plutonium missions at the Savannah River Site--the Mixed-Oxide Fuel Fabrication Facility, and the plutonium immobilization mission. Pit disassembly is considered the third key leg of the plutonium production mission and Thurmond says that operation belongs in South Carolina.

"I am pleased the Department has recognized the unique expertise and world class capabilities of the Savannah River Site to take on the Department's new MOX mission," said Thurmond. "We must now work to bring the pit disassembly mission to SRS as there is no facility better suited for this mission, and locating this operation in South Carolina will save the American taxpayer $1.6 billion."

The Department of Energy has said that it is considering two locations for pit disassembly, one in Texas and the Savannah River Site. Thurmond said that the Department of Energy will have a very difficult task in making a compelling argument that Texas is a better place to locate this vital plutonium mission.

"The Department of Energy's policy of not introducing plutonium operations into a site where plutonium doesn't already exist is a sound one. Plutonium is not a material to be handled by amateurs. The skilled employees of the Savannah River Site have been competently and safely working with plutonium for years. It simply doesn't make economic or technical sense to conduct pit disassembly anywhere except Savannah River," said Thurmond. "The facility in Texas has never processed plutonium, they do not have a work force of individuals trained in how to process plutonium oxides or solutions. Further, it does not make sense to split up the plutonium production missions and recreate the complex and costly infrastructure necessary to handle plutonium safely. It is my hope that the department will soon decide to site the pit disassembly mission at the Savannah River Site, along with MOX fuel fabrication and immobilization activities."

A copy of Thurmond's delegation letter follows this release.

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SCD77

SCD77–1 **Alternatives**

DOE acknowledges the Senators' and Congressmen's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

STROM THURMOND
SOUTH CAROLINA

COMMITTEES
ARMED SERVICES, CHAIRMAN
JUDICIARY
VETERANS' AFFAIRS

United States Senate
WASHINGTON, DC 20510-4001

PRESIDENT PRO TEMPORE
UNITED STATES SENATE

June 23, 1998

The Honorable Frederico F. Peña
Secretary
Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, DC 20585

Dear Secretary Peña:

We commend your decision to locate the Mixed-Oxide Fuel Fabrication Facility at the Savannah River Site (SRS). We agree that SRS is the best site to take on this new mission; however, a crucial decision is still forthcoming regarding the final component of the Plutonium Disposition Program: pit disassembly and conversion. It is our firm belief that SRS is the right location for this mission and should be designated the consolidated plutonium disposition site.

SRS has been safely and efficiently handling plutonium materials since the 1950's. In 1997 DOE referred to SRS as "a plutonium-competent site with the most modern state-of-the-art storage and processing facilities and a site with the only remaining large-scale chemical separation and processing capability in the DOE complex." Further, in the 1996 Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management regarding Pit Manufacturing at Pantex, DOE stated, "Plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities." 1

We believe the policy of only introducing plutonium into a site with extensive plutonium handling experience is valid and correct. Further, we believe this policy should apply to pit disassembly and conversion as it has for pit manufacturing. Selecting SRS as the site for this program will reaffirm the Administration's position on this matter. Aside from being environmentally sound, the decision to consolidate the entire Plutonium Disposition Program makes economic sense as well. Siting the three components of this program at SRS will result in over $1.6 billion of cost savings to the American Taxpayer, taking into consideration both capital and life cycle costs. The Department recently announced the intention to move to single complex-wide integrating contracts as part of an effort to increase efficiency. This concept should apply to the Materials Disposition Program. Selecting a single site and single contractor for all Plutonium Disposition Missions will result in greater efficiency.

SCD77

UNITED STATES SENATE, HONORABLE STROM THURMOND AND HONORABLE ERNEST F. HOLLINGS
UNITED STATES HOUSE OF REPRESENTATIVES, HONORABLE JAMES E. CLYBURN, LINDSEY O. GRAHAM, BOB INGLIS, MARK SANFORD, FLOYD D. SPENCE, AND JOHN M. SPRATT, JR., SOUTH CAROLINA
PAGE 3 OF 3

will result in greater efficiency.

We are aware that the Department is considering processing multiple waste products from other sites at SRS prior to their ultimate destination at a national repository, which we hope will be sited and open to receive waste materials on schedule. If DOE seeks cooperation from the people of South Carolina in this effort, then it is vital that attention be given to our concerns over future missions at SRS. 1

Selecting SRS to take on the Plutonium Disposition Mission is the right decision for DOE and our Nation. SRS has the trained personnel, technological infrastructure, and community support to accept this mission. No other site can make such a claim. We firmly believe that the entire Plutonium Disposition Program should be sited at SRS. Selecting any other site would be costly, technically risky, and short-sighted.

With kindest regards and best wishes,

Sincerely,

Ernest F. Hollings
United States Senator

Strom Thurmond
United States Senator

Floyd D. Spence
Member of Congress

John M. Spratt, Jr.
Member of Congress

James E. Clyburn
Member of Congress

Bob Inglis
Member of Congress

Lindsey O. Graham
Member of Congress

Mark Sanford
Member of Congress

SCD77

STROM THURMOND
SOUTH CAROLINA

COMMITTEES
ARMED SERVICES, CHAIRMAN
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PRESIDENT PRO TEMPORE
UNITED STATES SENATE

United States Senate
WASHINGTON, DC 20510-4001

August 13, 1998

Mr. Greg Rudy
Manager
Savannah River Site
Post Office Box A
Aiken, South Carolina 29802

Dear Mr. Rudy:

I regret that I am unable to attend today's hearing, but I would like to submit this statement for the record which outlines my support for the location of the pit disassembly mission at the Savannah River Site (SRS).

There are many strong and convincing reasons why the Savannah River Site is unquestionably the right choice to receive the entire plutonium disposition mission, not the least of which is that it is simply the most logical place to task with this critical function. As you know, two of the three plutonium disposition missions are already assigned to the Savannah River Site, and sending pit disassembly there guarantees efficiency in both program management and in budgetary considerations. I understand that by some estimates, giving SRS the pit disassembly mission will save the government approximately $1.6 billion.

Furthermore, there is no location in the United States that has the infrastructure and highly skilled workforce in place to handle this mission. Locating pit disassembly at the Savannah River Site means that the Department of Energy (DoE) will be able to capitalize on assets already found in South Carolina. In an era when the Department of Energy is seeking ways to streamline its organization and to operate more efficiently, it does not make sense to split-up the plutonium disposition mission or to create what will be redundant infrastructure by building a pit disassembly facility at another DoE site. 1

Of course, public safety is an issue which must be taken into consideration and is one that exceeds all other considerations including budgetary savings. Plutonium is far too volatile a material to be handled by individuals or facilities that have no experience in dealing with it. As you know, the Savannah River Site has a longstanding and well earned reputation for safety. The men and women who work at SRS have been safely and efficiently handling plutonium since the 1950's and there is no reason for the Department of Energy to turn anywhere other than to a proven commodity.

In various documents published by the Department of Energy, that agency has acknowledged the suitability of the Savannah River Site for plutonium disposition missions. I refer to a 1997 Environmental Impact Statement, the Department of Energy referred to SRS as "a plutonium-competent site with the most modern, state-of-the-art storage and processing facilities, and ... a site with the only remaining large-scale chemical separation and processing capability in the DoE complex." In a 1996 Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management regarding Pit Manufacturing at Pantex, DoE stated, "Plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium

SCD44

SCD44–1 **Alternatives**

DOE acknowledges the Senator's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

UNITED STATES SENATE
HONORABLE STROM THURMOND, SOUTH CAROLINA
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capabilities.

Simply put, there is no better place in the United States to locate pit disassembly than the Savannah River Site, a modern facility with a proven safety record, and capable of carrying out the demanding requirements of plutonium disposition. This is an assessment with which officials at the Department of Energy agree.

Mr. Rudy, though your superiors at the Department of Energy are already well aware of my commitment to seeing pit disassembly being located at the Savannah River Site, I could not allow the opportunity to go "on the record" one more time to pass. I appreciate your including my comments in the proceedings of today's meeting. 1

With kindest regards and best wishes.

Sincerely,

Strom Thurmond

Strom Thurmond

ST/jd

SCD44

UNITED STATES SENATE
MAURY LANE FOR THE HONORABLE ERNEST F. HOLLINGS, SOUTH CAROLINA
PAGE 1 OF 6

STATEMENT FOR PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT -- NORTH AUGUSTA MEETING

Good evening, my name is Maury Lane. I work for Senator Hollings' office and have been asked by the Senator to convey his strong support for this new mission for the Savannah River Site.

This is actually a extremely nice moment for me. As many know, before I started with Sen. Hollings I worked for Westinghouse, specifically on ensuring that we had enough federal appropriations to operate the site and to work with the local community to find new missions for the site.

When I first I began at Westinghouse it was crystal clear that the Savannah River Site had world-class employees with world-class skills with a world-class safety record. Let me tell you, DOE knows there are no harder working, smarter, safer employees at any DOE site. 1

If Senator Hollings were here, he would say one thing

The Savannah River Site is the ONLY site for the Immobolizations, MOX Fuel and Pit Dissassemby and Conversion because there is no leadership that can do it better, cheaper, safer and quicker than the SRS site.

Why is SRS the right choice? Because the community

SCD16

SCD16–1 **Alternatives**

DOE acknowledges the Senator's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

at SRS has assembled the safest and most capable workforce in the department; the Site has the facilities and infrastructure needed; it is the cheapest option available, and, as you are seeing here today, it enjoys the local community's complete support.

DOE should know what everyone in Aiken already knows: SRS has the safest and best trained workers in the DOE complex. The site has been successfully handling plutonium since it was created in the 1950s. DOE itself called SRS, " a plutonium-competent site, with the most modern, state-of-the-art storage and processing facilities." 1

As a member of the Senate Energy and Water Appropriations Subcommittee, Senator Hollings is keenly aware of the great expense associated with handling sensitive nuclear materials such as plutonium.

That is why we have been able to ensure that no significant layoffs will occur in 1998 or 1999. In the year 2000, we should be adding new jobs with the new MOX mission through the next five years. That is a great change from the difficult times of down-sizing.

Sen. Hollings has told DOE officials time and time again that it makes no sense to introduce plutonium into

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a site which does not have plutonium infrastructure or plutonium handling capabilities. To duplicate SRS's experience, know-how, and plutonium handling facilities would take years of work and cost millions of dollars. This is a luxury DOE does not enjoy.

Senator Hollings not only believes it would be a mistake, but DOE officials know too. In fact, DOE has said in the past, Quote "Plutonium (should) not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities." Unquote Senator Hollings agrees with this conclusion. It should follow that the Pit Disassembly and Conversion Facility should not be built in a site which does not have plutonium infrastructure. The risks would be too great. 1

Further, it is estimated that consolidating all three of the plutonium disposition components at SRS would save taxpayers roughly $1.6 billion over the life of the program. This is a savings we cannot ignore.

As I am sure DOE officials can see from this meeting, the Aiken/Augusta community supports this site and

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supports the addition of all of the plutonium disposition missions. When DOE brings these missions to South Carolina, it will know the depth of this support and the dedication of this community to DOE missions. In addition, the South Carolina Congressional delegation has the political will and power to secure these missions and keep them fully funded. I challenge DOE to find political leadership any where else which is working as hard as this delegation ~~is at SRS~~.

The merits lie with SRS, but how do we ensure that DOE sees these advantages? I know Senator Hollings has pledged to do everything he can to "show DOE the light." 1
I was in the room on several occasions when Senator Hollings called then Energy Secretary Pena to lobby for SRS and the MOX Fuel mission.

The Senator made it clear that the Savannah River Site was the only site for the MOX fuel facility. I know the Secretary got tired of hearing from the Senator.

In fact, it was probably a great relief for Secretary Pena when he called the Senator to tell him ~~his arguments had been convincing and~~ that the MOX plant was coming to S.C. I know Senator Hollings was grateful the Secretary

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saw it his way.

Now, Senator Hollings has more work to do. With the new Secretary of Energy, Bill Richardson, the Senator has more wearing down to do. In fact, Sen. Hollings has already heated up the lines between his office and the Secretary's. I know the Senator has already contacted the Secretary and has begun working to ensure Secretary Richardson chooses SRS as the site of the Pit Disassembly and Conversion Facility. There is no doubt Senator Hollings will put all 32 years of his Washington experience and his position as the senior Democrat on the Energy and Water Appropriations Subcommittee to work as he pushes DOE to do what is right and choose SRS as the Consolidated Plutonium Disposition Site. 1

Everyone at DOE should know this. The Savannah River Site has the capability to handle these missions in the safest, most cost- effective, and most efficient manner. Locating all three components here should be a simple decision, but simple decisions are not always made easily. I ~~can~~ am sure Senator Hollings will make it his business to show the Secretary and the Department of Energy know just how easy this decision can be -- especially if SRS is chosen as the site.

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UNITED STATES SENATE
MAURY LANE FOR THE HONORABLE ERNEST F. HOLLINGS, SOUTH CAROLINA
PAGE 6 OF 6

Speaking for Senator Hollings, I can tell you he looks forward to working with DOE over the next several months to make sure the Department sees the importance and the wisdom of consolidating all three missions here at SRS. I thank the Aiken/Augusta community for their outstanding support and hospitality and I thank you for your attendance and support. 1

SCD16

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE LINDSEY O. GRAHAM, SOUTH CAROLINA
PAGE 1 OF 1

LINDSEY GRAHAM
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PLUTONIUM DISPOSITION AT SRS

I continue to support the Department of Energy's current dual-track Plutonium Disposition plan. I must reduce the risk of proliferation of these materials to rogue states or terrorist organizations and I must do this in a responsible, cost-effective manner. The people of the Central Savannah River Area (CSRA) want to be part of the solution and I believe that Savannah River Site can and should play a vital role in disposing of this excess material.

The Department of Energy has made the right decision in selecting SRS and its skilled experienced work force as the MOX fuel fabrication site. I hope they continue to show that good judgement by selecting the most qualified, least expensive alternative for pit disassembly and conversion, the Savannah River Site. As I've said before, I have the luxury of having common sense and cost on my side, but, unfortunately, that doesn't always carry the day in Washington. It is incumbent upon us to prove this to DOE.

Savannah River Site is the best alternative for pit disassembly and conversion for the following reasons:

- Consolidating the three constituent parts of MOX (disassembly, conversion, and fabrication) at a site with existing plutonium infrastructure could save the Department and ultimately the taxpayers $1.6 billion.
- The unparalleled community support for this program throughout South Carolina and Georgia, especially in the Aiken SC-Augusta GA area as evidenced by letters of support from Governor Beasley, numerous resolutions passed by local governments, several letters of support from the entire congressional delegation, and the appearance of so many Members of Congress here today. 1
- SRS has unparalleled expertise in dealing with plutonium and currently has the necessary plutonium infrastructure in place, an infrastructure that Pantex does not have.
- In the September 1996 Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management, the department wisely and correctly decided not to introduce plutonium oxide into a site that does not currently have a plutonium infrastructure.

> "Plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities."

Introduce plutonium into a site, like Pantex, that is already clean would create yet another Environmental Management cleanup problem.

- South Carolina has long been a supporter of the Department of Energy programs dating back to the Atomic Energy Commission and hopes to continue that relationship.

SCD49

SCD49–1 **Alternative**

DOE acknowledges the Congressman's support for the surplus plutonium disposition program at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE LINDSEY O. GRAHAM, SOUTH CAROLINA
PAGE 1 OF 1

LINDSEY GRAHAM
3D DISTRICT, SOUTH CAROLINA
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June 18, 1997

Mario P. Fiori
Manager
U. S. Department of Energy
Savannah River Operations Office
PO Box A
Aiken, South Carolina 29802

Dear Dr. Fiori:

I regret that I will not be able to personally attend the U. S. Department of Energy (DOE) sponsored workshops regarding plutonium; however, I hope your workshops prove to be productive and educational for those who participate.

I feel Savannah River Site (SRS) is the logical site for the surplus plutonium disposition mission. SRS possesses a dedicated workforce that is experienced in handling plutonium combined with modernized facilities, support infrastructure, and tremendous community support.

I am very supportive of DOE's proposed dual track for plutonium disposition. Pursing both disposal options will give the U. S. the flexibility to select the appropriate disposal technology for the different grades of plutonium. The purity of the weapons-grade plutonium makes it well suited for use in mixed-oxide (MOX) fuel. Immobilizing other grades of plutonium could be the best option for disposing of this particular material. 1

Please accept my best wishes for a successful day of workshops and relay my sincerest regrets that I am not able to join you.

Sincerely,

Lindsey O. Graham
Member of Congress

LOG:rat

SCD105

SCD105–1 **Alternatives**

DOE acknowledges the Congressman's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

FLOYD SPENCE
2d District, South Carolina

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Congress of the United States
House of Representatives

June 19, 1997

COUNTIES
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Allendale
Barnwell
Beaufort*
Calhoun*
Colleton*
Hampton
Jasper
Lexington
Orangeburg*
Richland*
*Parts of

CRAIG METZ
Chief of Staff

Mr. Howard R. Canter
Acting Director
Office of Fissile Materials Disposition
United States Department of Energy
Post Office Box 23786
Washington, D.C. 20026-3786

Dear Mr. Canter:

I would like to commend the Office of Fissile Materials Disposition for having public meetings concerning the proposed "Surplus Plutonium Disposition Environmental Impact Statement" (SPD EIS). These forums provide a valuable opportunity for concerned citizens to have input into the decision making process in this important matter. It is a pleasure for me to join those who are commenting on the capabilities of the Savannah River Site for conducting the United States Department of Energy surplus plutonium disposition mission.

The Savannah River Site is ideally suited for the surplus plutonium disposition mission. It possesses the only operating large-scale plutonium processing facilities in the United States, and it has a work force that is experienced in the handling of plutonium. It also conducts the only certified training program in our Country for this specialized work. Recently, facilities at the Savannah River Site, that would be utilized in performing the surplus plutonium disposition mission, have been modernized and, under oversight from the Department, as well as the Defense Nuclear Facilities Safety Board, the staff has completed a readiness review for restarting those facilities. It is also my understanding that the Savannah River Site has the best plutonium handling safety record of the Department's facilities. 1

It is clear that the Savannah River Site has the complete range of infrastructure that is needed to carry out the proposed plutonium mission, as well as a highly skilled work force. Additionally, there is strong support for this mission from the communities surrounding the Site. I urge the Department to give most careful consideration to the excellent capabilities of the Savannah River Site for conducting the surplus plutonium disposition mission.

Sincerely,

FLOYD D. SPENCE
Member of Congress

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SCD107

SCD107–1 **Alternatives**

DOE acknowledges the Congressman's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE FLOYD D. SPENCE, SOUTH CAROLINA
PAGE 1 OF 3

AUG. 13. 1998 10:17AM

Jim Parham
DOE off. with
Cong. Norwood

STATEMENT BY CONGRESSMAN FLOYD D. SPENCE
FOR THE UNITED STATES DEPARTMENT OF ENERGY PUBLIC MEETING
ON THE SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT
THURSDAY, AUGUST 13, 1998
NORTH AUGUSTA COMMUNITY CENTER - NORTH AUGUSTA, SOUTH CAROLINA

It is a pleasure for me to join those who are commenting today on the proposed sites for conducting the United States Department of Energy surplus plutonium disposition mission. I would like to commend the Office of Fissile Materials Disposition for having five (5) public meetings concerning the draft "Surplus Plutonium Disposition Environmental Impact Statement" (SPD EIS). These meetings provide a valuable opportunity for concerned citizens to have input into the decision making process in this important matter.

As the Congressman for the Second District of South Carolina, I am proud to represent an area of our State, which includes part of the Savannah River Site (SRS/Site), as well as counties that are heavily impacted by the Site. Also, as the Chairman of the House Committee on National Security, I am keenly aware of the crucial role that the Plutonium Disposition Program plays in our national security posture, which is of a high priority to the Congress.

The Department of Energy is currently assessing the capabilities of two locations, the SRS and the Pantex Plant, to carry out the first component of the Plutonium Disposition Program, that of pit disassembly and conversion. The Department is to be commended on the earlier decision to locate the Mixed-Oxide Fuel (MOX) Fabrication Facility at the SRS and I would like to note at this point that, in the announcement of that decision, Former Secretary Pena put emphasis on the particularly ~~[illegible]~~ the assets of the existing infrastructure and the expertise of the work force in the handling of plutonium at the SRS.

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SCD18

SCD18–1 **Alternatives**

DOE acknowledges the Congressman's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility and approach to surplus plutonium disposition in the SPD EIS ROD.

the handling of plutonium at the SRS. These assets are equally as important to pit disassembly and conversion.

The SRS is ideally suited for the surplus plutonium disposition mission. It possesses the only operating large-scale plutonium processing capabilities in the United States, and the facilities that would be utilized in performing the surplus plutonium disposition mission have been modernized recently. Also, under oversight from the Department and the Defense Nuclear Facilities Safety Board, the highly skilled staff at the SRS has completed a readiness review for the continued operations of those facilities.

Another significant factor to consider is that of safety. The SRS is acknowledged as the safest Department of Energy site, with the best plutonium handling safety record of the Department's facilities. The American public recognizes that there are serious risks related to the handling of plutonium. Therefore, it is vital that a specially trained and experienced work force be entrusted with this responsibility. The SRS has such a work force. 1

Economy is also very important. In the Department's recent cost report, it is submitted that locating the pit disassembly and conversion mission at the SRS would save taxpayers at least $60 million. Furthermore, I have been advised that the potential savings could reach $715 million, using the +/- 40 percent factor. As a Member of Congress, who is striving to achieve fiscal responsibility and to maintain a strong national defense, I encourage the

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UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE FLOYD D. SPENCE, SOUTH CAROLINA
PAGE 3 OF 3

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Department to recognize the impressive savings benefits that are associated with locating this mission at the SRS.

In a joint letter to then Secretary Pena, on June 23, 1998, the entire South Carolina Congressional Delegation enthusiastically endorsed the location of the pit disassembly and conversion mission at the SRS. Additionally, there is strong support for this mission from the communities surrounding the Site, as well as throughout the ~~Palmetto~~ State. of S. C.

In conclusion, it is clear that the SRS has the complete range of infrastructure and a highly skilled work force to meet the needs of the pit disassembly and conversion mission. Also, the SRS has an outstanding record of safely and efficiently handling plutonium, since the 1950's. In making a final decision in this matter, I urge the Department to carefully consider the impressive capabilities of the SRS. The ~~SPD EIS~~ Surplus Plutonium Disposition Environmental Impact Statement, as well as the associated comments that have been obtained through this series of public meetings, should serve the Department well in this regard. As in the assessment that led to the Department's decision to locate the MOX Facility at the SRS, I am convinced that, when completely evaluated on its merits, the SRS is the logical choice to be the site for the pit disassembly and conversion mission. Thank you for providing me with this opportunity to address this issue today. 1

SCD18

UNITED STATES SENATE, HONORABLE KAY BAILEY HUTCHINSON AND HONORABLE PHIL GRAMM, TEXAS
PAGE 1 OF 2

KAY BAILEY HUTCHISON
TEXAS

COMMITTEES:
APPROPRIATIONS
COMMERCE, SCIENCE, AND TRANSPORTATION
RULES AND ADMINISTRATION

United States Senate
WASHINGTON, DC 20510-4304

August 11, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
c/o SPD EIS
P.O. Box 23786
Washington, D.C. 20026-3786

Attention: Mr. Bert Stevenson, NEPA Compliance Officer

Re: Comment on DOE's Draft Surplus Plutonium Disposition Environmental Impact Statement

Dear Mr. Stevenson:

Thank you for the opportunity to comment on the Department of Energy's (DOE) Draft Surplus Plutonium Disposition Environmental Impact Statement (SPD EIS).

First and foremost, any current and future functions at Pantex must be conducted in a safe and environmentally sound manner. Our first priority is to ensure that expansion at Pantex does not impair the health or safety of area residents or have an adverse effect on the environment. This must be a prerequisite to any current or future activities at Pantex. 1

We are aware that DOE has selected the Savannah River Site (SRS) as the preferred alternative for the MOX fuel fabrication facility and is considering SRS, along with Pantex, as the location for the disassembly/conversion mission. We do not understand DOE's decision to site the MOX facility at SRS, since Pantex remains the best and most cost-effective site for that mission. 2

However, with regard to the proposed plutonium disposition actions and alternatives discussed by the DOE in the SPD EIS, we are concerned that locating the conversion mission at a site other than Pantex would unnecessarily increase any safety hazards of dealing with plutonium. Such a decision would also ignore the facts that make Pantex the most economically rational site.

Pantex is uniquely suited to assume this new function. Pantex currently safeguards more than 8,000 surplus pits and has a long history of effectively and safely handling and securing pits and the related infrastructure. Furthermore, given the current weapons disassembly and storage functions at Pantex, disassembly and conversion of the pits already located there is consistent with the historic mission of the plant. 3

Web–http://www.senate.gov/~hutchison/
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TXD52

TXD52–1 General SPD EIS and NEPA Process

DOE acknowledges the Senators' support for siting the pit conversion and MOX facilities at Pantex. The environmental impacts of siting the proposed surplus plutonium disposition facilities at Pantex are summarized in Section 2.18.1 and analyzed in various sections in Chapter 4 of Volume I. The analyses show that such action would not have a major effect on the health, safety, and environmental resources in the Amarillo area.

TXD52–2 Alternatives

As indicated in Section 1.6, SRS is preferred for the MOX and pit conversion facilities because these activities complement existing missions and take advantage of existing infrastructure and staff expertise. In addition, SRS has extensive experience with plutonium processing. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TXD52–3 Alternatives

In determining its preference, DOE also considered the transportation requirements for each alternative, including the shipment of surplus plutonium both in the form of pits (Alternative 3) and plutonium dioxide (Alternative 5) from Pantex to SRS. The transportation risks and costs would be slightly higher for Alternative 3 because the required number of SST/SGT shipments are higher for pits than plutonium dioxide. The radiological risk for both alternatives is about the same. All the candidate sites were considered to have adequate safeguards and security systems in place, as well as the capability to perform the necessary radiation monitoring and dosimetry.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost

UNITED STATES SENATE, HONORABLE KAY BAILEY HUTCHINSON AND HONORABLE PHIL GRAMM, TEXAS
PAGE 2 OF 2

There are a number of other budgetary and policy reasons why DOE should site disposition functions at Pantex. First, due to its lower labor costs and utility rates, as well as its abundant water and land availability, Pantex clearly is more cost-effective than SRS over the life of the program. Second, transportation of plutonium in non-classified form (after disassembly and conversion at Pantex) to the SRS is far preferable to the perils that would be incurred by unnecessarily shipping plutonium in a weapons-ready form. Third, Pantex has the necessary safety, security, and surveillance capabilities to accommodate an expanded role. Finally, the Pantex plant enjoys unparalleled public and congressional support for new missions and could provide them at the lowest cost to the taxpayer. 3

In summary, we strongly believe that Pantex should be selected for the pit disassembly and conversion facility as soon as possible so that our country and DOE's plutonium disposition mission in general can benefit from Pantex's cost, safety, and productivity record. There is not another facility in the world that can perform this mission at the same caliber of Pantex.

Thank you for the opportunity to comment on this decision-making process.

Sincerely,

PHIL GRAMM
United States Senator

KAY BAILEY HUTCHISON
United States Senator

TXD52

estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following sites: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE MAC THORNBERRY, TEXAS
PAGE 1 OF 3

MAC THORNBERRY
13TH DISTRICT
TEXAS

Congress of the United States
House of Representatives

COMMITTEE ON
NATIONAL SECURITY

COMMITTEE ON
RESOURCES

JOINT ECONOMIC
COMMITTEE

Statement of Representative Mac Thornberry

at the Public Hearing on the

Department of Energy Surplus Plutonium Disposition
Draft Environmental Impact Statement

August 11, 1998

I would first like to thank, once again, the Department of Energy for holding this important public hearing on where to build the new facilities for the plutonium disposition program. This tremendously important program will allow our country to ensure that surplus weapons material in the former Soviet Union will not be used by any country to again threaten the security of the United States. I commend the Department, and its dedicated public servants, in working to secure such a future.

Before I turn to the specific issue at hand -- siting the pit disassembly and conversion facility at the Pantex Plant -- I want to provide some additional context. Since I came to Congress to represent this district three and a half years ago, one of my primary interests and concerns have been maintaining and strengthening our nation's nuclear weapons complex (because nuclear weapons remain the foundation of our defense posture). But at the same time, I have been heavily engaged in aggressively pursuing nonproliferation policies that serve to reduce the threat of nuclear war world wide. I am fortunate to represent a facility that has an opportunity to serve both of these important interests.

Acting upon these interests, I was able to travel to Russia last year to visit with their Minister of Atomic Energy and others about both US and Russian interests in plutonium disposition. Among the most important conclusions I drew from the experience was the need for our country to achieve our goals of Russian plutonium disposition as quickly as possible. I believe the United States has a particular and indefinite window of opportunity in which to act to help Russia eliminate the products of the Cold War that could still threaten us today. Neither I nor anyone else can know for sure when that window will close, or when the warming of US-Russo relations will once again cool. I believe we must take advantage of the opportunity that is presented to do as much as possible, as quickly as possible, and as effectively as possible. 1

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TXD04

TXD04–1 **Nonproliferation**

DOE recognizes the urgency of the disposition of Russian surplus plutonium and is working on many fronts to encourage timely progress. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain surplus plutonium disposition activities in order to encourage the Russians and set an international example.

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE MAC THORNBERRY, TEXAS
PAGE 2 OF 3

As you are well aware, the Panhandle of Texas proudly possesses a long and superb record of service in support of our country's national security. In the last several years we have endured, if not enjoyed, a similarly long series of public comment sessions, briefings, and hearings on the future of Pantex and the role it will continue to play. On each of these occasions, our citizens have been pleased and proud to demonstrate our appreciation for the important work Pantex performs, our enduring interest in a safe environment, and our overwhelming public support for the Plant and its future missions.

And we come here again today to strongly urge you to place the plutonium pit disassembly facility at Pantex. Pantex is the common-sense choice--not because it is the best thing for our area, but because it is the best thing for our country. There are four key reasons for this:.

1. Pit disassembly is consistent with the historic mission of Pantex. For over 40 years, Pantex has been the Department's primary facility for taking apart weapons and demilitarizing the component parts. Pit disassembly is a natural and common-sense extension of that mission. Because we have always done this type of work, we have a safe and solid history of strict production operations management. No current site in the complex has handled more pits, more times than Pantex. 2

2. Pantex has the pits now. This point is as significant as it is obvious.

- **Transportation of the pits would be a logistical nightmare.** The pit packaging and unpackaging expertise that exists today only at Pantex would have to be recreated at Savannah River at substantial cost. Furthermore, such a decision would put additional and unnecessary requirements on the Department's Transportation and Safeguards Division.

- **Transportation of the pits would create unnecessary and additional proliferation risk.** Shipping over 15,000 plutonium pits across country in their classified weapons configuration is unnecessary and irresponsible. By performing pit disassembly at Pantex and then shipping demilitarized and unclassified plutonium oxide, the Department can eliminate such unnecessary risk.

- **Transportation of the pits would create unnecessary and additional political risk.** Many political, budgetary and diplomatic issues stand as obstacles to quickly commencing the plutonium disposition strategy. Siting pit disassembly at Pantex allows the Department to move out aggressively on demilitarizing surplus weapons material in place and putting that material under bilateral inspection in a manner which enhances our arms control relationship with Russia. This important first step should occur independent of, and far in advance of, the politically and economically contentious MOX disposition process. As such, Pantex is the more affordable and flexible site for this long interim step before final disposition. 3

2

TXD04

TXD04–2 **Transportation**

DOE acknowledges the Congressman's support for siting the pit conversion facility at Pantex and concern for the security of offsite shipment of pits. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS. Section 2.4.4.1 discusses safety measures taken for shipment of pits. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TXD04–3 **DOE Policy**

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself.

The remainder of this comment is addressed in response TXD04–1.

3. Pantex enjoys unparalleled community and political support. The Amarillo community and its elected officials are universal in their support of the Pantex Plant. Repeated public polling has shown support for the plant to be in the 80% range among the residents of the Amarillo area. Furthermore, the Plant enjoys the strong bi-partisan support of the 32-member-strong Texas Congressional Delegation. The Department must have broad based political support for its plutonium disposition strategy to succeed. Placing pit disassembly at Pantex only strengthens your hand.

4. Pantex is ready to accept the mission. Because the plant already enjoys extensive and modern support facilities and capabilities, no other site could take on the pit disassembly mission at a lower cost. Pantex has the most modern safeguards and security system, and a world-class and highly decorated guard force. The plant's emergency management system was recognized as the "Standard Setter" after a joint assessment by Defense Programs and Nonproliferation and National Security. Since this system already has in place integrated safety elements for plutonium operations, it could easily accommodate the new pit disassembly mission. 4

In summary, siting the pit disassembly mission at Pantex is the common-sense approach. It is consistent with what we have always done and allows the Department to avoid the cost and problems of having to transport the pits across the country. Finally, the workers at the plant, the members of our community, and the political leadership of our State are ready and willing to proudly accept this mission and begin a new partnership with your Department.

3

TXD04

TXD04–4 **Alternatives**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

The remainder of this comment is addressed in response TXD04–2.

UNITED STATES HOUSE OF REPRESENTATIVES
HONORABLE MAC THORNBERRY, TEXAS
PAGE 1 OF 1

MAC THORNBERRY
13TH DISTRICT
TEXAS

Congress of the United States
House of Representatives

COMMITTEE ON NATIONAL SECURITY
COMMITTEE ON RESOURCES
JOINT ECONOMIC COMMITTEE

August 18, 1998

Ms. Laura Holgate
Director
Office Of Fissile Materials Disposition
Department of Energy
1000 Independence Ave., SW
Washington, D.C. 20585

Dear Laura,

You may recall that during the hearing last week in Amarillo, a number of speakers made the point that over the past two years the Savannah River Site had suffered 99 reportable safety incidents while Pantex had only experienced 10 reportable incidents. Although SRS employs roughly 5 times as many people as Pantex and each site has a very different mission, SRS had 10 times as many reported safety incidents.

I do not doubt that the SRS workforce is very capable, but I do want to emphasize what I believe is a very unique production and safety culture at Pantex. For over forty years, the personnel at Pantex have developed and refined a very professional work ethic characterized by strict adherence to safety rules. That is one of the reasons I believe the work should be performed at Pantex. 1

I trust you will consider the enclosed documents detailing this information as you analyze the siting decision.

Sincerely,

Mac Thornberry
Member of Congress

WMT:ac

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MD148

MD148–1 **Human Health Risk**

DOE acknowledges the Congressman's support for Pantex. The proposed surplus plutonium disposition facilities would be designed, constructed, operated, and deactivated in accordance with applicable Federal, State, and local environmental, safety, and health requirements. Specifically, 10 CFR 835, *Occupational Radiation Protection* (1995), requires the implementation of employee radiation safety indoctrination, education programs, and exposure-monitoring programs. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including occurrence reporting records of the candidate sites), technical and cost reports, national policy and nonproliferation considerations, and public input. (The Congressman's letter was received without the enclosed documents.)

Surplus Plutonium Disposition
Draft Environmental Impact Statement
Public Meeting August 4, 1998 Richland, WA

As part of the public scoping for the Surplus Plutonium Disposition Environmental Impact Statement, I urged the Department of Energy to compare and indicate costs of utilizing existing facilities such as those at Hanford versus the construction of new facilities. In addition, I stressed the importance of addressing timing considerations and comparisons to bring existing or new facilities on line in the most expeditious and economic way.

This draft EIS fails to adequately address cost or timing comparisons for the location alternatives. It does, however, eliminate the Hanford Site on the basis that the Department of Energy determined Hanford's cleanup mission is critical and should remain its top priority.

I do not disagree that cleanup remain a priority at Hanford, as it should be at all DOE sites. However, I fear that the Department's decision to eliminate Hanford as an alternative location is fiscally irresponsible and will most certainly impact future available cleanup funding. Hanford's existing multipurpose Fuels and Materials Examination Facility (FMEF), could afford considerable cost savings, as determined by the National Academy of Sciences and DOE's 1996 cost estimate. The current cost analysis is in conflict with those previous analyses. This disregard for the true overall costs of plutonium disposition will be detrimental in attempting to obtain sufficient funding levels for this and other important DOE activities, including cleanup at Hanford and all Department of Energy sites. 1

Furthermore, time is critical in reducing the availability of excess weapons-grade materials, therefore utilization of existing facilities would be beneficial in bringing the disposition project in line.

It is imperative that credible cost and timing analyses be used in the decision making process for plutonium disposition. I urge the Department of Energy to reevaluate cost and timing factors for its location alternatives in the Record of Decision.

SLADE GORTON
UNITED STATES SENATOR

WAD20

WAD20–1 **Cost**

This comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

UNITED STATES SENATE, HONORABLE SLADE GORTON
UNITED STATES HOUSE OF REPRESENTATIVES, HONORABLE DOC HASTINGS, WASHINGTON
PAGE 1 OF 2

Congress of the United States
Washington, DC 20515
August 3, 1998

The Honorable Bill Richardson
Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Secretary Richardson:

Congratulations on being confirmed to your new appointment as Secretary of Energy. Among the many issues you will be facing that deal with our state, this letter pertains to both fiscal responsibility and the economic diversification of the Hanford site.

The Department of Energy (DOE) recently announced it eliminated the Hanford site as an alternative in determining preferred locations for two facilities needed to implement the nation's plutonium disposition strategy. The Savannah River site in South Carolina is the preferred site for a plant to fabricate plutonium into mixed oxide (MOX) fuel, while both the Savannah River site and Pantex Plant in Texas are preferred to build a pit disassembly and conversion plant. The Hanford site was eliminated from consideration in the Environmental Impact Statement (EIS) because, according to DOE, "Hanford's cleanup mission is critical and should remain its top priority."

We do not disagree that cleanup efforts remain the priority at Hanford, however, we fear that the Department's decision is fiscally irresponsible and the decision to eliminate Hanford as an alternative location will most certainly impact the future availability of cleanup funding. Since Hanford has an exiting multi-purpose facility know as the Fuels and Materials Examination Facility (FMEF), more than $300 million could be saved if plutonium disposition activities were located there. Time is critical in reducing the availability of excess weapons-grade materials, therefore utilization of existing facilities would be beneficial in bringing the disposition project on-line.

Last July, as part of the public scoping hearing for the Surplus Plutonium Disposition project, we urged the Department to thoroughly analyze and compare not only each of the possible sites' technical feasibility, but the costs of both capital construction and operations of disposition activities. We asked that the EIS compare and indicate costs of using existing facilities such as those at Hanford versus the construction of new facilities. We also requested the Department address timing considerations and comparisons to bring exiting or new facilities on-line and determine the most expeditious and economical way to proceed. It is obvious by the selection of the preferred alternatives that the Department did not consider either costs or timing. Additionally, the EIS does not appear to accurately reflect cost comparisons of the alternatives. This disregard for overall costs of plutonium disposition will be detrimental in attempting to 1

WAD03

WAD03–1 **Alternatives**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. This comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following sites: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

DOE expects that the time required to build new facilities or to extensively remodel existing facilities would be about the same. At most, it is estimated that the remodeling approach could save a few months of the 3-year construction schedule.

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

obtain sufficient funding levels for this and other important DOE activities, including cleanup at Hanford.

In addition, we are becoming increasingly concerned that this same flawed process of analysis will be used in evaluating the use of the Fast Flux Test Facility (FFTF) for interim or back-up tritium production. Again, using this existing, federally-owned facility has the potential to dramatically reduce federal expenditures, freeing additional resources for what we all agree should be Hanford's principal mission: environmental cleanup. Additionally, coming on the heels of the Department's plutonium disposition decision, we need to emphasize that the Department should not make the mistake of granting one site in the DOE complex all of the new missions. That would ignore the significant advantages of diversification and utilization of existing resources that Hanford offers to the nation and the region. Therefore, we expect the FFTF will be treated fairly in the Department's analysis of tritium production needs. 1

Please provide us with the cost comparisons of utilizing existing facilities at Hanford versus the construction of new facilities for plutonium disposition. Additionally, we urge you to seriously consider cost and timing factors in determining locations for plutonium disposition in the Record of Decision. Our staffs have access to extensive cost and schedule information, so if there is anything we can do to help with your decision, please let us know.

Sincerely,

SLADE GORTON
United States Senator

DOC HASTINGS
Member of Congress

WAD03

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RICHARD E. SANDERSON, WASHINGTON, D.C.
PAGE 1 of 14

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 16 1998

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Mr. Howard R. Canter
Acting Director
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

Dear Mr. Canter:

In accordance with the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) and Section 309 of the Clean Air Act, the Environmental Protection Agency (EPA) has reviewed the Department of Energy Surplus Plutonium Disposition Draft Environmental Impact Statement (SPD EIS). The stated purpose and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner.

The SPD EIS addresses the extent to which each of two plutonium disposition approaches [immobilization and conversion to mixed oxide (MOX)] would be implemented and analyzes candidate sites for plutonium disposition facilities, as well as alternative technologies for immobilization. The SPD EIS analyzes 50 metric tons (t) of surplus weapons-usable plutonium, which is primarily in the form of pits, metals, and oxides (p. S-1). The document presents a total of 23 alternatives plus a No Action Alternative that evaluate options for siting, construction, operation, and ultimately decontamination and decommissioning (D&D) of three types of plutonium disposition facilities: a pit conversion facility, an immobilization facility, and a MOX facility. A total of four pit conversion candidate sites, two immobilization candidate sites, and four MOX candidate sites are evaluated. In addition to the presented alternatives, the EIS separately evaluates the establishment of a MOX lead assembly facility at five sites and a postirradiation examination (PIE) facility at two sites. The preferred alternatives (Alternative 3A or 5A) include an immobilization facility at the Savannah River Site (SRS) near Aiken, South Carolina, a MOX facility at SRS, and a pit conversion facility at either SRS or Pantex near Amarillo, Texas. No lead assembly for MOX or PIE site preference is indicated. The preferred alternative stipulates a hybrid disposition method in which approximately 17t would be immobilized in a ceramic form, placed in cans, and embedded in large canisters containing high-level vitrified waste for ultimate disposal in a geologic repository pursuant to the Nuclear Waste Policy Act (NWPA). Approximately 33t would be used to fabricate MOX fuel, which would be irradiated in existing domestic commercial reactors. The resulting spent fuel would be placed in a geologic repository pursuant to NWPA (pp. S-8 and S-9).

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FD325

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RICHARD E. SANDERSON, WASHINGTON, D.C.
PAGE 2 of 14

The EIS provides adequate analysis and appropriate mitigation measures for most of the proposed activities and resource areas that are analyzed except for those discussed below. The models used for air quality impact analysis (ISCST3), radiological impacts (GENII computer code), and accident impacts (MACCS2) are appropriate and were used correctly. Assumptions used in the modeling and impact analyses were consistent with supporting site information, and appropriate given the resource areas and hazardous materials associated with the proposed action. However, the EIS appears deficient in the following areas. 1

The EIS does not fully analyze all activities that are part of the proposed action or that may affect proposed alternatives and impact analysis. For example, MOX fuel reactor impacts, and impacts from transuranic (TRU) waste processing to meet Waste Isolation Pilot Plant (WIPP) waste acceptance criteria at Los Alamos National Laboratory (LANL).

The EIS obscures the central choice of what do with the plutonium (dispose all or dispose some and convert remainder to MOX) with a proliferation of alternatives and subalternatives. It has exhaustive analysis of certain details, but does not address other relevant issues, or refers to other studies for key pieces of information. To make the environmental choices clear, the EIS needs to include a focused comparison of the alternatives that DOE favors (#3a–Use SRS for pit disassembly, plutonium conversion and immobilization and MOX fuel fabrication or #5a--Do pit disassembly at Pantex, everything else at SRS) with the parallel options that dispose of all the plutonium and do not create MOX. (Alternatives 12a and 12c). This should include a lifecycle analysis of the flow of material to and through the DOE operations and, in the case of MOX fuel, through commercial reactors to temporary storage to disposal. 2

The analysis of these key alternative (e.g., 3a versus 12a) should assemble all the relevant information including costs and the consequences of disposal of the fuel. To leave these as separate studies to be completed later (see page 1-5) is to leave the public, outside commentators, and perhaps even DOE decision-makers with limited ability to view the larger picture before a decision must be made.

There is insufficient analysis of the impacts of the use of MOX fuel at commercial reactors, both in terms of economic impacts on the commercial reactor fuel market, and impacts of on-site storage of spent MOX fuel assemblies at commercial reactors. The SPD EIS should include an analysis of the economic impacts of the use of MOX as substitute fuel. The following statement in the introduction is unclear: "A number of commentators expressed concern over the market viability of alternative reactor fuels, even though MOX fuel would not be sold on the open market"(page 1-5). We believe that the use of 33 tons of plutonium to make MOX fuel for use in reactors will have some displacement effect even if it is given away and not sold. 3

We believe that the data presented do not fully support the selection of the DOE preferred option. The analysis suggests that the environmental impacts of converting part of the plutonium to MOX are consistently greater than disposing of all the metal. Transuranic (TRU) and Low Level Waste (LLW) are about 10% greater, human health risks are slightly greater, the distance that material must travel is 65% greater. Costs are not presented, and the foreign affairs benefits are vague, presumably because of security or diplomatic concerns. Given this, it is important that 4

FD325

FD325–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views and has revised this SPD EIS in response to comments. Section 4.28 was revised to include the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel. Section 4.27.4.2 was revised to provide further details on TRU waste management at LANL based on information from the *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory* (DOE/EIS-0238, January 1999). DOE believes that this EIS reflects a thorough analysis of the environmental impacts of those activities involved in implementing the proposed action.

FD325–2 **General SPD EIS and NEPA Process**

One of the key decisions of this SPD EIS is siting the proposed surplus plutonium disposition facilities in accordance with decisions made in the *Storage and Disposition PEIS*. DOE believes that the range of alternatives meets the letter and spirit of NEPA and 40 CFR 1502.14. The level of detail is consistent among all of the alternatives. DOE believes that all relevant issues have been addressed, and that the inclusion of information by reference has been done in accordance with 40 CFR 1502.21. An even comparison was provided of all the alternatives, not just the preferred alternatives, to comply with 40 CFR 1502.14(b). Each alternative includes a life-cycle environmental/operational analysis for the proposed action. The analysis of the alternatives includes the impacts of using the MOX fuel in a domestic, commercial reactor and the impacts of storing the MOX spent fuel after it is removed from the reactor. The additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and

monitoring, related transportation, and eventual closure of a potential geologic repository. The MOX spent fuel is included in the inventory analyzed in that draft EIS should the decision be made to proceed with the hybrid or immobilization-only approaches.

A comparison of the preferred alternative (Alternative 3) and the immobilization-only alternative (Alternative 12A) at SRS is provided in the table below.

Section 2.3.1 of the SPD Draft EIS explained that a range of 23 reasonable alternatives remained after evaluating over 64 options against three screening criteria: worker and public exposure to radiation, proliferation concerns due to transportation of materials, and infrastructure cost. These 23 reasonable alternatives were evaluated in the SPD Draft EIS. After the Draft was issued, DOE eliminated as unreasonable the 8 alternatives that would involve use of portions of Building 221–F with a new annex at SRS for plutonium conversion and immobilization, thereby reducing the number of reasonable alternatives to the 15 that are analyzed in the SPD Final EIS. This SPD EIS analyzes the potential environmental impacts associated with implementing the proposed surplus plutonium disposition activities at the candidate sites. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, demonstrate that the activities would likely have minor impacts at any of the candidate sites.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe–md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

Comparison of Alternative 3 with Alternative 12A at SRS

Summary of Impacts	Alternative	
	3	12A
Air quality		
(incremental pollutant concentrations in μg/m³)[a]		
Carbon monoxide	0.37	0.246
Nitrogen dioxide	0.0634	0.0529
PM_{10}	0.00423	0.00364
Sulfur dioxide	0.124	0.0852
Waste management (m³)[b]		
TRU	1800	1500
LLW	2400	1700
Mixed LLW	50	20
Hazardous	940	910
Employment (direct)[c]		
Construction	1968	1196
Operations	1120	751
Land disturbance (ha)[d]	32	20
Human health risk (dose in person-rem)[e]		
Construction (workforce)		
Dose	4.1	2.9
LCFs	1.6×10^{-3}	1.2×10^{-3}
Operations		
Dose		
Public	1.8	1.6
Workers	456	446
LCFs		
Public	9.0×10^{-3}	8.0×10^{-3}
Workers	1.8	1.8
Facility accidents[f]		
Tritium release at pit conversion facility	5.0×10^{-2}	5.0×10^{-2}
Transportation[g]		
LCFs	8.1×10^{-2}	0.152
Traffic fatalities	5.3×10^{-2}	8.1×10^{-2}
Kilometers traveled (millions)	4.3	4.4
Additional risk of LCFs at Pantex	8.3×10^{-2}	8.3×10^{-2}

[a] Values represent the incremental criteria pollutant concentrations associated with surplus plutonium disposition operations for the annual averaging period for nitrogen dioxide, particulate matter with an aerodynamic diameter smaller than or equal to 10 microns (PM_{10}), and sulfur dioxide, and for the 8-hr averaging period for carbon monoxide.

[b] Values are based on a construction period of approximately 3 and 10 years of operation.

[c] Values are for the peak year of construction for each site and for the annual operation of all facilities for each alternative.

[d] Values represent the total land disturbance at each site from construction and operations.

[e] Values for Alternative 1 represent impacts over 50 years of operation under No Action. Those for the remaining alternatives are for the period of construction and 10 years of operation. Public dose values represent the annual radiological dose (in person-rem) to the population within 80 km (50 mi) of the facility for the year 2030 under Alternative 1, or for 2010 under Alternatives 2 through 12. Worker dose values represent the total radiological dose to involved workers at the facility (in person-rem/year). Public LCFs represent the 50-year LCFs estimated to occur in the population within 80 km (50 mi) for the year 2030 under Alternative 1, or the 10-year LCFs estimated to occur for the year 2010 under Alternatives 2 through 12. Worker LCFs represent the associated 50- or 10-year LCFs estimated to occur in the involved workforce.

[f] The most severe design basis accidents (based on 95 percent meteorological conditions) is used to obtain the population LCF.

[g] For alternatives that involve more than one site, the transportation impacts for the entire alternative are shown in the first site listed in the alternative. LCFs are from the radiological exposure associated with incident-free operation, radiological accidents, and fatalities expected as a result of vehicle emissions. Traffic fatalities are from nonradiological vehicle accidents. LCFs at Pantex are associated with repackaging requirements if the pit conversion facility is located elsewhere.

Key: LCF, latent cancer fatality; LLW, low-level waste; TRU, transuranic.

FD325–3 **MOX Approach**

Section 4.28 was revised to discuss the effect of displacing normal commercial reactor fuel with MOX fuel at the proposed reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

The impacts of onsite storage of MOX spent fuel assemblies from the time they are removed from the reactor until they are sent to a potential geologic repository are analyzed in Section 4.28. MOX fuel would be handled the same as other fuels with regard to pools and dry casks. MOX fuel assemblies would be the same size and shape as the LEU fuel for the specific reactor. The only difference would be the additional decay heat from the higher actinides, especially americium, in the MOX fuel. Dry casks are designed and certified for a maximum heat load, so the additional decay heat would contribute to the total heat load and not require any redesign. The additional heat load may result in less spent fuel stored per cask. A more likely option is that the MOX fuel would be selectively packaged with cooler LEU fuel to obviate any overall heat output restriction. As a result, DOE does not expect any changes in the cask design. An amendment to the Certificate of Compliance for the cask, and the reactor operating license, would be needed to include storage of MOX fuel assemblies. DCS intends to leave the MOX fuel assemblies in the reactors for a full cycle.

The statement in Section 1.4 concerning the market viability of alternative reactor fuels was revised to clarify the commentors' views. With regard to the concern about the displacement effect of MOX fuel sold on the open market, it is not expected to have a significant impact. Only 6 of the 110 operating reactors in the United States are proposed to use MOX fuel. In those six reactors, only 40 percent of the core would be MOX fuel.

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked

to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

FD325–4 **Alternatives**

The selection of a preferred alternative by the decisionmaker was based on a large number of factors, including environmental impacts. The environmental impacts of dispositioning different amounts of surplus plutonium, using different technologies, are among the impacts that would have to be taken into consideration in making a decision on where to site the proposed surplus plutonium disposition facilities. The cost of implementing each of the alternatives has been determined and is available to the decisionmaker and the public. The nonproliferation aspects of the proposed action are also the subject of a separate document, *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), which is available to the decisionmaker and the public. Section 1.6 was revised to provide further information regarding the preferred alternatives.

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the analysis address omitted environmental effects such as fuel disposal (given that MOX has somewhat different chemical and physical properties than typical reactor fuel) and provide a more complete picture of the tradeoffs involved. 4

The overall analysis depends on the use of a number of models including MACCS2 for accident occurrence. Under routine operations the effects of the various alternatives are not great. The key is the plausibility of the probabilities of an accident. The figures given are generally quite low. This may be reasonable, but some explanation of the derivation of the figures would be helpful and would increase confidence in the final result. 5

Based upon our review, we have rated the Draft SPD EIS EC-2, Environmental Concerns - Insufficient Information (see attached Summary of the EPA Rating System). This rating reflects our conclusion that the Final EIS should provide additional information, particularly on alternative analysis for MOX fuel assemblies . Our environmental concerns are based upon the effects on water and ecological resources and the presence of contamination in the existing environment and lack of assurance, based on insufficient information, that the proposed operations, as described, would not lead to further adverse impacts of a similar kind. Our detailed comments are attached. 6

We appreciate the opportunity to comment on the proposed project. If you have any questions or wish to discuss any aspect of our comments, please contact me or Marguerite Duffy of my staff at (202) 564-7148.

Sincerely,

Richard E. Sanderson
Director
Office of Federal Activities

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FD325–5 **Facility Accidents**

MACCS2 was used to estimate the consequences of the postulated accidents, but not their frequency of occurrence. Appendix K was revised to discuss the basis of accident frequencies and summarizes their development in the supporting data reports or information related to the specific reactors proposed to use MOX fuel.

FD325–6 **General SPD EIS and NEPA Process**

DOE acknowledges EPA's rating of EC–2 for the SPD Draft EIS and has revised this EIS to include additional information.

U.S. EPA
Detailed Comments
Surplus Plutonium Disposition Draft EIS

1. Scope of Analysis
Reference
p.1-6, Section 1.5
P.1-8, Section 1.5
P.4-360, Section 4.27.4.2

Comment
The EIS notes (p.1-6) that additional environmental impact analysis relating to reactor MOX impacts will be included in the Final EIS. The same section of the document also states that R&D activities on potential processes for the disposition of surplus plutonium are ongoing (p.1-8). Recommend that to the extent that R&D activities alter the proposed action and alternatives, or environmental impact analyses, they should also be included in the final EIS. 7

At each of the sites where TRU waste would be generated (except LANL), facilities are proposed for the processing of the waste to meet WIPP waste acceptance criteria. Potential impacts are then analyzed based on the processing facility. The document states that at LANL the TRU waste processing facilities and location have not been identified and defers to the LANL Site-Wide EIS. Recommend that in the Final EIS environmental impacts for TRU waste processing for WIPP disposal be included based on the information provided in the LANL Site-wide EIS. 8

2. Ecological Resources
Reference
p. 3-77, Section 3.3.8.1.1

Comment
The section states that "Important game animals that reside at INEEL include roughly 30 percent of Idaho's pronghorn antelope population, sage grouse, mule deer, and elk". It is doubtful that 30 percent of the state's population of pronghorn reside at INEEL. This number of pronghorn have been observed to winter there in the past but are migratory and do not reside at the INEEL. 9

Reference
p. 3-78, Section 3.3.8.2.2
p. 3-117, Section 3.4.8.2.2
p. 4-319, Section 4.26.2.3.1
p. 4-325, Section 4.26.3.3.1

Comment
The cited listings of threatened and endangered species and species of concern omit the mention of plant species listed by the states as rare, sensitive, or plant species of special concern. 10

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FD325–7 **MOX Approach**

None of the ongoing R&D activities are expected to have an impact on the proposed action or the environmental impact analyses. This is because the work is primarily engineering development work and not basic or advanced research. As indicated in the revised Section 1.8.1, these activities were analyzed in an environmental assessment, *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998). After the SPD Draft EIS was issued in July 1998, the environmental assessment and a finding of no significant impact for the pit disassembly and conversion demonstration and other R&D activities were issued in August 1998.

FD325–8 **Waste Management**

Section 4.27.4.2 was revised to discuss in further detail TRU waste management at LANL based on information from the *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory* (DOE/EIS-0238, January 1999). Section 4.32.6.3 was added to discuss the cumulative impacts of waste management at LANL.

FD325–9 **Ecological Resources**

Section 3.3.8.1.1 was revised to stipulate that 30 percent of Idaho's pronghorn antelope winter at INEEL but do not reside there all year long.

FD325–10 **Ecological Resources**

Sections 3.3.8.2.2 and 4.26.2.3.1 were revised to include information on sensitive plant species. There are no sensitive plant species listed for Pantex, and the agencies consulted indicated no concerns for impacts to plant habitats. Appendix O was added to provide the results of informal consultations with the respective USFWS regional offices and State equivalent offices for the candidate sites.

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Recommend that the section explain that there are sensitive plant species at the sites however there are no plant species of special concern near the proposed sites at Pantex and INEEL. The impact sections (p.4-319 and 4-325) should indicate that listed or sensitive plant species would *not be impacted*. The most recent listings of Federally listed threatened and endangered species should be obtained from the USF&WS to ensure accuracy. 10

3. Resource Areas
Reference
p. S-21
p. 4-1
pp. 4-311 to 4-336, Section 4.26

Comment
The EIS should provide additional detail and justification for the determination that the proposed actions have no or "minimal" impacts on following resource areas: Geology and Soils, Water Resources, Ecological Resources, Cultural and Paleontological Resources, Land Use and Visual Resources, and Infrastructure. At a minimum, DOE should address how and through what analytical processes such determinations were made. The Additional Environmental Resource Analyses section (pp. 4-311 to 4-336, Section 4.26) provides primarily conclusions and determinations without supporting analysis. 11

4. Relationship to Other Actions and Programs
Reference
pp. 1-10 to 1-12, Section 1.7.1

Comment
The EIS should describe why analysis and decisions made in the Storage and *Disposal of* Weapons-Usable Fissile Materials Final Programmatic EIS (S&D) PEIS and ROD are being revisited in this document (e.g. immobilization technology assessment). Also, the S&D PEIS identified SRS as the preferred site for the immobilization facility, but this EIS reconsiders this by looking at Hanford. This could be better explained in Section 1.7.1. 12

5. Description of Alternatives
Reference
p. S-3, S-8, S-10
p. 1-4

Comment
The EIS should more clearly present and describe the alternatives under evaluation. The way that the alternatives are presented is somewhat confusing and complicated. There are 23 alternative configurations for siting but most of those alternatives also include another series of alternatives (not presented as alternatives or mentioned in the cover sheet abstract) regarding lead assembly production sites and PIE sites. For example, p. S-3 and p. 1-4 list additional decisions to be made through the EIS on lead assembly production sites, although the EIS states no preference at this time (p. S-10). It is unclear whether the selection of a PIE site from among two alternatives is 13

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FD325–11 **General SPD EIS and NEPA Process**

The qualitative methods used to analyze impacts on these resource areas are documented in Appendix F and discussed in Section 4.1, with impacts discussed in Section 4.26. Where appropriate, analyses were incorporated by reference from the *Storage and Disposition PEIS* or in the case of new information was explained in the revised subsections of Section 4.26.

FD325–12 **Purpose and Need**

The decisions made in the *Storage and Disposition PEIS* ROD are not being revisited in this SPD EIS. Those decisions were simply the starting point for this site–specific environmental analysis in accordance with 40 CFR 1508.28. The *Storage and Disposition PEIS* allowed DOE to focus on storage and disposition actions that were ripe for decision while excluding other actions (e.g., siting of the disposition facilities) that were not. The choice of a specific immobilization technology was one of those areas that were not ripe for decision and therefore is included in this tiered EIS.

The *Storage and Disposition PEIS* did not identify SRS as the preferred site for the immobilization facility. Both Hanford and SRS were mentioned as possible sites in the Preferred Alternative section. The ROD on that document included a statement of DOE's expectation that the follow-on EIS (this EIS) would identify, as one approach, immobilizing a portion of the surplus plutonium at DWPF using the can-in-canister technology. It was not until the NOI for this EIS that DOE formally made this approach the preferred alternative.

FD325–13 **Alternatives**

The Cover Sheet Abstract, *Summary*, and Section 1.6 were revised to include a discussion of the preferred alternatives for lead assembly fabrication and postirradiation examination sites. As discussed in response FD325–2, the number of reasonable alternatives for new facilities was reduced from 23 to 15.

among the decisions that the DOE intends to make in the ROD. | 13

6. Mitigations
Reference
p. 4-332, Section 4.26.4.4.1

Comment
Many of the mitigations are described in the EIS as ones that "could" be employed, implying that they may help to mitigate impacts but are not formally proposed. Proposed mitigations should be clearly identified as such, both in the EIS and the ROD. In the example referenced, the EIS should be more specific about the direct impacts that are expected if the listed possible mitigations do not occur. | 14

7. Purpose and Need
Reference
p. 1-3, Section 1.2

Comment
The EIS should more clearly explain how the preferred alternative(s) clearly meet the stated goals of fewer environmental impacts and improved proliferation resistance. | 15

8. MOX Fuel Economic Impacts
Reference
pp. 1-5 to 1-6
p. 4-378, Section 4.28

Comment
The economic impacts on the commercial reactor fuel market of the use of MOX at commercial reactors should be addressed in the EIS. These impacts may have the potential to be significant in nature. DOE should describe the process whereby MOX will be provided to commercial reactors (e.g. sold, provided free) and analyze the resulting impacts on the commercial reactor fuel market.

9. MOX Fuel Storage Impacts
Reference
p. 2-27, Section 2.4.3
p. 2-58, Section 2.17.1
p. 4-378, Section 4.28 | 3

Comment
The Draft EIS currently defers the impact analysis relating to specific reactors to the Final EIS. This may not give adequate opportunity for the public, interested organizations, and government agencies to have their comments on this analysis addressed in the EIS.

The EIS should analyze the impacts of storage (at least until Yucca Mountain is open) of spent

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FD325–14 **General SPD EIS and NEPA Process**

This SPD EIS reflects the change suggested by EPA; where appropriate, potential mitigative actions are now part of the proposed action. As discussed in Section 4.26.4.4.1, land disturbance for the preferred alternative at SRS is likely to impact an identified cultural resource eligible for nomination to the National Register of Historic Places. This section was revised to include a statement that the extent of mitigation is being discussed with the South Carolina SHPO, but would likely involve data recovery. Mitigation of this concern would be accomplished before any actions are taken as a result of decisions made in the SPD EIS ROD that could have an adverse affect on cultural resources at SRS.

FD325–15 **Purpose and Need**

In the SPD EIS ROD, DOE will clearly explain how the selected alternative best meets its needs and will specify related environmental effects and proliferation concerns. This will be done in accordance with 40 CFR 1505.

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MOX fuel assemblies at commercial reactors. (p. 2-27, Sec. 2.4.3) Issues that should be addressed include whether there is adequate storage capacity at the commercial sites, wet versus dry storage questions (i.e. is dry storage acceptable (may be the only option at many commercial reactor sites) for fuel rods that are "hotter" than usual since MOX will only be irradiated to meet IAEA Spent Fuel Standards). p. 2-58, Sec. 2.17.1 seems to imply pool storage for 6 months. Also, the procedure of only irradiating the MOX fuel assemblies until the IAEA standards are met may generate more spent fuel than usual low-enriched uranium (LEU) (p. 4-378, Sec. 4.28). 3

10. Transportation
Reference
Appendix L
p. L-23, Section L.6.5

Comment
Transportation analysis in the EIS for all alternatives that require the transport of plutonium pits should address unique security issues (if any) and demonstrate that heightened proliferation resistance will be ensured. Where current DOE transportation methods and carriers are proposed, the EIS should clearly demonstrate that such methods will meet the unique requirements necessitated by transport of weapons grade plutonium spent fuel in order to protect the environment.. 16

Reference
p. 2-33, Table 2-3

Comment
Additional waste shipments to WIPP, NTS, and/or Yucca Mountain of TRU, LLW, and mixed-LLW wastes generated at the pit conversion facility, immobilization facility, MOX facility, and lead assembly fabrication facility should be considered in the transportation analysis. 17

11. Health Analysis
Reference
General

Comment
For the human health analysis, the EIS should compare the potential impacts of the proposed actions with applicable DOE, EPA, NRC, and OSHA standards. 18

12. Safety and Emergency Planning
Reference
General

Comment
It appears as though the potentially significant impacts for the proposed actions are in the area of safety. The EIS should discuss the tailored safety and emergency management plans that have been or will be developed to mitigate the impacts of the various accident and disaster events. 19

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FD325–16 **Transportation**

There are no unique environmental or security issues involved with the transportation of surplus pits. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. As described in Appendix L.3.2, this involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications and additional couriers. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are evaluated in this SPD EIS. The proliferation resistance of shipping pits is addressed in a separate document, *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), which has been provided to the public and is available to the decisionmaker.

FD325–17 **Transportation**

Transportation analyses and potential cumulative impact analyses of shipping TRU, LLW, and mixed LLW are discussed in the Transportation sections in Chapter 4 of Volume I. As described in response FD325–2, this SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel.

FD325–18 **Human Health Risk**

This SPD EIS compares potential impacts of the proposed actions with applicable DOE, EPA, and NRC standards. DOE worker dose standards (e.g., 10 CFR 835, *Occupational Radiation Protection*) are presented in conjunction with all the Involved Worker Impact tables throughout Chapter 4 of Volume I. DOE public dose standards (e.g., DOE Order 5400.5, *Radiation Protection of the Public and the Environment*) are presented in Section 4.32. EPA standards such as those established pursuant to the Clean Air Act and the Safe Drinking Water Act are also presented and discussed in Section 4.32. Comparisons with applicable NRC standards are given in Section 4.28 for the

specific reactors selected to use MOX fuel. In regard to OSHA chemical exposure standards, there are no additional impacts of this type anticipated for workers associated with the proposed actions.

FD325–19 **Facility Accidents**

As discussed in the Emergency Preparedness sections of Chapter 3 of Volume I, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program.

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13. Noise Impacts
Reference
p. 4-47, Section 4.4.1.1
pp. 4-329 to 4-332
Appendix F

Comment
The conclusions regarding potential noise impacts for the various alternatives do not appear to be supported by analysis and modeling. For example see SRS impacts at p. 4-47, Sec. 4.4.1.1 and pp. 4-329 to 4-332. 20

14. Event Probabilities
Reference
p. 4-60, Section 4.4.2.6
p. 4-55, Section 4.4.2.5

Comment
The DEIS uses frequency and probability of certain events in the analysis without a description of the methodology used in determining the frequency and probability of those everts. For example, the probability of more severe accidents than those described on p. 4-60 is stated as "1 chance in 10 million per year" and the frequency of the described earthquake on p. 4-55 is "1 in 100,000 and 1 in 10,000,000 per year". 21

15. Site Specific

EPA Region IX review of the SPD EIS focused on a possible Mixed Oxide Fuel (MOX) lead assembly at Lawrence Livermore National Laboratory (LLNL). Page 1-10 of the DEIS states that, at this time, DOE does not have a preference (preferred alternative) for the location of a lead assembly or a Postirradiation facility (PIE). In the FEIS, DOE should identify its preferred alternative for the lead assembly facility and a PIE facility. EPA, Region IX, has rated the section of the DEIS devoted to LLNL as EC-2-- environmental concerns, insufficient information. Our concerns are based on the presence of contamination in the existing environment at LLNL and lack of assurance, based on insufficient information, that the proposed operations, as described, would not lead to further adverse impacts of a similar kind.

The Superfund Division provided background information regarding Lawrence Livermore. The main facilities and a separate location, area 300, are both nationally listed, federal, Superfund sites. Under the Council on Environmental Quality (CEQ) Regulations at 40 CFR 1502.15, the EIS should describe the environment of the area(s) to be affected or created by the alternatives under consideration. Similarly, an EIS should describe cumulative impacts which are defined at 40 CFR 1508.7 as including impacts from past actions. In the case of LLNL, plutonium anomalies have been found in soils within Big Trees Park, adjacent to the facilities. The site is currently being investigated and the source or mode of plutonium deposition is at this point yet to be determined. The FEIS should provide additional background information on the existing 22

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FD325–20 **Air Quality and Noise**

Discussions and conclusions regarding traffic noise impacts along routes used to access the site are based on analysis of the projected changes in employment at the sites and the number of materials shipments associated with each alternative. Discussions and conclusions regarding onsite noise sources and their effect on the public are based on the types of noise sources prevalent during construction and operation, the distance from the facility area to the site boundary, and construction and operation activities typical of these sites. DOE expects that there would be some disturbance of wildlife during construction, especially where new facilities require the expansion of an existing facility fence line. Noise disturbance of wildlife during normal operation would be similar to impacts from existing activities at these facilities, except that impacts could be greater where new facilities require the expansion of an existing facility fence line. As discussed in the appropriate Air Quality and Noise sections in Chapter 4 of Volume I, it is unlikely that any threatened or endangered species would be affected by noise from construction or operation of these facilities because none are known to occur within the immediate vicinity of the proposed site locations.

FD325–21 **Facility Accidents**

The methodology and estimated frequency for accidents that are summarized in Chapter 4 of Volume I are provided in Appendix K.1.5.1 and cited technical support documents. The methodology and estimated frequency for the transportation accidents that are summarized in Chapter 4 are provided in Appendix L.6.3. These appendixes contain detailed discussions of the analysis methodologies, summaries of the source terms used to prepare the analyses, and listings of source documents.

FD325–22 **Lead Assemblies**

Section 1.6 was revised to include the preferred alternatives for lead assembly fabrication and postirradiation examination. Sections 3.6.3.2 and 3.6.4.2 were revised to include information on Superfund sites at LLNL and LANL, respectively. Section 4.32 was revised to include a discussion of the cumulative impacts at LLNL and LANL.

contamination, in the context of providing assurance to the public that the Proposed Action would not result in additional contamination. Even if reference documentation is provided, the FEIS should provide additional narrative general background information regarding the Superfund site. 22

16. Cumulative Impact

The cumulative impact section of the document is quite brief and appears to de-emphasize the various problems that have historically occurred at the various discussed facilities. Cumulative impacts include incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). Major past or current impacts are discussed under "affected environment"- Chapter 3; however, these impacts (e.g., ground water contamination at Hanford) should be summarized, perhaps in table/matrix format within chapter 4. Chapter 4 should identify the potential affected resources, a geographical area for analysis (scale is resource specific), and expected cumulative impacts. We refer the DOE to the recently completed CEQ guidance entitled *Considering Cumulative Effects*, for ways it can enhance and provide a more meaningful cumulative impacts analysis. 23

17. Radionuclide National Emission Standards

Table 5-1 addresses the National Emission Standards for Hazardous Air Pollutants (NESHAP) (NESHAP) (40 CFR Part 61) but does not discuss the criteria under which the facility would need to apply for permission to construct or modify their operation. While it is unlikely that LLNL would have to formally apply, we would request that LLNL (or another proposed facility) provide EPA with its radionuclide NESHAP review prior to commencing operation. 24

FD325

FD325–23 **Cumulative Impacts**

DOE considered CEQ guidance in development of the cumulative impacts analyses. The cumulative impacts presented include the incremental impacts of operation of the proposed surplus plutonium disposition facilities and the impacts of other past, present, and reasonably foreseeable actions at or near the candidate sites. Those resource areas that would not be impacted as resources of concern are not discussed in the Cumulative Impacts section; therefore, DOE has not developed a table. For each candidate site, past environmental problems that bear on the proposed action are recognized and discussed.

FD325–24 **DOE Policy**

The lead assembly fabrication site would provide EPA with its radionuclide NESHAP review prior to commencing operation.

BIRNIE, PATRICIA
PAGE 1 OF 1

Hello, this is Patricia Birnie in Tucson, Arizona. I just called previously to request a DEIS on MOX. I also wanted to request that a hearing be placed for this in Phoenix, Arizona since the Palo Verdi Reactors are probably at the top of the DOE list of possible reactors for using MOX fuel. It would seem to be appropriate and a courtesy to local residents in our area that you would assign a hearing, public hearing to be in Phoenix, Arizona. You have my name and address from the previous request for the DEIS but I would like to record this request for a hearing in Phoenix. Thank you, bye. 1

PD003

PD003–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for a public hearing in Phoenix, Arizona. Because the proposed reactors were not known at the time the SPD Draft EIS was published, DOE issued the *Supplement to the SPD Draft EIS* in April 1999. The *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). The proposed reactors are Catawba Nuclear Station Units 1 and 2 in South Carolina, McGuire Nuclear Station Units 1 and 2 in North Carolina, and North Anna Power Station Units 1 and 2 in Virginia.

During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement*. DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of a South Carolina State Senator, DOE attended and participated in a public meeting held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

GE STOCKHOLDERS' ALLIANCE
PATRICIA T. BIRNIE
PAGE 1 OF 6

GE Stockholders' Alliance
for a sustainable nuclear-free future

September 14, 1998

5349 W. Bar X Street
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Phone: (520) 908-9269
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Chair
Patrica T. Birnie
Board of Advisors
E. Cooper Brown
National Committee for Radiation Survivors
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Center for Economic Conversion
Scott Denman
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Kay Drey
Missouri Coalition for the Enviroment
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Environmental coalition on Nuclear Power
Charles Komanoff
Komanoff Energy Associates
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Nuclear Control Institute
Michael Mariotte
Nuclear Information and Resource Service
Arthur Milholland, M.D.
Physicians for Social Responsibility
Grisby Morgan-Hubbard
Energy Consultant
Mile H. Robinson, M.D.
Citizens for Health Information
J. Andy Smith III, Ph.D.
National Ministries American Baptist Churches, USA CRES
John Surr
Children's Advocate
Faith Young
Energy People, Inc.
Technical Advisor
Marvin Resnikoff
Radioactive Waste Management Associates
Affiliations for Identification Purposes Only

Office of Fissile Materials Disposition
United States Department of Energy
P.O.Box 23786
Washington, DC 20026-3786

Dear Officials:

We have reviewed the SPD EIS, dated July 1998, and wish to make the following comments.

The purpose of the SPD is to reduce the threat of nuclear weapons proliferation by making surplus weapons-usable plutonium inaccessible and unattractive for re-use "in an environmentally safe and timely manner". The goal is commendable, and as such should be implemented as quickly as possible, and with the minimum of transportation of the materials (for safety, less environmental exposure, and minimal access to theft). 1

While the text stated, "DOE will base the following decisions on the analytical results of this SPD EIS *and other cost, schedule, and nonproliferation considerations....*" I was unable to find any cost comparisons discussed or tabulated in this report. It would have been helpful to have had this information included, and not in the separate report indicated in this document.

The purpose of the SPD is <u>not</u> for any "economic benefit" of using the plutonium as fuel for commercial reactors since the NAS and other studies document that plutonium fuel would be far more expensive than the present LEU now so readily available at very low cost. With electric utility competition (deregulation) being implemented in this country, already several reactors are being permanently shut down because of their excessive cost in comparison to other methods of generation. It would be a waste of taxpayer money to subsidize the expensive reactors' retrofits, maintenance and security costs for utilizing the MOX fuel. Not choosing the MOX option would also avoid the cost of building MOX fabrication plants and reduce the necessity to transport the toxic material in the public domain. 2

We find it objectionable for the DOE to reserve the option to use some of the surplus plutonium as MOX fuel in Canadian Deuterium Uranium (CANDU) reactors, for all of the above reasons, and in addition, we 3

FD317

FD317–1 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

FD317–2 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus

Page 2. Office of Fissile Materials Disposition September 14, 1998

consider it unwise to join limited international agreements between countries over whose internal policies we have no control, when fissile materials disposition is the focus. We have difficulty supporting a process (MOX fuel use) that bridges the traditional separation between military and civilian uses of nuclear materials. Since Russia is "broke", the U.S. is likely to finance whatever disposition takes place in Russia. It would be to our economic and political interest to advocate and promote the immobilization-only option of disposition for Russia as well as the U.S. 3

In the discussion of air quality, the report was not clear whether depleted uranium hexafluoride would be involved in the pit conversion or immobilization processes. Two charts indicated the gaseous fluoride standards at SRS and Hanford (not Pantex or INEEL). And another section indicated that ceramic immobilization requires the use of uranium dioxide (obtained from depleted uranium hexafluoride). But nowhere did I find any charts or discussion as to air pollutants to include hexafluoride. Since hexafluoride is a very toxic compound, I want to make sure this was not overlooked. 4

I have several questions in regard to Accident Scenarios for the various locations.

1) The text stated that an aircraft crash scenario was discussed only for the Pantex facility (because calculations of frequency of expected crashes at all the other sites was too low). I strongly believe that an aircraft crash is a possible source of terrorist activity at each of the sites, even though those locations may not be near regularly scheduled flights. Therefore, it seems appropriate to consider an aircraft crash at each location as a possibility, especially now that terrorism is currently a greater threat. 5

2) Even though the SRS is perhaps 90 miles inland, I wonder if hurricane damage has been considered as a threat to the facility? This was not mentioned in the text.

3) I found no reference to potential tornado damage being considered as an accident scenario for the Pantex site (which is located in the heart of tornado country). 6

From the point of view of proximity to supporting facilities, it would appear to me that the SRS site would require the least overall transportation of materials, once the plutonium pits had been shipped to SRS. SRS also appears to have the largest pool of potential workers for both construction and operation of the facilities. 7

It seems logical for the can-in-canister method of immobilization to be chosen as the preferred method of immobilization, from the standpoint of fewer workers required, and lower waste volumes than the homogenous ceramic immobilization or the homogeneous vitrification technology previously evaluated. 8

We strongly recommend that the DOE conduct SPD EIS reviews at each of the candidate reactor sites, and conduct public hearings at each of these sites before choosing any reactor complex for 9

FD317

plutonium disposition program. DCS would pay for spent fuel disposal in the same manner as LEU spent fuel as well as the ultimate D&D of the reactors.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in weapons again.

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system.

FD317–3 **Nonproliferation**

In the SPD Draft EIS, DOE retained the option to use some of the surplus plutonium as MOX fuel in CANDU reactors, which would have only been undertaken in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the SPD Draft EIS was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is no longer actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. A separate environmental review, the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999), analyzes the fabrication and proposed shipment of MOX fuel rods for research and development activities involving the use of limited amounts of U.S. MOX fuel in a

GE STOCKHOLDERS' ALLIANCE
PATRICIA T. BIRNIE
PAGE 3 OF 6

Canadian test reactor. A FONSI was signed on August 13, 1999. Both of these documents can be viewed on the MD Web site at http://www.doe-md.com. If a decision is made to dispose of Russian surplus plutonium in Canadian CANDU reactors in order to augment Russian's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provided general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

DOE acknowledges the commentor's opposition to the commercial use of weapons-usable plutonium. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing irradiation.

FD317–4 **Air Quality and Noise**

Depleted uranium hexafluoride would be converted to depleted uranium dioxide at a commercial conversion facility (see Section 1.5). Depleted uranium dioxide would be used as feed material for the ceramic immobilization option and in the MOX facility. Section 4.30.3 analyzes the conversion of depleted uranium hexafluoride, from a representative site (Portsmouth), to uranium dioxide, which would be used as feedstock for immobilization and MOX fuel fabrication. No air pollutant emissions of gaseous fluorides are expected from the immobilization facility or the MOX facility.

FD317–5 **Facility Accidents**

The possibility of an aircraft crash due to intentional terrorist activity is considered to be conjecture, and is not analyzed in this SPD EIS. However, an accidental aircraft crash is analyzed for Pantex, including an estimate of the credible consequences of such an event.

FD317–6 **Facility Accidents**

Section K.1.3.2 states that because of the robust structure of new plutonium facilities, the only design basis natural-phenomena-initiated accidents with the potential to impact the facility interior are seismic events. Similarly, seismic events also bound the consequences and risks posed by beyond-design-basis natural phenomena. In other words, the surplus plutonium disposition facilities have been designed to withstand natural phenomena, including hurricanes and tornadoes at sites where these phenomena are of concern, such as Pantex, where the frequency of tornadoes is high relative to the other candidate sites.

FD317–7 **Alternatives**

As indicated in the revised Section 1.6, SRS is preferred for the surplus plutonium disposition facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

GE Stockholders' Alliance
Patricia T. Birnie
Page 5 of 6

FD317–8 **Immobilization**

DOE acknowledges the commentor's support for the preferred can-in-canister technology for immobilization.

FD317–9 **General SPD EIS and NEPA Process**

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

Page 3. Office of Fissile Materials Disposition September 14, 1998

participation in MOX utilization. We feel that this EIS is incomplete for not including this review as part of your report. 9

If immobilization for ALL of the surplus plutonium is chosen, the costs and risks would obviously be much lower since neither the MOX fuel fabrication facility, nor the plutonium polishing process (the report did not say that gallium must be removed for the immobilization process), nor the Lead Assembly fabrication facility would be required, nor would the DOE have to subsidize the chosen reactors' maintenance, operations and enhanced security for the duration of the MOX fuel use. This would save not only money, but would create less environmental pollution, less radioactive waste, and less worker exposure/public exposure, and cost less for eventual decontamination and decommissioning of facilities since fewer facilities would be involved. The report did not state whether the DOE would be responsible for the decommissioning of the reactors chosen for MOX utilization, but I would assume it would be a part of the agreement required by any utility choosing to be a part of the SPD mission. 10

The SPD EIS does not make it clear what the criteria for decisions by the DOE on which method(s)/location(s) will be chosen. If the criteria are: based on common sense, the answer would be obvious: Immobilize ALL of it; based on economics, the answer would be obvious: Immobilize ALL of it; based on least environmental impact, the answer would be obvious: Immobilize ALL of it; based on the greatest public interest, the answer would be obvious: Immobilize ALL of it; but based on politics, special interests and corporate PAC influences, the choices are wide open, but not likely to be in the public interest.

If nuclear disarmament progresses as proponents advocate, there will be great quantities of additional surplus plutonium that will also need disposal. This SPD covers only surplus weapons plutonium disposal. What is to become of the huge and growing quantities of plutonium which has been separated by reprocessing from commercial irradiated fuel...and which may never be used as fuel in commercial reactors? 11

In this report I found no clear delineation of the roles and jurisdictions of the Nuclear Regulatory Commission and the Department of Energy for SPD. This is a crucial matter to be resolved before starting on any part of the process. 12

Respectfully Submitted,

Patricia T. Birnie

Patricia T. Birnie, Chair

FD317

FD317–10 **Alternatives**

DOE acknowledges the commentor's support for the immobilization-only approach. The remainder of this comment is addressed in responses FD317–1, FD317–2, and FD317–3.

FD317–11 **DOE Policy**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. Therefore, the United States will not build an inventory of plutonium that has been separated from commercial irradiated fuel. Other nations who do reprocess, however, will produce such plutonium. In his *Nonproliferation and Export Control Policy* (September 1993), President Clinton states that "the United States will maintain its existing commitment regarding the use of plutonium in civil nuclear programs in Western Europe and Japan" even though this country does not encourage the civil use of plutonium.

FD317–12 **NRC Licensing**

DOE is responsible for implementing the U.S. program for surplus plutonium disposition. DOE would own the proposed non-reactor facilities and would be responsible for operation and regulatory oversight of the pit conversion and immobilization facilities. DCS would operate the MOX facility under an NRC license issued in accordance with 10 CFR 70, *Domestic Licensing of Special Nuclear Material*. All three proposed facilities would be located at DOE sites, and DOE anticipates that the MOX facility would use the site infrastructure. NRC will continue to be responsible for licensing the specific reactors selected to use MOX fuel, and as such would have to approve the use of MOX fuel through the license amendment process. In addition, early in the preparation of the *Storage and Disposition PEIS* and this SPD EIS, DOE invited NRC to be a cooperating agency for the surplus weapons-usable fissile materials program. NRC declined the offer in favor of being a commenting agency. DOE is conducting regular meetings with NRC on the MOX approach, including fuel design and qualification.

ARKANSAS DEPARTMENT OF FINANCE AND ADMINISTRATION
TRACY L. COPELAND
PAGE 1 OF 7

STATE OF ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION
P.O. BOX 3278
LITTLE ROCK • 72203

OFFICE OF
INTERGOVERNMENTAL
SERVICES
PHONE (501) 682-1074
FAX (501) 682-5209

September 4, 1998

U.S. Department of Energy
Office of Fissile Materials
Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

RE: SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT
(SUMMARY) JULY 1998

Dear Sir:

The State Clearinghouse has received the above Document pursuant to the Arkansas Project Notification and Review System.

To carry out the review and comment process, this document was forwarded to members of the Arkansas Technical Review Committee. Resulting comments received from the Technical Review Committee which represents the position of the State of Arkansas are attached. 1

The State Clearinghouse wishes to thank you for your cooperation with the Arkansas Project Notification and Review System.

Sincerely,

Tracy L. Copeland, Manager
State Clearinghouse

Enclosure
PC: Randy Young, AS&WCC
TLC/msm

0001N

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MD154

MD154–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's review of the SPD Draft EIS.

ARKANSAS DEPARTMENT OF FINANCE AND ADMINISTRATION
TRACY L. COPELAND
PAGE 2 OF 7

Arkansas Soil and Water Conservation Commission

J. Randy Young, P.E.
Executive Director

101 EAST CAPITOL
SUITE 350
LITTLE ROCK, ARKANSAS 72201

PHONE 501-682-1611
FAX 501-682-3991

MEMORANDUM

TO: Mr. Tracy Copeland
Manager, State Clearinghouse

FROM: J. Randy Young, P.E.
Chairman, Technical Review Committee

SUBJECT: SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT (SUMMARY) JULY 1998

DATE: August 26, 1998

Members of the Technical Review Committee have reviewed the above referenced project. The Committee supports this project. Agency comments are included for your review.

The opportunity to comment is appreciated.

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STATE CLEARINGHOUSE

JRY:smc
Enclosures
cc: Members of the Technical Review Committee

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PHONE (501) 682-1074
FAX (501) 682-5206

STATE OF ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION
P.O. Box 3278
[illegible]

TO: All Technical Review Committee Members

FROM: Tracy L. Copeland, Manager - State Clearinghouse

DATE: July 23, 1998

SUBJECT: SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT(SUMMARY) JULY 1998 - NOTE: SHOULD YOU NEED MORE INFORMATION PLEASE CONTACT THE PHONE NUMBER IN THIS MATERIAL.

Please review the above stated document under provisions of Section 404 of the Clean Water Act, Section 102(2)(c) of the National Environmental Policy Act of 1969 and the Arkansas Project Notification and Review System.

Your comments should be returned by AUGUST 13, 1998 to - Mr. Randy Young, Chairman, Technical Review Committee, 101 E Capitol, Suite 350, Little Rock, Arkansas 72203.

If we have no reply within that time we will assume you have no comments and will proceed with the sign-off.

NOTE: It is imperative that your response be in to the ASWCC office by the date requested. Should your agency anticipate having a response which will be delayed beyond the stated deadline for comments, please contact Ms. Shani Cable of the ASWCC at 682-1611 or the State Clearinghouse Office.

___ Support
___ Comments Attached
✓ No Comments
___ Do Not Support (Comments Attached)
___ Support with Following Conditions
___ Non-Degradation Certification Issues (Applies to PC&E Only)

Signature Joseph Krystofik Agency ASWCC Date 8/11/98

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P.O. Box 3278
M.F.-W.R.C.A.-N.P.D.E.S.

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JUL 24 1998
EXECUTIVE DIRECTOR'S OFFICE

TO: All Technical Review Committee Members

FROM: Tracy L. Copeland, Manager - State Clearinghouse

DATE: July 23, 1998

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___ Support
___ Comments Attached
X No Comments
___ Do Not Support (Comments Attached)
___ Support with Following Conditions
___ Non-Degradation Certification Issues (Applies to PC&E Only)

Signature Carolyn Dover Agency Parks - Tourism Date 8/10/98

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STATE OF ARKANSAS 98 AUG 11 AM 11:42

DEPARTMENT OF FINANCE AND ADMINISTRATION SOIL & WATER COMM.
P.O. Box 3278
M E M O R A N D U M

TO: All Technical Review Committee Members

FROM: Tracy L. Copeland, Manager - State Clearinghouse

DATE: July 23, 1998

SUBJECT: SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT(SUMMARY) JULY 1998 - NOTE: SHOULD YOU NEED MORE INFORMATION PLEASE CONTACT THE PHONE NUMBER IN THIS MATERIAL.

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X Support
___ Comments Attached
X No Comments
___ Do Not Support (Comments Attached)
___ Support with Following Conditions
___ Non-Degradation Certification Issues (Applies to PC&E Only)

Signature Kenneth Colbert Agency AFC Date 8/7/98

0173N

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ARKANSAS DEPARTMENT OF FINANCE AND ADMINISTRATION
TRACY L. COPELAND
PAGE 6 OF 7

OFFICE OF INTERGOVERNMENTAL SERVICES

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STATE OF ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION
P.O. Box 3278
Little Rock, Arkansas 72203

RECEIVED
A.H.T.D.
ENVIRONMENTAL DIVISION

TO: All Technical Review Committee Members

FROM: Tracy L. Copeland, Manager - State Clearinghouse

DATE: July 23, 1998

SUBJECT: SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT(SUMMARY) JULY 1998 - NOTE: SHOULD YOU NEED MORE INFORMATION PLEASE CONTACT THE PHONE NUMBER IN THIS MATERIAL.

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____ Support
____ Comments Attached
_X_ No Comments
____ Do Not Support (Comments Attached)
____ Support with Following Conditions
____ Non-Degradation Certification Issues (Applies to PC&E Only)

Signature [illegible] Agency AWD Date 8/11/98

0173N

"AN EQUAL OPPORTUNITY EMPLOYER"

MD154

OFFICE OF
INTERGOVERNMENTAL
SERVICES

PHONE (501) 682-1074
FAX (501) 682-5206

RECEIVED

STATE OF ARKANSAS

DEPARTMENT OF FINANCE AND ADMINISTRATION
P.O. Box 3278
Little Rock, AR 72203

TO: All Technical Review Committee Members

FROM: Tracy L. Copeland, Manager - State Clearinghouse

DATE: July 23, 1998

SUBJECT: SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT(SUMMARY) JULY 1998 - NOTE: SHOULD YOU NEED MORE INFORMATION PLEASE CONTACT THE PHONE NUMBER IN THIS MATERIAL.

Please review the above stated document under provisions of Section 404 of the Clean Water Act, Section 102(2)(c) of the National Environmental Policy Act of 1969 and the Arkansas Project Notification and Review System.

Your comments should be returned by AUGUST 13, 1998 to - Mr. Randy Young, Chairman, Technical Review Committee, 101 E Capitol, Suite 350, Little Rock, Arkansas 72203.

If we have no reply within that time we will assume you have no comments and will proceed with the sign-off.

NOTE: It is imperative that your response be in to the ASWCC office by the date requested. Should your agency anticipate having a response which will be delayed beyond the stated deadline for comments, please contact Ms. Shani Cable of the ASWCC at 682-1611 or the State Clearinghouse Office.

____ Support
____ Comments Attached
✓ No Comments
____ Do Not Support (Comments Attached)
____ Support with Following Conditions
____ Non-Degradation Certification Issues (Applies to PC&E Only)

Signature [signature] Agency Ark Geol Comm Date 7-24-98

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MD154

(1) Comments on DOE/EIS-0283-D Volume 1 Part A
[Melvin S Coops] Pages 2-27 — 2-31
8/20/98

1) Document states "Glove Box Facilities (2-27), therefore I assume the processes will be largely manual operations.

2) Pu^{240} has a SF $T_{1/2}$ of 1.32×10^{11} years (total = 6,540 years)
(SF) Therefore emits 2,503 fiss/min/gram
6% WG Pu = 60 g/kg = 150×2.5 n/f = 375 fn/m/kg (6.3 n/s/kg) fast neutrons. (2.5 mev)

3) Additionally, Pu^{239} emits 1.38×10^{4} α/m/kg (2.3×10^{12} α/s/kg) (24,000 yr $T_{1/2}$ total)
(α,n) Oxygen (n,2n) emits ~ 1/2 n/10^{4} α so about 1.15×10^{6} n/s/kg emitted

∴ approx neutron emission per kg of PuO_2 = $\boxed{10^{6}\ n/s/kg}$
these neutrons are fast, about 2.5 Mev energy.

4) All elements except Li emit a capture gamma ray ranging from 2.2 Mev (H) to 5.5 Mev (Fe), when absorbing a neutron (capture usually from thermal neutrons), Li^{6} generates a tritium and helium atom from capture (large resonance at ~200 kev) $3Li^{6} + n^{1} \rightarrow Li^{7*} \rightarrow H^{3} + He^{4}$ and does not emit a capture gamma ray. 1

5) Heavy concrete walls act as neutron scatterers, and when close to the neutron source, increase the local neutron flux (operating area) by a large value, i.e. experience at RFP showed that operating manual glove boxes with ~2 kg metal WG Pu parts, caused workers to receive greater than allowable DOE exposure in 4-5 hours. This situation would be much worse for personnel handling Pu oxide in kilogram quantities.

IDD01

IDD01–1 **MOX Approach**

DOE acknowledges the commentors concerns about neutron flux to the radiation worker. Dose to the worker will be a primary influence in design of facilities for the surplus plutonium disposition mission. This includes considering the neutron flux that could occur in the material processing and storage areas. DOE will consider the location and spacing of work stations and room walls (including the ceiling and floor), and the use of building and shielding materials that are appropriate to the types and amounts of radiation expected, in order to minimize dose to the worker. Construction and operation of facilities would be in accordance with all applicable regulations and ALARA principles.

The MOX facility described in this SPD EIS is a preconceptual design. It contains all the elements necessary for MOX fuel fabrication in an arrangement that can be used to assess the potential environmental impact of such a facility. As with any construction project, however, this design is subject to modification during the design and construction stage as may be required to optimize equipment placement and process flow. A goal of the facility design is to ensure that worker doses do not exceed an average of 500 mrem/yr and a maximum of 2 rem/yr. A team consisting of Duke Engineering & Services, COGEMA Inc., and Stone & Webster (DCS) has been hired by DOE to design, build, and operate the MOX facility should it be given the go-ahead in the SPD EIS ROD. The design team would review and consider available information on similar facilities to ensure that the MOX facility would incorporate the newest technologies and benefit from previous experience.

COOPS, MELVIN S.
PAGE 2 OF 5

(2)

ref: John Hasbke - LANL

6) that is one of the reasons that the weapons laboratories store plutonium as metal, not oxide. other reasons for storing Pu as METAL !!

1. that is the form recovered from weapons
2. the density is 16 or 19.4, not about 5 to 6 for oxide, and is much more compact.
3. No oxide present means no α,n neutrons
4. Can easily remove Am^{241} daughter (from Pu^{241} decay) by vacuum distillation.

7) any MOX facility, especially manned facilities, must have neutron absorbing walls to keep operating neutron fields as low as possible, and the actual process enclosures should be light-weight metal suspended on light wt floors to minimize neutron reflection. Massive walls must be kept away from the operating area to minimize exposure. 1

8) Wolfgang Stoll (AKA "the Plutonium Pope" in Germany) gave a presentation at LANL ~ 4/96 where he described the flaws in the Siemens MOX facility that prevented even start-up of the facility. the neutron fields in the operating area was a major reason for cancelling operation, this was due to the designer attempt to minimize cost (facility size) by placing the walls close to the operating glove boxes.

IDD01

(3)

9) It appears from a description of the proposed US-MOX facility that the designers do not understand the neutron field problem that accompanies work with any alpha emitting oxide material, especially Plutonium oxide (PuO_2). The facility, as described, will simply duplicate the problems encountered by Siemens in Germany and not be operable. 1

10) Other neutron related problems-
The proposed US facility has Materials Accountability Stations "MAP" adjoining each process area. The simplest and most practical way to quickly analyze Pu content is by "neutron counting" a fixed mass of feedstock. If the area has a high neutron background this is extremely difficult, if not impossible. Also, the detector becomes rapidly activated by the neutron field, and must be discarded (It cannot be rejuvinated). MAP areas depending on neutron emission counting must be located in areas that have a low background if accurate results are to be obtained. These areas can be on an upper floor in an area that is surrounded by lithium-bearing aggregate (Spodumene is a naturally occuring mineral with high Li content). 2

IDD01

IDD01–2 **MOX Approach**

This SPD EIS does not include a specification of systems or equipment at the individual component level; it only stipulates that certain types of systems or equipment would be included in the facility. The design team would ensure that the design of the MOX facility incorporated appropriate technologies arranged as appropriate for facility needs.

COOPS, MELVIN S.
PAGE 4 OF 5

(4)

11) Other obvious flaws in the design—
All toilets are located outside of the main operating areas beyond the security check points and will cause great displeasure to the operating staff. LLNL tried to operate in a similar facility and found that the technicians urinated into bottles that they either carried to the outside facilities at the end of the day, or emptied into the drains leading to the radioactive holding tanks for the internal controlled facility. Neither approach is acceptable. This design is neither practical or necessary. 3
Toilet areas can be included in the RMA operating gallery on raised platforms, with special drains leading to holding tanks for effluent monitoring. This has been done in many SNM handling facilities. Trying to inconvenience the workers to solve a simple sanitary engineering problem is just plain stupid. It will not be successful.

IDD01

IDD01–3 **MOX Approach**

DOE acknowledges the commentor's concern over the functional design of the MOX facility and appreciates the sharing of professional experience in that regard. However, it is not generally accepted practice to locate sanitary facilities within radiologically controlled areas.

"Hanford Facts"

"The Plutonium Pope" - Wolfgang Stoll (LANL 4/96)
Siemens Pu MOX facility - neutron emission
Stoll in now: Institute for Industrial Environment, in Germany.

- Spontaneous fission neut emission ≈2.5 MeV
  Pu^{240} SF $t_{1/2} = 1.32 \times 10^{11}$ years $= 2.503 \times 10^{4}$ fiss/min/gram
  total $T_{1/2} = 6{,}540$ years
  ($\alpha = 5 \times 10^{14}$/m/kg)
  [2.5×10^{7} f/min/kg
  [M ≈ 1×10^{6} n/s/kg]
  [e = 2.5 MeV
  Pu^{239} 24,100 year $T_{1/2}$
  α total $= 1.38 \times 10^{14}$ α/m/kg
  OXIDE = X3 or more
  α UO_2: O^{17} = 0.038% σ_α = 0.24 barns, R_α = 0.11 (Be^9 = 2mb) 4% = 1/16

- Store and Ship as metal John Haschke, LANL
  1. Because that is what is in Weapons
  2. The density is 16 → 19.4 (not <10) more compact.
  3. No oxide present no(α,n)
  4. Can remove Am^{241} by vacuum distillation (Growth from 14-yr Pu^{241})

- Facility -
  ① needs to have α,n neutron absorption capability for remaining scattered neutrons 2.5 MeV → thermal
  ② don't place "MAP" areas near areas where quantities of PuO_2 reside - activation of GE(Li) detectors, and high SF gamma background.

IDD01

EAST BAY PEACE ACTION
DALE NESBITT
PAGE 1 OF 3

East Bay Peace Action
P.O. Box 6574,
Albany CA 94706
-0574
pg 1 of 3

August , 1998

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy:

The following undersigned groups are requesting both an extension of the public comment period and additional Public Hearings on the "Draft Surplus Plutonium Disposition Environmental Impact Statement." The SPDEIS is the latest National Environmental Policy Act (NEPA) document that will help shape decisions on how to dispose of up to fifty metric tons of weapons usable plutonium that has been declared surplus to national security needs.

Extend the Public Comment Period for Sixty Days

The Department of Energy is allowing for a sixty day comment period for people to review and provide comments on a large, complex document that references twenty-eight other related NEPA documents, an economic report that not released until July 28, 1998, and numerous "Data Reports." 1

The Data Reports are unavailable to people who are not near a Department of Energy Reading Room, yet contain crucial information. For example, on page J-4 of the Draft SPDEIS, DOE wrote that, "source term data for radiological releases, stack heights, and release locations are provided in the data reports for the pit conversion, immobilization, and MOX facilities." In other words, the Draft SPDEIS does not contain any data on something as basic as expected quantities of radioactive air pollutants.

Provide for Additional Public Hearings

The Department of Energy is planning only five public hearings, four in the communities closest to DOE sites being considered for new plutonium processing plants, and one regional meeting in a downstream community (Portland). This public hearings schedule will likely dilute the diversity of public comments; inhibit the involvement of downwind and downstream communities that generally bear liabilities without benefits; and skew the public opinion curve in favor of DOE proposals.

DOE should add the following hearings to its list: 2

1. Regional Hearings in Savannah, Georgia and Columbia, South Carolina. The Savannah River Site is the preferred candidate site for all three new plutonium processing facilities. Real impacts on the Savannah River from SRS operations and accidents are well documented, with the most notable being the December, 1991 tritium leak that quickly reached Savannah, Georgia. DOE cannot justify not holding a regional hearings in the Savannah River region, which will bear the greatest liability from its proposals, while holding one in Portland to discuss why Hanford is no longer preferred for

FD198

FD198–1 **General SPD EIS and NEPA Process**

DOE believes that the comment period, longer than required by CEQ's NEPA regulations, allowed sufficient time for public review of the SPD Draft EIS. Moreover, comments submitted after the close of the comment period were also considered.

DOE's descriptions of the affected environment and the potential environmental impacts in this SPD EIS are in accordance with 40 CFR 1502.15 and 40 CFR 1502.16. These descriptions are no longer than necessary for an understanding of the effects of the alternatives, and the analyses and data are commensurate with the significance of the impact, the less-important information being consolidated, summarized, or referenced. Resources such as the data reports are available in the public reading rooms at the following DOE locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

FD198–2 **General SPD EIS and NEPA Process**

It was not possible to hold hearings in all areas of the country; therefore, the hearings were restricted to locations where the greatest impacts of the proposed surplus plutonium disposition facilities could be expected. DOE did, however, provide various other means for public comment on this SPD EIS: mail, a toll-free telephone and fax line, and the MD Web site. During preparation of the *Storage and Disposition PEIS*, regional hearings were held in locations such as Boston, Chicago, San Francisco, and Denver. Denver was included because the PEIS dealt with the removal of materials from RFETS. DOE made, and is honoring, a commitment to get all plutonium out of RFETS. Additional hearings in Denver were not held because the proposed surplus plutonium disposition facilities would not be sited in the area. Shipment of MOX fuel to Canada for testing is under consideration as part of a separate EA, and is not within the scope of this EIS. The *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI (August 1999) can be viewed on the MD Web site at http://www.doe-md.com.

EAST BAY PEACE ACTION
DALE NESBITT
PAGE 2 OF 3

these liabilities 2

2. Regional hearings in communities near nuclear reactor sites that are being proposed for irradiation of Mixed Oxide (MOX) fuel. Consortiums of utilities and nuclear fuel fabricators are scheduled to submit Proposals for MOX Fuel Fabrication and Irradiation Services August 1998. Based on these proposals, DOE can identify potentially affected reactor communities.

DOE has stated that "environmental impact analysis relating to specific reactors will be included in the SPD Final EIS," although these analyses are scheduled to be made by Consortiums in their Proposals. During the 1997 Scoping for the SPDEIS, DOE was repeatedly asked to involve nuclear reactor communities in the NEPA process, yet ignored these comments while moving forward on a process to select reactor sites that excludes community input. DOE cannot justify soliciting public comment for the site selection process for plutonium processing facilities, while excluding public involvement in selecting plutonium irradiation facilities. 3

3. A regional hearing in Denver, Colorado. Denver is in proximity to Rocky Flats where approximately 25% of the surplus plutonium is in storage, so the area has a stake in the decisions being made. Furthermore, DOE has never held hearings to discuss plutonium immobilization of Rocky Flats plutonium as a reasonable alternative, and is proposing to weaken the requirements for shipping plutonium from Rocky Flats to Savannah River Site.

4. A regional hearing in Dallas, Texas. Dallas is likely to be in the transportation corridor for shipments of special nuclear materials and radioactive waste from new operations. The Department of Energy cannot legitimately claim that state-wide support exists in Texas for Pantex becoming a new DOE plutonium processing site without seeking input from outside the Amarillo area. 2

5. A hearing in Washington D.C., where decisions are made, policy is formulated, and a substantial community of non-governmental organizations exists to monitor the Department of Energy, and where a larger community of organizations exists to monitor how taxpayer dollars are spent.

6. Port Huron, Michigan (or other location), the location of the border crossing for plutonium fuel shipments to Chalk River, Ontario to test in CANDU reactors. DOE is still considering the option of burning MOX fuel in CANDU reactors, yet has effectively excluded Canadian citizens from the process. The hearing could be a cooperative public event held with the Atomic Energy of Canada, Ltd.

The abundant uncertainties and recent changes in direction in the Department of Energy's hazardous plutonium disposition program indicates a continued need to subject Federal proposals to the highest and most rigorous levels of public debate possible. DOE has already failed to implement the easiest part of its plutonium storage and disposition program. At Pantex it has abandoned its new "safer" container and a proposed facility upgrade for plutonium pit storage. 4 5

For Rocky Flats plutonium, it is already amending the "Record of Decision" for the "Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement" to "address the environmental impact of utilizing the K-Reactor facility for plutonium 6

- 2 -

FD198

DOE actively sought public comments on the SPD Draft EIS and distributed approximately 1,700 copies of the document to all interested parties. All comments, regardless of how they were submitted, were given equal consideration.

FD198–3 **General SPD EIS and NEPA Process**

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

FD198–4 **General SPD EIS and NEPA Process**

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations on the weapons-usable fissile materials disposition program at various locations around the country, not just near the potentially involved DOE sites, to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. Additionally, various means of

EAST BAY PEACE ACTION
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8-28-98

storage, the possibility that plutonium stabilization would be done at SRS instead of at RFETS, the shipment of plutonium to SRS before the APSF storage vault is operational, the shipment of some *materials from RFETS that are less than 50% plutonium, and the need to utilize direct metal casting* in FB-Line to de-classify some of the RFETS." (Defense Nuclear Facilities Safety Board Weekly Report for Savannah River Site, June 26, 1998). 6

The National Environmental Policy Act requires Federal Agencies to insure that high quality "environmental information is available to public officials and citizens before decisions are made *and before actions are taken*", *and that substantial and meaningful public involvement in the* planning and decision process. By restricting public hearings to a few communities, DOE would, at best, be violating the spirit of NEPA. 1

Signed, Dale Nesbitt, Board member, East Bay Peace Action (Signature approved by majority of Board via a Telephone poll)

P.S. We urge that a public hearing also be held in the S.F. Bay area – preferably Oakland. We feel that everyone has a stake in in how Pu is "disposed" off – not just those who live close to the proposed processing sites. 2

- 3 -

FD198

communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue. It is DOE policy to encourage public input into these matters of national and international importance.

FD198–5 **Storage and Disposition PEIS and ROD**

DOE acknowledges the commentor's concern regarding interim and long-term storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of these pits and is considering additional upgrades to Pantex facilities to address plutonium storage requirements. In addition, DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components–AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com.

FD198–6 **Storage and Disposition PEIS and ROD**

DOE conducted a supplement analysis for the early movement to and storage of the RFETS surplus plutonium in Building 105–K after modifications to enable safe, secure plutonium storage. Based on this analysis, DOE issued the amended ROD referenced in the comment in the Federal Register (63 FR 43392) on August 13, 1998, in fulfillment of the letter and spirit of NEPA (40 CFR 1506.6(b)). The decision is contingent on a decision under this SPD EIS to locate an immobilization facility at SRS. A copy of the amended ROD and the supplement analysis is available in the DOE reading rooms and on the MD Web site at http://www.doe-md.com.

Yes, I would like to express my opposition to using weapons grade plutonium from the military in commercial reactor fuel, for commercial reactor fuel. And I would also like a copy of the environmental impact statement concerning this project. 1
My name is: James Ferrigno. My address is: 118 Miramar Avenue. That's in San Francisco, CA. Zip Code 94112. If you would like to, you can reach me daytime phone 415-334-7963. Thank you.

PD004

PD004–1 **DOE Policy**

DOE acknowledges the commentor's opposition to the commercial use of weapons-usable plutonium. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing irradiation.

R., P.A.
PAGE 1 OF 1

IT IS COARUIT— BADLY—CONSTRUCTED
AND TOTALLY DEVOID OF MERIT 1
PAR

Department of Energy
Washington, DC 20585

1998-008753 7/28 11:41

To Interested Parties:

The Department of Energy's *Surplus Plutonium Disposition Draft Environmental Impact Statement* (EIS) is now available for public review. The formal public comment period for the draft will begin on July 17, 1998 and will close on September 16, 1998.

If you have not already received a copy of the draft EIS or a summary, you can obtain copies by written request to:

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

Or by calling 1-800-820-5134.

As part of the formal comment period and pursuant to the National Environmental Policy Act, the Office of Fissile Materials Disposition will hold public meetings at five different locations to solicit written and oral comments on the draft SPD EIS. These meetings are an important component of the Department's continuing efforts to provide the public with meaningful and easily-assessable opportunities to participate in its decision making process

The public meetings will be held between the dates of August 4, 1998 and September 16, 1998. Two sessions (afternoon and evening) will be held at each location and will include workshops to provide an opportunity for discussion and comment. Preregistration for the meetings is requested. For your convenience, preregistration may be accomplished by fax, electronic bulletin board, or a toll-free telephone number. Please refer to the preregistration form on the back of this letter for specific meeting dates, times, locations, and registration instructions.

After the comment period on the draft EIS has closed, the Department will evaluate all comments received. The final EIS will incorporate changes to the text and will include responses to all comments. The final EIS will be completed in late 1998 and will be

We welcome your interest in the fissile materials disposition program and look forward to the receipt of your comments and participation in the public meetings.

Sincerely,

Howard R. Canter
Acting Director
Office of Fissile Materials Disposition

Enclosure

Printed with soy ink on recycled paper

FD002

FD002–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on this SPD EIS.

I'm a native of Colorado. I've lived up in the mountains above north Boulder my whole life. I've been around Rocky Flats and I realize that this stuff needs to be placed somewhere. I just don't believe bringing it all the way to the Carolinas through Georgia is the answer. I think that there's plenty of places within this state to stash the stuff safely indeed. And that's my, that's my urge and my hope that it will keep it within the state. Transferring this stuff really bothers me and annoys me. I think it's dangerous to put it on the road. I think we should keep it within the state. It was produced within the state, let's just keep it here. 1

PD061

PD061–1 **Transportation**

DOE acknowledges the commentor's concern regarding the movement of fissile materials from RFETS to SRS. DOE made, and is honoring, a long-standing commitment to get all plutonium out of RFETS and to expedite closure of the site.

HATFIELD, SCOTT
PAGE 1 OF 4

9/16/98

To: Howard Canter, Director Office of Fissile Materials Disposition
Re: Surplus Plutonium Disposition DEIS

Again the question is raised "What should be done with the plutonium (Pu)?" This woefully inadequate and voluminous document fails to address many important issues. At the top of the list are proliferation concerns with MOX. All the Pu needs to be immobilized. Many issues in the previous PEIS are still very relevant to this DEIS. Transport minimization and the ongoing refusal of DOE to follow its own inadequate transport rules needs some sunshine also. 1 2

Only Alternative II would be preferable to the no action Alternative 1. Alternative 12 involves way too much cross continental transport. Alternatives 11 and 12 do, however, give the important priority to non-proliferation and immobilization and show that MOX is by no means a done deal. There is a cultural problem at DOE on whether Pu is a liability or an asset -- or asset to whom. Also there is what the Rocky Flats Federal Grand Jury called a "culture of contempt for the environment at DOE." The high density of poor minorities at preferred alternative SRS site is also of great concern. 3 4 5

Needs would be best met by a compromise between Alternatives 11 and 12 including multiple immobilization facilities including Pantex, Hanford, INEEL, SRS, and RFETS. Transport must be minimized. Some of these need to be built so that they can be moved, especially at RFETS. Design should also incorporate immobilization of other nuclear waste. At RFETS there is no need to bring in more nuclear waste. The Spent Fuel Standard need not limit dilution levels in the logs. It is allright to make it less accessible than in spent fuel. 6

MD238

MD238–1 **Nonproliferation**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition based on concerns regarding nuclear proliferation. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

MD238–2 **Transportation**

DOE acknowledges the commentor's concerns regarding transportation. DOE would follow all applicable DOE orders and NRC and DOT regulations. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE

Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS.

MD238–3 **Alternatives**

Implementation of Alternative 11 or 12, each of which involves immobilization of all the surplus plutonium, would require approximately the same amount of transportation, with the possible exception of transportation of the final form to the potential geologic repository. Since the location of the potential geologic repository has not yet been determined, the distance from the candidate sites to the potential location at Yucca Mountain, Nevada, was used for the analysis. As indicated in Section 1.6, DOE's preferred alternative is the hybrid approach, not continued storage of the surplus plutonium as described as the No Action Alternative or the immobilization-only approach described as Alternatives 11 and 12. As indicated in Section 2.5, the No Action Alternative would not satisfy the purpose of and need for the proposed action because DOE's disposition decisions reflected in the *Storage and Disposition PEIS* ROD would not be implemented.

MD238–4 **DOE Policy**

DOE considers the existence of surplus plutonium a potential danger. DOE is implementing the President's nonproliferation policy by converting surplus plutonium in an environmentally safe and timely manner, to forms that cannot be reused in weapons again without significant risks, time, and money.

MD238–5 **Environmental Justice**

DOE acknowledges the commentor's concern regarding the density of poor minorities in the vicinity of SRS. As shown in Chapter 4 of Volume I, implementation of the alternatives for disposition of surplus plutonium at SRS would pose no significant risk to public health regardless of the minority and economic status of individuals in the population. This chapter also includes a separate and specific analysis of the potential impacts on minority or low-income populations. Appendix M describes the process that was used to obtain these impacts.

MD238–6 **Alternatives**

Because the implementation of multiple immobilization facilities would be very costly and time-consuming, no such alternative was considered for this SPD EIS. With only 50 t (55 tons) of surplus plutonium to disposition, it would not be practical to construct and operate more than one immobilization facility, even if the decision were made to immobilize all the surplus plutonium. While DOE prefers to minimize the transportation of plutonium that is still desirable for weapons use, plutonium is routinely and safely transported in the United States. As described in Appendix L.3.3, transportation of nuclear materials would be performed in accordance with all applicable DOT and NRC transportation requirements. Interstate highways would be used, and population centers avoided, to the extent possible.

All shipments of surplus plutonium that had not been converted to a proliferation-resistant form would use DOE's SST/SGT system. The transportation analysis results are presented for each alternative in Chapter 4 of Volume I and detailed in Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions would be expected. Therefore, there is no transportation concern that would warrant the construction and operation of multiple immobilization facilities.

MOX is a nightmare no one needs. MOX makes commercial reactors even more dangerous. MOX is an economic bailout for a failed industry. DOE must not use taxpayer dollars to pay utilities to use MOX. The Clinton administration favored complete immobilization, with no MOX, in accordance with NAS recommendations. The last minute justification of MOX under intense nuclear lobby was primarily to keep up technologically with other countries, such as Russia primarily, that planned to use MOX. However, financial, fabrication, environmental, and public outrage pressures are making MOX unlikely in Russia. MOX also carries intense proliferation concerns because it can be used for Pu breeder reactors, along with distribution and other proliferation concerns with MOX. Associated tritium production is also of great proliferation concern. Remember, the Nuclear Non-Proliferation Treaty obligates the USA to work towards eliminating nuclear arsenals and weapons. 7

Sincerely,

Scott Hatfield - various environmental, peace, and scientific groups

Scott Hatfield
PO Box 18471
Boulder CO
80308-8471

MD238

MD238–7 **DOE Policy**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). Section 4.28 discusses the potential environmental impacts of operating the reactors that would use the MOX fuel.

The remainder of this comment is addressed in response MD238–1.

LOCKHART, WADE
PAGE 1 OF 1

Hi, my name is Wade Lockhart and my phone number is (303) 473-9986. I'm calling to express my opinion and to discourage you from using mixed oxide fuel in nuclear reactors for numerous reasons. I'd like to encourage you once again not to use MOX in nuclear reactors. It doesn't make any sense. It doesn't really eliminate any of the plutonium. It's quote, Westinghouse has quoted as saying that only one percent less than the amount of plutonium that goes into it comes out of the reactor. So this no way to get rid of our nuclear stockpile plutonium. My opinion is the best way to deal with this plutonium is to monitor it and perhaps do more research on vitrification or ways of storing it, but not to put it into nuclear reactors. All we are asking for there is just to enhance the, the waste problem that we already have and we haven't dealt with. And so I encourage you to not use mixed oxide or produce mixed oxide fuel for commercial nuclear reactors. Thank you. 1

PD049

PD049–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Rocky Mountain Peace and Justice Center
P.O. Box 1156, Boulder, CO 80306 ph: (303) 444-6981 fax: (303) 444-6523

Comments on the Surplus Plutonium Disposition Draft Environmental Impact Statement (DOE/EIS-0283-D)
submitted by the Rocky Mountain Peace and Justice Center
September 16, 1998

The Rocky Mountain Peace and Justice Center (RMPJC) appreciates the opportunity to comment on the Surplus Plutonium Disposition Draft Environmental Impact Statement (SPDEIS). Since 1983 RMPJC has worked on issues pertaining to the DOE nuclear weapons complex, with a focus on the Rocky Flats Site.

As Rocky Flats currently stores approximately 12 metric tons of plutonium, most of which has been declared surplus, RMPJC has a strong interest in the disposition of plutonium. We also strongly agree that timely and environmentally safe disposition of plutonium is needed to reduce the threat of nuclear weapons proliferation worldwide (we note that note that it is not only the proliferation of weapons but the material itself that is of concern). However, we do not believe that any of the alternatives analyzed in the SPDEIS lead toward fulfillment of this goal, we find that the SPDEIS is fundamentally deficient, and ask that it be redone.

DOE identifies three preferred alternatives for disposition of plutonium: 1

1) Construct a new immobilization facility at the Savannah River Site that would operate in conjunction with the Defense Waste Processing Facility to immobilize waste using the can-in-can process;

2) Construct and operate a new MOX fuel fabrication facility at Savannah River Site;

3) Construct and operate a pit disassembly and conversion facility at Pantex or Savannah River Site.

RMPJC has the following concerns with the preferred alternatives and the disposition strategy outlined through these alternatives.

1) The SPDEIS does not demonstrate the need or benefit of a dual track disposition strategy. 2

2) The SPDEIS does not adequately consider the costs associated with a delay in plutonium disposition caused by public opposition to the MOX option. 3

3) The SPDEIS does not provide a rationale for directing only 17 tons of plutonium toward immobilization. 4

FD323

FD323–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentors' views. DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively).

FD323–2 **Purpose and Need**

DOE acknowledges the commentors' concern about the preferred alternatives and the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

FD323–3 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), that analyses the site-specific cost estimates for each alternative was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

FD323–4 **Alternatives**

DOE reviewed the chemical and isotopic composition of the surplus plutonium and determined in the *Storage and Disposition PEIS* ROD that about 8 t (9 tons) of surplus plutonium were not suitable for use in making MOX fuel. Furthermore, DOE has identified an additional 9 t (10 tons) for a total of 17 t (19 tons) that have such a variety of chemical and isotopic compositions that it is more reasonable to immobilize these materials and avert the processing complexity that would be added if these materials were made into MOX fuel. The criteria used in this identification included the level of impurities, processing requirements, and the ability to meet the MOX fuel specifications. If at any time it were determined that any of the 33 t (36 tons) currently proposed for MOX fuel fabrication was unsuitable, that portion would be sent to the immobilization facility. The addition of this material would not require the immobilization facility to operate longer because it is being designed to handle a throughput of up to 50 t (55 tons) over a 10-year period. Likewise, the MOX facility is being designed to handle up to 33 t (36 tons) of surplus plutonium but would have the flexibility to operate at a lower throughput.

4) The SPDEIS analyzes only the disposition of 50 tons of surplus plutonium. According to the SPDEIS, "The three facilities would be designed so that they could collectively accomplish disposition of up to 50t (55 tons) of surplus plutonium over their operating lives. . . ." (p. 1-6) It is probable that significantly more plutonium will be declared surplus during this time frame. This needs to be anticipated in the design of current disposition alternatives. 5

5) The SPDEIS does not adequately analyze the impact of a significant delay or the failure of one track of the disposition strategy on the goal of accomplishing timely disposition. 6

6) The SPDEIS fails to analyze immobilization at more than one site. 7

7) Proprietary information in bids for MOX fuel fabrication does not allow the public to fully assess the impact of this work. 8

The Rocky Mountain Peace and Justice Center urges the Department of Energy to redo the SPDEIS. It should analyze the impact of using the just the MOX option, and just the immobilization option. It should also analyze the possibility of immobilizing plutonium at more than one site, including the Rocky Flats Site. Portable and small scale immobilization technology should be analyzed. It should analyze the possibility of splitting the immobilization steps for the can-in-can process between different sites. That is, explore the possibility of immobilizing the "inside can" at the current storage location. 9

Again, RMPJC would like to thank the Department of Energy for the opportunity to comment on the SPDEIS. If you have any questions regarding our comments please contact LeRoy Moore or Tom Marshall at (303) 444-6981.

FD323

FD323–5 **Purpose and Need**

During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. This document was added to Appendix A of Volume II.

DOE acknowledges the commentor's concern that the amount of surplus weapons-usable plutonium may change in the future. The design of the facilities could remain the same, but additional amounts could affect the schedule of surplus plutonium disposition. If the amount increased, DOE would comply with NEPA requirements and conduct further analyses.

FD323–6 **Purpose and Need**

The advantages of DOE's hybrid approach are described in response FD323–2.

FD323–7 **Alternatives**

As described in Chapter 2 of Volume I, all of the surplus plutonium disposition alternatives include immobilization of some or all of the surplus plutonium at either Hanford or SRS. Although DOE's preferred alternative is to locate the immobilization facility at SRS, Chapter 4 of Volume I analyzes the site-specific impacts associated with construction and operation of the immobilization facility at both Hanford and SRS.

FD323–8 **MOX RFP**

This comment is addressed in the public comment opportunity portion of response FD323–3.

FD323–9 **Alternatives**

Regarding portable, small-scale immobilization at plutonium storage sites, development work to date on the conversion, blending, and immobilization of these feed materials calls for a centralized plant to produce a durable, standardized product in a cost-effective manner. In addition, the NWPA qualification of the immobilized forms for disposal in a potential geologic repository could be affected if current plans for producing uniform products

were replaced with forms that varied significantly from site to site. In addition, deploying a new plutonium immobilization mission at RFETS would conflict with DOE commitments to expedite closure of the site by 2006.

While immobilizing all surplus plutonium is analyzed in this SPD EIS, fabricating all surplus plutonium into MOX fuel is not a reasonable alternative and is not analyzed. As described in response FD323–4, this is due to the complexity, timing, and cost that would be involved in purifying those plutonium materials to make them suitable for use in MOX fuel.

SMITH, FRANK W.
PAGE 1 OF 1

To: Harold Canter, Director
Office of Fissile Materials Disposition
U. S. Department of Energy
PO Box 23786
Washington, DC 20026-3786

10 September, 1998

From: Frank W. Smith

Re: Comment, Surplus Plutonium Disposition (SPD) EIS

We once met, at the Arvada Center in Denver with me in a wheelchair. I remain active at an appropriate level of engagement for growing physical limitations.

I strongly suggest that another facet be added to your Final EIS, namely a constructive showing that the commercial reactor(s) owners will "accept-and-use" MOX fuel to be created by that plutonium disposition option.

It has been shown in other studies that plutonium-based fuel(s) are not the "economic" fuel-of-choice" for light water reactors, and that there is a "uranium industry" that can be expected to fight use of MOX fuels that place the government (DoE) in competition with private industry. Without takers of MOX fuel, disposition will not be accomplished, and holding costs will continue. 1

Without addressing the "acceptance-and-use" of MOX fuels to be fabricate, the SPD EIS is incomplete. So please examine and report upon the prospect(s) for "acceptance and use of surplus-plutonium-based MOX fuel" for commercial reactors in the FINAL SPD EIS.

Frank W. Smith

Frank W. Smith
235 Lipan Way ... a change of street address for your mailing list, please
Boulder, CO 80303-3634
(303) 494-8355

MD166

MD166–1 **MOX Approach**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. Because the fuel fabricator and reactor licensees work closely as a team, it is unlikely that there would be a problem in accepting the MOX fuel. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

THE ROCKY FLATS LOCAL IMPACTS INITIATIVE
BOB DYER
PAGE 1 OF 1

THE ROCKY FLATS LOCAL IMPACTS INITIATIVE

5460 Ward Road, Suite 205
Arvada, Colorado 80002

Phone: (303) 940-6090
Fax: (303) 940-6088
e-mail: rflii@rflii.org

August 28, 1998

Howard R. Canter
Acting Director
Office of Fissile Materials Disposition
US Department of Energy
PO Box 23786
Washington, DC 20026-3786

Dear Mr. Canter:

Thank you for the opportunity to comment on the Environmental Impact Statement for the disposition of surplus plutonium. The Rocky Flats Local Impacts Initiative is a coalition of local governments, unions, neighbors and community interest groups working together to provide a community voice in the downsizing of the Rocky Flats facility. It is not within our mission nor expertise to comment on the options for disposition facilities or processes. However there are two corollary issues important to us.

First, we are eager to have the excess plutonium now being stored at Rocky Flats safely moved to better locations. With over two million people now living within fifty miles of Rocky Flats and the plutonium being stored in inadequate facilities, we support the goals of the Rocky Flats Field Office and Kaiser-Hill to accelerate shipments. In order to optimize the cleanup schedule, shipments of plutonium metals and oxides should begin in the next two to four years. We support and appreciate the August amendment to the Record of Decision for storage and disposal that would accelerate shipment of Rocky Flats non-pit plutonium to Savannah River once the decision is finalized that SRS should be the ultimate disposal site. 1

Second, we foresee that a concern will be raised by citizens and communities along the transportation corridors. The EIS does not specify routes due to security concerns. However, if this material is to be shipped on routes other than those already designated by states for transport of hazardous materials, concerns of local communities may be justified. We urge your office to continue to coordinate with other DOE programs, states, Tribes, local governments and others to provide information and assurance to those in potential transportation corridors of the safety of the transport. 2

Sincerely,

DeAnne Butterfield

for Bob Dyer
Chair

MD171

MD171–1 **Storage and Disposition PEIS and ROD**

DOE acknowledges the commentor's support of the amended *Storage and Disposition PEIS* ROD to support the early closure of RFETS.

MD171–2 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997) because the waste types and volumes that would result from surplus plutonium disposition activities have been included in those environmental reviews. The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

J.R. WHITE CONSULTING
J.R. WHITE
PAGE 1 OF 1

I think the transportation issues have not been adequately treated. Transportation issues could be the show stoppers because this is where you interface with the public. It appears to me to be obvious that from the standpoint of minimizing public risk and minimizing the possible diversion of SNM during transportation, the best option is Pu conversion and MOX at Pantex with Pu Immobilization at SRS to avoid shipping weapons grade materials around the country. It appears, however, that politics is moving MOX to SRS so you haul PuO_2 from TX to SC. For my money I would put PDCF (pits to PuO_2) and MOX at Pantex, then you would be shipping reactor fuel from Pantex not PuO_2. 1

WD008

WD008–1 **Transportation**

DOE acknowledges the commentor's concern regarding transportation of special nuclear materials, and support for siting the pit conversion and MOX facilities at Pantex and the immobilization facility at SRS. This siting corresponds to Alternative 9 in this SPD EIS. Transportation impacts are summarized in Chapter 4 of Volume I and Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Decisions on the surplus plutonium disposition program will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 1 OF 8

STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS
"Helping Floridians create safe, vibrant, sustainable communities"

LAWTON CHILES
Governor

JAMES F. MURLEY
Secretary

September 29, 1998

Mr. Howard R. Canter
U.S. Department of Energy
Office of Fissile Materials Disposition
Post Office Box 23786
Washington, DC 20026-3786

RE: U.S. Department of Energy - Surplus Plutonium Disposition - Draft Environmental Impact Statement - Statewide
SAI: FL9808110565C

Dear Mr. Canter:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the above-referenced project.

Based on the information contained in the draft environmental impact statement and the enclosed comments provided by our reviewing agencies, the state has determined that, at this stage, the above-referenced action is consistent with the Florida Coastal Management Program. 1

Thank you for the opportunity to review the draft environmental impact statement. If you have any questions regarding this letter, please contact Ms. Cherie Trainor, Clearinghouse Coordinator, at (850) 922-5438.

Sincerely,

Chris McCay
for Ralph Cantral, Executive Director
Florida Coastal Management Program

RC/cc

Enclosures

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100
Phone: 850.488.8466/Suncom 278.8466 FAX: 850.921.0781/Suncom 291.0781
Internet address: http://www.state.fl.us/comaff/dca.html

FLORIDA KEYS
Area of Critical State Concern Field Office
2796 Overseas Highway, Suite 212
Marathon, Florida 33050-2227

GREEN SWAMP
Area of Critical State Concern Field Office
155 East Summerlin
Bartow, Florida 33830-4641

SOUTH FLORIDA RECOVERY OFFICE
P.O. Box 4022
8600 N.W. 36th Street
Miami, Florida 33159-4022

MD333

MD333–1 **General SPD EIS and NEPA Process**

DOE acknowledges the State's receipt of the SPD Draft EIS and its determination that the proposed action, at this stage, is consistent with the Florida Coastal Management Program.

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 2 OF 8

COMMENTS DUE-2 WKS: 08/28/1998
CLEARANCE DUE DATE: 09/25/1998
SAI#: FL98081105

Message:

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
X Agriculture Community Affairs Environmental Protection Game and Fresh Water Fish Comm OTTED State Transportation		Environmental Policy/C & ED

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

___ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

_X_ Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

___ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

___ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of Energy - Surplus Plutonium Disposition Draft Environmental Impact Statement - Florida.

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- [x] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [x] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:
Division/Bureau: Florida Division of Forestry, Forest Resource Planning & Support Services Bureau, 3125 Conner Boulevard, Tallahassee, Florida 32399-1650
Reviewer: James Eric Ford
Date: 5/6/98

MD333

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 3 OF 8

Message:

CLEARANCE DUE DATE: 09/25/1998
SAI#: FL980811056

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Agriculture Community Affairs Environmental Protection Game and Fresh Water Fish Comm OTTED State Transportation	RECEIVED SEP 02 1998 State of Florida Clearinghouse	X Environmental Policy/C & ED

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EO. 12372/NEPA

- [x] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:
Division/Bureau: EOG/OPB ENV
Reviewer: Paula L Allen
Date: ~~September~~ August 31, 1998

MD333

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 4 OF 8

Message:

COMMENTS DUE-3 WKS: 09/04/1998
CLEARANCE DUE DATE: 09/25/1998
SAI#: FL98081105(

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Agriculture Community Affairs X Environmental Protection Game and Fresh Water Fish Comm OTTED State Transportation	RECEIVED SEP 23 1998 State of Florida Clearinghouse	Environmental Policy/C & ED

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

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Project Description:

Department of Energy - Surplus Plutonium Disposition Draft Environmental Impact Statement - Florida.

To: **Florida State Clearinghouse**
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- [x] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From: FDEP
Division/Bureau: ECOSYSTEM MGT / OIP
Reviewer: Chris D. Wilff
Date: 9/21/98

MD333

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 5 OF 8

Message:

CLEARANCE DUE DATE: 09/25/1998
SAI#: FL98081105

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Agriculture Community Affairs Environmental Protection X Game and Freshwater Fish Comm OTTED State Transportation		Environmental Policy/C & ED

RECEIVED AUG 18 1998 State of Florida Clearinghouse

RECEIVED BY GFC AUG 14 1998 OFFICE OF ENVIRONMENTAL SERVICES

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

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_X_ Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

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Project Description:

Department of Energy - Surplus Plutonium Disposition Draft Environmental Impact Statement - Florida.

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA	Federal Consistency
☒ No Comment	☒ No Comment/~~Consistent~~
☐ Comments Attached	☐ Consistent/Comments Attached
☐ Not Applicable	☐ Inconsistent/Comments Attached
	☐ Not Applicable

From:
Division/Bureau: Office of Environmental Services
Reviewer: Brian Barnett
Date: 8/14/98

MD333

Florida Coastal Management Program
Chris McCay
Page 6 of 8

Message:

CLEARANCE DUE DATE: 09/25/1998
SAI#: FL98081105(

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Agriculture Community Affairs Environmental Protection Game and Fresh Water Fish Comm X OTTED State Transportation		Environmental Policy/C & ED

RECEIVED
SEP 01 1998
State of Florida Clearinghouse

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

___ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

_X_ Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

___ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

___ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of Energy - Surplus Plutonium Disposition Draft Environmental Impact Statement - Florida.

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- [x] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [x] No Comment/~~Consistent~~
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:
Division/Bureau: OTTED
Reviewer: M. Blakely
Date: 8/27/98

MD333

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 7 OF 8

Message:

COMMENTS DUE-2 WKS: 08/28/1998
CLEARANCE DUE DATE: 09/25/1998
SAI#: FL98081105

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
. Agriculture Community Affairs Environmental Protection Game and Fresh Water Fish Comm OTTED X State Transportation	NONE IN FL	Environmental Policy/C & ED All FLA SAI-DOE-DEIS 98 5 14 RECEIVED BUREAU OF HISTORIC PRESERVATION 98 AUG 19 PM 12:01

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EO. 12372/NEPA	Federal Consistency
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☐ Comments Attached	☐ Consistent/Comments Attached
☐ Not Applicable	☐ Inconsistent/Comments Attached
	☐ Not Applicable

From:
Division/Bureau: Historical Resources
Reviewer: [signature] Laura A. Kammerer
Date: 8/25/98 8-25-98

MD333

Message:

CLEARANCE DUE DATE: 09/25/1998
SAI#: FL98081105

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Agriculture Community Affairs Environmental Protection Game and Fresh Water Fish Comm OTTED State X Transportation		Environmental Policy/C & ED

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- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:
Division/Bureau: Environmental Mgt. OFFICE
Reviewer: Louis Reis
Date: 8/26/98

MD333

This is Ed Arnold from Atlanta, Georgia. Address here is 421 Clifton Road, Atlanta 30307. My phone number here is (404) 371-1849. Just as a citizen, I'm concerned that this MOX idea has progressed. Contrast, putting these things in the ground as they are with processing the pits, changing into the MOX fuel, transporting them from place to place as they need to be, getting the extra plutonium out into the commercial sector where there is more security risk, running the risk of higher temperatures and more hazardous waste at the commercial sites and as I understand it, the EIS does not include anything about final placement either for fuel use at the commercial sites or spent fuel disposal after its finished. Contrast that with just putting these things in the ground. I don't understand you. I, I have spoken with people who say Russians say, well we have to do it because the U.S. is doing it. One justification I would thought might be the case was that we wanted to do it so we'd know something the technology so that we could help the Russians if anything went wrong. Well if they are doing it because we are doing it and, I just don't understand you. Good-bye. 1

PD057

PD057–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. The MOX approach was recommended by NAS as an effective means for managing surplus plutonium, and was endorsed by those elements of the international scientific community involved in studies of plutonium disposition. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

The direct-disposition alternative (i.e., direct placement of plutonium into the ground) was eliminated by the *Storage and Disposition PEIS* ROD, mainly because the plutonium would be more retrievable and thus less proliferation resistant. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

AUGUSTA COMMISSION
HONORABLE LARRY SCONYERS
PAGE 1 OF 8

I am Larry Sconyers, Mayor of Augusta Richmond County. I am here today to express my support for the Savannah River Site and the new missions under consideration for location there. 1

SRS has a long and outstanding safety, environmental and production record.

1

SCD51

SCD51–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

We are proud of SRS and the employees there, both past and present. They have made significant contributions to our national security and to the end of the Cold War. They are outstanding citizens in every respect.

1

Plutonium Disposition is an essential program for our nation's security, today and in the

2

SCD51

AUGUSTA COMMISSION
HONORABLE LARRY SCONYERS
PAGE 3 OF 8

future. SRS stands ready to accept that responsibility and this community stands behind that readiness. Our support for SRS is second to none any where in the DOE complex. Secretary Pena saw this in his visit here last December and we look forward to Secretary Richardson visiting us in the very near future. 1

3

SCD51

SRS has the experience, expertise, and infrastructure required to accomplish the Plutonium Disposition missions. Having been selected as the preferred site for Mixed Oxide Fuel Fabrication and Immobilization based on these existing capabilities, Pit Disassembly and Conversion should also be located here. Consolidating the three missions at SRS will save taxpayers hundreds of millions of dollars. 1

4

SCD51

AUGUSTA COMMISSION
HONORABLE LARRY SCONYERS
PAGE 5 OF 8

Pantex has never processed plutonium and therefore, does not have the infrastructure, experience or expertise to support any of the missions, especially Pit Disassembly and Conversion. We as taxpayers do not need to pay to build at Pantex what already exists and operates at SRS.

1

5

SCD51

The EIS appears to have been prepared so as to attempt to level the competition field between SRS and Pantex. DOE should correct this document before it is published. Once done in an objective manner, it will verify what those of us who are familiar with SRS and Pantex already know - Pantex does not come close to being equal to SRS. 2

6

SCD51

SCD51–2 **General SPD EIS and NEPA Process**

Preparation of this SPD EIS involved carefully obtaining comparable data on all of the alternatives, analyzing such data consistently using well-recognized and accepted procedures, and presenting the results in a full and open manner.

Location of Pit Disassembly and Conversion work at SRS is not just about jobs. It is the right thing to do for our nation and its taxpayers. I encourage DOE to make the correct decision. 3

Thank you for this opportunity to express my comments and support.

7

SCD51

SCD51–3 **Other**

DOE acknowledges the commentor's support for DOE to make the correct decision.

RESOLUTION

RESOLUTION IN SUPPORT OF PLUTONIUM MISSION AT THE SAVANNAH RIVER SITE

WHEREAS, Plutonium handling must be in the hands of professionals with proven experience.

WHEREAS, DOE has already expressed confidence in SRS by assigning the Site the MOX and immobilization missions.

WHEREAS, use for all parts of the plutonium disposition mission, including pit disassembly and conversion, can save taxpayers at least $1.6 billion based on avoided costs of new structures and equipment that would be required at other DOE sites.

WHEREAS, the Pantex facility in Texas has never processed plutonium; therefore there is no plutonium handling infrastructure and competency at Pantex. 1

WHEREAS, transportation should not be an issue relative to choosing SRS. The pits are already being transported to Pantex in Texas.

WHEREAS, the DOE plutonium missions are safe, especially when performed by people with demonstrated competency such as the people at SRS. Tens of thousands of nuclear weapons workers have been involved in U.S. plutonium operations. Comprehensive medical surveillance programs at SRS and other sites have never found a death or even a cancer that could be related to worker exposure to plutonium.

NOW, BE IT RESOLVED, that the Augusta Commission strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River site as its local facility in plutonium management and disposition.

Duly adopted by The Augusta Commission this 4th day of August, 1998

The Augusta Commission

By Larry E. Sconyers
As Its Mayor

ATTEST:
As its Clerk

SCD51

AUGUSTA-RICHMOND COUNTY LEGISLATIVE DELEGATION
HONORABLE BEN ALLEN ET AL.
PAGE 1 OF 1

RESOLUTION

WHEREAS, the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS, plutonium disposition represents one of the most certain future missions of the Department of Energy for the next 20 to 30 years; and

WHEREAS, the Department of Energy has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and

WHEREAS, the Savannah River Site has produced approximately 40 percent of all U.S. weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public or the environment; and

WHEREAS, the Department of Energy in its Record of Decision recognizes the Savannah River Site as "a plutonium competent site with the most modern, state-of-the-art storage and processing facilities . . . with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and

WHEREAS, the regional community in the Central Savannah River Area (CSRA) of South Carolina and Georgia strongly supports continued plutonium missions for the Department of Energy's Savannah River Site;

NOW BE IT RESOLVED that the Savannah River Regional Diversification Initiative (SRRDI) strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

1

APPROVED this 11th day of March, 1997, by the Augusta-Richmond County Legislative Delegation of the State of Georgia.

Representative Ben Allen

SCD84

SCD84–1 **Alternatives**

DOE acknowledges the commentors' support for the surplus plutonium disposition program at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed surplus plutonium disposition facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AUGUSTA-RICHMOND COUNTY LEGISLATIVE DELEGATION
HONORABLE JACK CONNELL
PAGE 1 OF 1

JACK CONNELL
Speaker Pro-Tem

House of Representatives
Atlanta, Georgia 30334

P. O. Box 309
Augusta, Georgia 30903
Telephone: 706/823-6212

Room 340
State Capitol
Atlanta, Georgia 30334
Telephone: 404/656-5072

June 19, 1997

Mr. Howard R. Canter, Director
U. S. Department of Energy
Office of Fissile Materials Disposition
P. O. Box 23786
Washington, D.C. 20026-3786

Dear Mr. Canter:

Due to circumstances that prevent me from attending the U. S. Department of Energy's workshop today, this letter is written to voice my support for the Savannah River Site as the selection for the plutonium disposition options under consideration.

Clearly, the SRS should be the choice for the plutonium mission based on what is best for the citizens of our country. While it is certainly important to our local area, my utmost concern is for this selection to be based on cost-effectiveness, safety for the workers, public environmental concerns, and for the betterment of our national security . . . **and the SRS unquestionably meets all of these requirements.** 1

SRS has the only large-scale plutonium processing facility in the country. From strictly a business standpoint, why would you spend the dollars to duplicate their capabilities at another location and additional dollars to transport components to the SRS? It is only logical to keep all the plutonium handling operations at one site. Further, the SRS has maintained a good safety record for more than 40 years with the technical and operating staff experienced in plutonium handling.

I hope the DOE will consider all of the advantages that the SRS has to offer.

Sincerely,

Jack Connell

Jack Connell, Speaker Pro Tem
Chairman, Augusta-Richmond County Legislative Delegation

JC/dl

SCD81

SCD81–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed surplus plutonium disposition facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BOOKER, SAM
PAGE 1 OF 2

Question/ Information Request Card

Name: Sam Booher
Address: 4387 Roswell Dr
Augusta, Ga 30907
Phone: 706 863-2324 Fax: 706 863-2324
E-mail: s booher @ AOL.com
Question/ Request: While I am very pleased with new missions coming to SRS, I am concerned that there will be a rush to develop on land outside the Industrial Zone 1

For further information contact:
U.S. Department of Energy, Office of Fissile Materials Disposition, MD-4
Forrestal Building, 1000 Independence Ave., SW, Washington, D.C. 20585
1-800-820-5156

SCD88

SCD88–1 **Ecological Resources**

DOE acknowledges the commentor's concern regarding natural wildlife habitat and recognizes the importance of protecting the ecological resources at SRS. To accommodate the proposed surplus plutonium disposition facilities, the fence in F-Area would need to be moved to incorporate more land. However, this parcel of land has been previously disturbed by past actions. Prior to construction, the proposed site would be surveyed for nests of migratory birds and consultations with USFWS and the South Carolina Department of Natural Resources would ensure that any appropriate mitigation actions would be implemented as needed to protect sensitive habitat or species.

on land in the Buffer Zone that to date is still ecologically important and never been paved over or had roads built over.

Please make every effort to not sacrifice our Natural Wildlife Habitat in your effort to bring new jobs to SRS 1

I hope you share my belief that both can be done without harm

Sam Booker

SCD88

BUSS, NANCY
PAGE 1 OF 1

This is Nancy Buss calling from Atlanta, Georgia. I just wanted to say that I think that the MOX fuel facilities do not sound like a good idea. It seems to me that we should be getting rid of all nuclear fuel plants because so far we have not found any good way to contain the waste products. I think the Department of Energy would do much better to put its resources and expertise behind solar power and things, wind power and things like that that can be renewed and are passive power sources, as far as contaminating the environment. Thank you very much. 1

PD047

PD047–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. By fabricating MOX fuel from surplus plutonium, the United States is not encouraging domestic or foreign commercial use of plutonium as an energy source. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, the facility would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the facility would be shut down at the completion of the surplus plutonium disposition program.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

Through various programs in addition to the surplus plutonium disposition program, DOE is engaged in innovative technology development for energy production.

This is Emily Calhoun. I am a resident of Banks County, Georgia. I am calling to protest the proposal to allow utility companies to generate electricity from plutonium. That stuff is too hot to handle. It is highly radioactive. It is very dangerous. It should be immobilized. It should certainly not be used as fuel. We should develop renewable energy sources. Thank you. 1

PD053

PD053–1 **Alternatives**

DOE acknowledges the commentor's support for the immobilization approach. However, DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Through various programs in addition to the surplus plutonium disposition program, DOE is engaged in innovative technology development for energy production.

CAMPAIGN FOR A PROSPEROUS GEORGIA
RITA KILPATRICK
PAGE 1 OF 3

CAMPAIGN FOR A PROSPEROUS GEORGIA

COMMENTS REGARDING THE SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT

Submitted on behalf of Campaign for a Prosperous Georgia
September 16, 1998

Campaign for a Prosperous Georgia is a ratepayer-based organization working state-wide in Georgia on electricity issues to strengthen the economy and to protect the environment now and for future generations.

In making comments on the Draft Environmental Impact Statement, we bring attention to several issues which our organization urges the Department of Energy to address before proceeding any further with the mixed-oxide fuel experiment.

1) Consider the impacts of mixed-oxide fuel on individual commercial reactors. Until this is done, and it needs to be done up-front during the Environmental Impact Statement process, the EIS is not completed. 1

2) It is our understanding that none of the reactors in the country, including the Southeast region, were designed to accommodate mixed-oxide fuel. We also understand that generation of electricity with mixed-oxide fuel is an untried experiment and that nowhere in the world has mixed-oxide fuel using plutonium from warheads been used. In Europe, process plutonium that was never put in a warhead was used. We also understand that the use of mixed-oxide fuel from warhead plutonium increases the wear and tear on a reactor. This needs to be addressed as it relates to decommissioning plans, decommissioning costs, and public safety. 2

3) We understand that utilities or utility consortiums are looking to receive a "free" plutonium subsidy from the federal government for mixed oxide fuel generation. Issues such as "Whose money is this?" and "Will utilities be paid twice for the same kilowatt-hour—once by ratepayers and once by the government or taxpayers?" need to be addressed. At the public meeting in Augusta which our organization representatives attended, the Department of Energy response to the subsidy question was that utilities will not pass any costs of using mixed-oxide fuel onto ratepayers. With all due respect, we have heard that kind of statement before. Unfortunately, lack of sound cost estimates associated with the construction of nuclear plant Vogtle at the Savannah River Site resulted in the worst and most serious rate hike Georgians have ever experienced. 3

4) The Department of Energy needs to address the ways in which a mixed-oxide fuel subsidy unfairly advantage certain companies in a competitive utility market. 4

1083 AUSTIN AVENUE NE • ATLANTA, GEORGIA 30307 • 404 659 5675 • FAX 404 659-5676

FD315

FD315–1 **MOX Approach**

DOE acknowledges the commentor's concern regarding the MOX approach. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

FD315–2 **MOX Approach**

Although no domestic, commercial reactors use MOX fuel, several are in fact designed to do so, and others can easily and safely accommodate a partial MOX core. Electricity is generated from MOX fuel in Europe, and a demonstration of the process was conducted in the United States in the early 1970s. While plutonium from warheads may never have been used in MOX fuel, its behavior in fuel is essentially the same as that of non-weapons-grade plutonium, and thus does not present a situation different from the MOX fuel experience to date. Reactor-grade and weapons-grade plutonium are chemically indistinguishable. The difference is isotopic: there is less plutonium 239 (and therefore more plutonium 240) in reactor-grade plutonium than in plutonium that was produced for use in weapons. However, since plutonium 240 is not fissile, it is the amount of plutonium 239 that dominates criticality concerns. MOX fuel, regardless of the origin of the plutonium, has a higher flux than LEU fuel, and thus can cause more wear on the reactor than LEU fuel. However, this is taken into account when developing fuel management strategy. Section 4.28 was revised to include reactor-specific analyses, including accident analyses, for the reactors proposed to irradiate MOX fuel.

Use of MOX fuel should not increase the cost of reactor operation or decommissioning. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

FD315–3 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

The MOX approach is not intended to affect the viability of nuclear power generation at any particular reactor. DCS does not have to continue to use MOX fuel if it determines that it is uneconomical to operate the reactor. This ensures that DOE is not driving the continuation of reactor operations solely for the surplus plutonium disposition program. Furthermore, DCS would

CAMPAIGN FOR A PROSPEROUS GEORGIA
RITA KILPATRICK
PAGE 3 OF 3

Campaign for a Prosperous Georgia (cont.)

The Department of Energy's proposal to unfairly advantage nuclear energy suppliers through a subsidy is in sharp contradiction to the significant ongoing efforts nationwide to create a "level playing field" for power suppliers in an increasingly competitive utility market. 4

5) Without mixed-oxide fuel subsidies, is the Department of Energy prepared to buy out any mixed-oxide fuel reactors to keep them operating and is the Department of Energy prepared to address taxpayer opposition to government buyout?

6) The issue of who is going to buy electricity generated from mixed-oxide fuel must be addressed. Polls around the country show consistently that when given a preference, the majority of people want to invest in renewable energy and conservation, not fossil fuels and more clearly, not nuclear power. 5

In conclusion, we urge the Department of Energy to consider more wisely and more strategically a decision of whether to pursue the mixed-oxide fuel experiment at all. In the event the Department requires any background papers which support our above stated concerns, please do not hesitate to contact us at the address of phone number on the first page of these comments. 1

Further, we request to be informed of the Environmental Impact Statement process for individual commercial reactors.

Respectfully submitted on behalf
of Campaign for a Prosperous Georgia,

Rita Kilpatrick
Executive Director

FD315

only be reimbursed for costs solely and exclusively related to MOX fuel irradiation. This would ensure that the taxpayers were not underwriting otherwise uneconomical electricity-generating assets.

FD315–4 **MOX Approach**

This comment is addressed in response FD315–3.

FD315–5 **General SPD EIS and NEPA Process**

As discussed in Section 2.1.3, if DOE decides to implement alternatives that require MOX fuel fabrication, then the MOX fuel would be irradiated in the Catawba, McGuire, and North Anna reactors. As described in Section 2.4.3.2, MOX fuel is produced with a process similar to that for the production of traditional LEU fuel for commercial power reactors. The use of MOX fuel is intended to be revenue neutral for participating utilities and transparent to their customers. The use of MOX fuel would not be expected to alter the customer base for participating utilities.

MOX fuel would displace traditional LEU fuel in participating reactors. However, the purpose of the alternatives that include MOX fuel would not be to compete with traditional LEU fuel or renewable energy sources. DOE acknowledges the commentor's opposition to the production and use of plutonium. As discussed in Section 1.2, the goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner.

CITIZENS FOR ENVIRONMENTAL JUSTICE
MILDRED MCCLAIN
PAGE 1 OF 1

Rev. Vernell Currer
Convenor

CITIZENS FOR ENVIRONMENTAL JUSTICE

Dr. Mildred McClain
Executive Director

September 14, 1998

Mr. G. Bert Stevenson
NEPA Compliance Officer
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

Dear Mr. Stevenson,

This letter is requesting that the Department of Energy not to make a decision regarding the Surplus Plutonium Disposition Draft Environmental Impact Statement without the input of the environmental justice communities. We are aware that the Savannah River Site Citizen's Advisory Board and DOE sponsored their own workshop with over 1,100 community representatives attending. Unfortunately, those who attended the workshop did not represent the People of Color and disenfranchised communities. 1

We believe that the, September 16, 1998 comment period ending date for the Surplus Plutonium Disposition Draft Environmental Impact Statement is too soon . This is a formal request for the comment period to be extended beyond its cut off date so that the environmental justice communities, the communities that will directly be affected by this EIS, will be able to make a formal reply.

Working for environmental justice everywhere,

Dr. Mildred McClain

Dr. Mildred McClain
Executive Director

MM/dle

1115 HABERSHAM STREET • SAVANNAH, GEORGIA 31401 • PHONE: (912) 233-0907 • FAX: (912) 233-5105

FD316

FD316–1 **Environmental Justice**

A public hearing on the SPD Draft EIS was held in North Augusta, South Carolina, on August 13, 1998. A special outreach effort was made to make "People of Color and disenfranchised communities" aware of the hearing. This was done by advertising in print media and on radio stations recommended by organizations that represent these communities. Further, special transportation support was offered to ensure that members of these communities were able to attend the hearing, and the hearing was held after normal working hours so that they would not have to miss work. Copies of the SPD Draft EIS were mailed to members of these communities, as well as organizations that represent them, in advance of the hearing. In addition to the hearing, DOE provided several other means to solicit comments: mail, a toll-free telephone and fax line, and the MD Web site.

A period of 60 days was allowed for public comment on the SPD Draft EIS, and DOE accepted comments submitted by various means: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Although it did not extend the comment period, DOE did consider all comments received after the close of that period. All comments were given equal consideration and responded to. As shown in Chapter 4 of Volume I, implementation of the alternatives for disposition of surplus plutonium at SRS would likely pose no significant risk to public health regardless of the minority and economic status of individuals in the population. Chapter 4 also includes Environmental Justice sections for all alternatives on the potential impacts on minority or low-income populations. Appendix M describes the process that was used to determine these impacts.

CITIZENS FOR ENVIRONMENTAL JUSTICE
MILDRED MCCLAIN
PAGE 1 OF 10

Rev. Verneil Cutter
Convenor

CITIZENS FOR ENVIRONMENTAL JUSTICE

Dr. Mildred McClain
Executive Director

October 5, 1998

Mr. G. Bert Stevenson
NEPA Compliance Officer
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

Re: Surplus Plutonium Disposition Draft Environmental Impact Statement DOE/EIS-0283-D

Dear Mr. Stevenson,

Citizens For Environmental Justice (CFEJ conducted eight workshops on the Department of Energy (DOE) proposed activity associated with the disposition of surplus plutonium, for communities traditionally not involved in the decision-making process related to federal facilities like Savannah River Site (SRS) . These workshops held in Augusta, Waynesboro and Savannah in Georgia, and Barnwell and Ridgeland in South Carolina focussed on two areas **1) providing information and 2) gathering input from communities**.

The first series of workshops were conducted in August 1997 and the follow-up workshops occurred in September 1998. Two hundred fifty-one people have participated in these workshops.

The concerns and recommendations contained in this document represent the input from primarily African American stakeholders, but also include the views of those from the general community. Input was collected from the workshops, interviews and telephone surveys. Interviews and surveys were conducted with stakeholders unable to attend the workshops, but expressed an interest in having their voice represented in our formal response to DOE on the Surplus Plutonium Disposition Draft Environmental Impact Statement (EIS). Twelve interviews and thirty telephone surveys were conducted.

It is important to note that many stakeholders that we dialogued with expressed two main concerns about the EIS 1) not having enough time to respond to such lengthy, complex 1

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MD332

MD332–1 **General SPD EIS and NEPA Process**

The public comment period on the SPD Draft EIS was extended from 45 days to 60 days. During this comment period, public hearings were held in areas that would be directly affected by implementation of the alternatives. DOE also accepted comments submitted by various other means: mail, a toll-free telephone and fax line, and the MD Web site. The various channels of communication were open to all interested individuals and organizations, and provided for regional and nationwide comment on the EIS. DOE did consider all comments received after the close of that period. All comments were given equal consideration and responded to.

The *Summary* of this SPD EIS provides an overview of the proposed actions and their potential impacts, and Section 2.18 provides, in layman's terms, a summary of impacts by alternative. As discussed in Chapter 4 of Volume I, implementation of the alternatives would pose no significant risk to human health or the environment downstream from the proposed facilities during normal operations.

documents and 2) a lack of a simplified summary that covered all important elements in layman's terms. Downstream communities also expressed concern over the lack of public meetings being held in their communities. The schedule of public meetings did not encourage the participation and involvement of downstream and downwind communities "that generally bear liabilities, but no economic benefits; and to skew the public opinion curve in favor of DOE proposals".

Regional hearings should have been held in Savannah, Georgia and Columbia, South Carolina. The SRS is the preferred candidate site for all three new plutonium processing facilities. Real impacts on the Savannah River from SRS operations and accidents are well documented, with the most notable being the December 1991 tritium leak that quickly reached Savannah, Georgia. How can DOE justify not holding regional hearings in the Savannah River region? Because of the abundant uncertainties and what is at stake, we strongly recognize "a continued need to subject Federal plutonium proposals to the highest and most rigorous levels of public debate possible". 1

The National Environmental Policy Act (NEPA) requires federal agencies to insure that high quality "environmental information is available to public officials and citizens before decisions are made and before actions are taken," and that there is substantial and meaningful involvement in the planning and decision process. By restricting public hearings to a few communities and excluding potentially affected communities DOE is violating the spirit and the letter of NEPA.

Community Concerns

The following is a list of major concerns expressed by community stakeholders:

1. How will the unproven technologies that will be used in the plutonium pit processing facility be tested and validated with public input? 2
2. What increase in tritium emissions would occur as a result of locating a Plutonium Pit Disassembly and Conversion Facility at SRS and what would the impact be on the air and/or water? 3
3. How will DOE collect input from nuclear reactor communities on selection of reactor sites for plutonium irradiation facilities (irradiation of MOX fuel)? 4
4. What will be done to train medical facilities' personnel to handle exposure problems in the event of an accident? Local emergency responders? 5
5. What security measures will be implemented for communities near SRS to protect against possible terrorists attack? 6

MD332

MD332–2 **Pit Disassembly and Conversion**

The technologies to be used in the pit conversion facility are not unproven. They are, for the most part, technologies that have been used for some time by DOE to perform different functions. DOE is now engaged in a demonstration project that will bring these technologies together in one place so that the engineering design and performance parameters of various types of pits can be determined (*Pit Disassembly and Conversion Demonstration EA* [DOE/EA-1207, August 1998]). This would allow DOE to design and operate a pit conversion facility in a safe and efficient manner. Since 1994, the public has been involved in providing input to the decisionmakers on how to proceed with the disposition of surplus plutonium. The pit conversion facility has been part of a large number of environmental reviews and technical, economic, and nonproliferation studies that have been made public and for which DOE has solicited comments.

MD332–3 **Air Quality and Noise**

Appendix J was revised to include expected radiological release quantities from the proposed surplus plutonium disposition facilities. Appendix J.4.2.1 presents the expected radiological release quantities for the pit conversion facility at SRS. The radiological impacts on air at SRS are discussed in Section 4.4.2.4 for Alternative 3 and in corresponding sections for the other alternatives. Impacts on water at SRS are discussed in Section 4.26.4.2.

MD332–4 **MOX RFP**

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental

impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

MD332–5 **Facility Accidents**

As discussed in the Emergency Preparedness sections in Chapter 3 of Volume I, each candidate site has an established emergency management program that would be activated in the event of an accident. Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program. These modifications would include training medical facilities' personnel and local emergency responders in accordance with DOE Order 151.1, *Comprehensive Emergency Management System*.

MD332–6 **DOE Policy**

In order to address security against terrorist-related incidents, all intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications equipment and additional couriers. Further, the disposition facilities proposed in this SPD EIS are all at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Site personnel work with local, State, and Federal emergency responders and authorities and have plans and procedures in place to ensure appropriate and prompt coordination of efforts when responding to terrorist threats.

The remainder of this comment is addressed in response MD332–5.

Plutonium Recommendations Letter
Page 3 of 5

6. How will the amount of water used from the Savannah River affect communities and the fishing? How would water be cleaned if there was a leak? How would the concept of "containment with the least amount of water" be assured?	7
7. What is the training for transportation personnel and how are they selected?	8
8. Are SRS and DOE prepared for negative outcomes?	9
9. Is adequate funding available for the implementation of all proposals, which includes outreach and public education?	10
10. How will issues associated with transportation be addressed? • Routes • Community/local government and authorities readiness • Informing communities	11
11. How will communities monitor the secret transportation routes? How will the communities be alerted?	
12. In what processes will the Savannah River water be used?	7
Other significant concerns include:	
13. Increased exposure to workers, communities, and environment.	12
14. The impact of gallium (corrosion of the metal).	13
15. Health risks.	12
16. Community plans not in place.	5
17. Location of commercial reactors.	14
18. Cost of MOX.	15
19. Community right-to-know.	16
20. Consistency of emergency training.	5
21. Training of youth regarding new technology.	17
22. Public outreach.	18
23. Equity issues.	1
24. Only the voice of stakeholders in favor of processes coming to SRS being heard.	19
25. Politics driving decisions rather than science and technology.	20
26. Criteria for decisions on the pit disassembly facility.	21

MD332

MD332–7 **Water Resources**

As described in Section 4.26.4.2, the proposed surplus plutonium disposition facilities at SRS would not use water from the Savannah River. Groundwater supplied by the central domestic water supply system would be used. There are redundant systems to prevent a release of contaminants from the proposed facilities. In addition, systems are included that continuously monitor for leaks, allowing early detection and response. If an accident were to release contaminants to the environment, containment and then cleanup would be conducted.

MD332–8 **Transportation**

DOE's Transportation Safeguards Division is responsible for selecting and training the couriers that operate and escort the SST/SGTs. To be considered for selection as a courier, one must pass a background investigation and receive DOE's highest security clearance, be certified to operate SST/SGTs, possess mental alertness, and meet physical performance requirements. Couriers are initially trained in firearms, tactics, and driving and receive specialized training in physical fitness, communications, radiation, and hazards/detection. The emergency management training for couriers includes the above-mentioned areas and nuclear weapons safety, hazardous materials safety, emergency response training, general firefighting, fire prevention, and explosive hazards.

MD332–9 **DOE Policy**

DOE acknowledges the commentor's concern regarding the safety of nuclear materials. Accident analyses for SRS are summarized in the Facility Accidents section in Chapter 4 of Volume I for alternatives that include SRS.

SRS has an emergency management program that includes emergency planning, preparedness, and response in the event of an accident. The Emergency Preparedness Facility at SRS provides overall direction and control for onsite responses to emergencies and coordinates with Federal, State, and local agencies and officials on the technical aspects of the emergency.

MD332–10 **DOE Policy**

Funding for the surplus plutonium disposition program is appropriated annually by the U.S. Congress. DOE, in its 5-year budget plan, has notified both the Office of Management and Budget and the Congress about the funding level required to implement the surplus plutonium disposition program. This budget plan includes funds for maintaining the public outreach program. Since its creation, MD has supported a vigorous public participation policy and will continue to provide the public with information and maintain communication mechanisms (e.g., mail, a toll-free telephone and fax line, MD Web site) to facilitate public input.

MD332–11 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997).

The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com or by calling (202) 586-5368.

The commentor's recommendations are consistent with DOE policy. As part of the development of a transportation plan, details of emergency preparedness, security, and coordination of DOE with local emergency response authorities would be addressed before any hazardous material was shipped. Any additional training or equipment needed would be provided as part of the planning process. In addition to direct Federal assistance to State, tribal, and local governments for maintaining emergency response programs, there are national emergency response plans under which DOE provides

radiological monitoring and assessment assistance. Under these plans, DOE provides technical advice and assistance to the State, tribal, and local agencies who might be involved in responding to a radiological incident. DOE anticipates that transportation of plutonium pits, nonpit plutonium, MOX fuel, and HEU (i.e., special nuclear materials) required to disposition surplus plutonium would be done through DOE's SST/SGT system. Appendix L.3.2 provides a description of this system. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

MD332–12 Human Health Risk

All potential impacts are addressed in detail for each alternative in Chapter 4 of Volume I. The SRS Cumulative Impacts section (Section 4.32.4.4) provides information about incremental exposures that may be associated with surplus plutonium disposition activities.

MD332–13 Plutonium Polishing and Aqueous Processing

At the time DOE issued the SPD Draft EIS, it believed the gallium content in the plutonium dioxide feed specifications for MOX fuel could be reached using the dry, thermal gallium removal method included in the pit conversion process. However, in response to public interest on this topic and to ensure adequate NEPA review in the event that the gallium specification could not be met with the thermal process, an evaluation of the potential environmental impacts of including a small-scale aqueous process (referred to as plutonium polishing) as part of either the pit conversion or MOX facility was presented in Appendix N of the SPD Draft EIS.

On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide in order to eliminate the concern of gallium reacting with the zirconium metal of the MOX fuel rods. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.4.3 was also revised to include the impacts associated with plutonium polishing. While it is true that plutonium polishing would

add to the amount of LLW and TRU waste generated, this amount of waste should be a small fraction of the total amount of these waste types generated at the candidate sites. For example, at SRS, which is the preferred site for the MOX facility, the addition of the plutonium-polishing process would be expected to increase the site's projected generation of LLW and TRU waste by less than 1 percent and 2 percent, respectively. Section 4.32.4 discusses the cumulative impacts of the proposed action at SRS; Sections 4.32.1, 4.32.2, and 4.32.3, the cumulative impacts of the proposed action at Hanford, INEEL, and Pantex, respectively.

The commentor is correct in stating that the use of plutonium would require a license modification, but the modifications needed at the reactors and to handle the spent fuel are expected to be small. Any required reactor modifications would, nevertheless, be conducted in accordance with associated NRC license modification procedures. Section 4.28 was revised to provide reactor-specific analyses.

The purpose of the Comment Response Document is to address comments on environmental impact issues considered in this SPD EIS. The portion of this comment relating to cost has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MD332–14 **MOX Approach**

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the

three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4. The reactors selected as a result of the procurement are Catawba in York, South Carolina; McGuire in Huntersville, North Carolina; and North Anna in Mineral, Virginia.

MD332–15 **Cost**

This comment is addressed in response MD332–13.

MD332–16 **Candidate Sites**

The Emergency Planning and Community Right-to-Know Act is listed in Chapter 5. Activities for the surplus plutonium disposition program would be conducted in accordance with all applicable regulations, including community right-to-know laws.

MD332–17 **Other**

The DOE Education in Science, Technology, Energy, Engineering, and Math (ESTEEM) program offers a wide range of technology-, math-, and science-related education programs for students at various grade levels. Information on ESTEEM, including types of activities offered and points of contact, can be obtained on the Web at http://www.sandia.gov/ESTEEM/home.htm or by contacting Samuel Rodriguez, Assistant Director of Science for Communications and Science Education and Chair, DOE's ESTEEM Education Council, by email at: Samuel.Rodriguez@oer.doe.gov or by phone at: (202) 586-7141.

MD332–18 **General SPD EIS and NEPA Process**

Each of the DOE candidate sites that could be involved in the surplus plutonium disposition program conducts public outreach and education programs in the surrounding communities, and all have a Citizens' Advisory Board.

The remainder of this comment is addressed in response MD332–1.

MD332–19 **Environmental Justice**

Per the commentor's recommendation, Section S.7 of the *Summary* was revised to include the results of DOE's analysis of environmental justice concerns. Chapter 4 of Volume I includes Environmental Justice sections, which provide analyses of the potential impacts on minority or low-income populations for each of the alternatives considered. Appendix M describes the process that was used to determine these impacts and gives additional detail on the minority and low-income populations surrounding each of the candidate sites.

MD332–20 **DOE Policy**

DOE acknowledges the commentor's concern regarding the drivers in the decisionmaking process for locating the surplus plutonium disposition program at SRS. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

MD332–21 **DOE Policy**

DOE acknowledges the commentor's concern regarding the criteria used in the decisionmaking process for locating the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Plutonium Recommendations Letter
Page 4 of 5

Recommendations

Based on the information presented and the concerns expressed the communities recommend the following:

I.	Translate information in the EIS into everyday language.	1
II.	Include summary of environmental justice analysis in the Executive Summary.	19
III.	Conduct public meetings in all areas where citizens may be affected/conduct special sessions for youth.	18
IV.	Work with local community based organizations to conduct outreach and public education activities.	
V.	Provide emergency training for communities near selected site and those on transportation routes (police department, fire department, hospitals, Local Emergency Planning Committees, etc.).	5
VI.	Train the communities in terminology associated with the E I S ♦ Spent Nuclear Fuel ♦ fission ♦ Pit Disassembly ♦ plutonium ♦ disposition ♦ conversion ♦ uranium ♦ basins/tanks ♦ reactors ♦ chemical separations ♦ MOX ♦ robotics	1
VII.	Test the technology (MOX)	22
VIII.	Create community monitoring panels	18
IX.	Provide a detailed analysis of potential impacts on Savannah, GA and other downstream communities. Each community should have a booklet just on its area.	23
X.	Notify communities/insure emergency plan.	5
XI.	Conduct open public debate on the EIS.	1
XII.	Summarize environmental justice analysis in separate document.	19

Finally, our most significant recommendation focuses on the issue of gallium.

XIII.	Potential actions being evaluated by the DOE for surplus plutonium disposition must address the issue of gallium residue in the conversion of plutonium into fuel in civilian reactors. It is reported by nuclear weapons scientists that not only will gallium interfere with the conversion, but will also cause 1) chemical problems after the fuel is used, and add an additional $200 million (to remove gallium) to the $1 billion cost to convert the plutonium into fuel.	13

MD332

MD332–22 **MOX Approach**

The use of MOX fuel in domestic, commercial reactors is not a new concept. The fabrication of MOX fuel and its use in commercial reactors have been accomplished in Western Europe, and electricity was generated on a demonstration basis in the United States in the late 1970s. Several U.S. commercial reactors were designed to use MOX fuel, and others can easily and safely accommodate a partial MOX fuel core. The lead assemblies for test irradiation would be inserted into selected reactors as part of the fuel qualification program before full-scale operation was undertaken (see Section 2.17).

MD332–23 **General SPD EIS and NEPA Process**

This SPD EIS does provide analyses of the potential impacts of implementing each of the alternatives considered. Those analyses show that the disposition of surplus plutonium would have no significant environmental impacts on Savannah, Georgia, or other communities on the Savannah River from normal operations. The *Summary* of the SPD EIS can be used as the suggested booklet.

GEORGIA-CAROLINA COURIER
PATRICIA C. MCCRACKEN
PAGE 1 OF 8

Symposium
June 10,1998 Clark County Library Las Vegas Nevada

GEORGIA CAROLINA COURIER

505 Courthouse Lane
Augusta, Ga. 30901

July 1998

I. SPOOKED SPOOKED SPOOKED

Top billing for the current spooky story goes to the *Wall Street Journal's* April 28th, 1998 headline, "U.S. Admits Its Jets Harmed Horses." This story reported that:

> The U.S. conceded that noise caused by its jet fighters injured racehorses in November, during Japan-U.S. military drills off Cape Erimo in southern Hokkaido. ... The bureau said the two governments must jointly compensate owners for the damage in line with the bilateral Status-of-Forces Agreement."

The GAO/NSIAD-98-66, Mar. 2 release *Overseas presence; Issues Involved in Reducing the Impact of the U.S. Military Presence in Okinawa* is also spooky. This story reported that:

> ..A new U.S.-Japanese agreement to reduce the American military presence on Okinawa includes replacing a Marine air station with a new $4 billion sea-based facility and paid for by Japan. Operating costs for the new facility are estimated at nearly $200 million a year, much higher than costs for the existing air station. Japan has been asked to pay these costs but has yet to agree. GAO raises the issue of responsibility for cleaning up any environmental contamination at the military facilities being returned to Japan. Also, the construction and operation of the sea-based facility could have harmful consequences for the environment.

Inquiries from our publication regarding these reports directed to Congressman Norwood and copied to Senator Cleland remain unanswered.. The U.S. EPA library services reports no information on these reports regarding their

1

FD231

FD231–1 **DOE Policy**

DOE acknowledges the commentor's concern regarding NRC regulation of DOE facilities. Because NRC regulations are beyond the scope of this SPD EIS, this comment has been forwarded to the DOE team addressing external regulation and to the DOE Savannah River Operations office.

PAYMENTS TO UTILITIES NO LONGER GENERATING ELECTRICITY

	Total Payment
Dairyland Power Coop	193,000
Public Service Co. of Colorado	26,000
Sacramento Mun. Util. Dist.	1,221,000
Yankee Atomic Elec. Co.	1,025,000
Portland General Electric	5,008,000
GRAND TOTAL*	$7,473,000

* Does not reflect utility fee credits. Includes rounding.

FD231

GEORGIA-CAROLINA COURIER
PATRICIA C. MCCRACKEN
PAGE 3 OF 8

One-Time Fee Outstanding As of 03/31/1998, ($000)

State	Utility Name	Option	One Time Fee Owed	One Time Fee Interest Owed	TOTAL
Arkansas	Entergy Arkansas	2	49,149	76,033	125,182
Connecticut	Connecticut Yankee	2	48,726	74,810	123,537
Connecticut	Northeast Utilities	2	82,108	126,061	208,169
Illinois	Commonwealth Edison	2	276,792	424,964	701,756
Maine	Maine Yankee	2	50,394	77,959	128,353
Michigan	American Electric Power	2	71,964	111,328	183,291
Michigan	Consumers Power	2	44,286	68,511	112,797
New Jersey	GPU Nuclear	1	47,417	73,354	120,771
New York	New York Power Authority	2	58,710	90,823	149,533
New York	Niagara Mohawk	2	45,499	70,387	115,886
New York	Rochester Gas & Electric	2	33,134	51,258	84,392
Ohio	Toledo Edison	2	8,875	13,730	22,605
Pennsylvania	GPU Nuclear	1	24,150	37,360	61,510
Vermont	Vermont Yankee	2	39,285	60,773	100,058
	TOTAL		**880,489**	**1,357,351**	**2,237,840**

Option 1-Payments over 40 quarters to be completed prior to first scheduled delivery date
Option 2-Single payment prior to first delivery

FD231

:hibit B

RYAN LABS, INC. **PORTFOLIO TRADE BLOTTER**
AUTHORIZED BY :

Client:	DEPARTMENT OF ENERGY	Submitted Date:	4/28/98	Portfolio Name:	MATCH FUND	Page 1 of 1

Duration Call	Cusip	Buy Par	Issue Description	Sell Par	Comments
15	912833KA7	350,000,000	S 5/15/13		
17	912833KF9	625,000,000	S 5/15/15		
			OR		

GENERAL NOTES:

FD231

Exhibit C

Owner means any person who has title to spent nuclear fuel or high-level radioactive waste.

Purchaser means any person, other than a Federal agency, who is licensed by the Nuclear Regulatory Commission to use a utilization or production facility under the authority of sections 103 or 104 of the Atomic Energy Act of 1954 (42 U.S.C. 2133, 2134) or who has title to spent nuclear fuel or high level radioactive waste and who has executed a contract with DOE.

Secretary means the Secretary of Energy of his designee.

Other definitions relating to the subject matter of this rule are set forth in Article II of the contract which is contained in §961.11, Text of the contract, of this part.

§961.4 Deviations.

Requests for authority to deviate from this part shall be submitted in writing to the Contracting Officer, who shall forward the request for approval to the Senior Procurement Official, Headquarters. Each request for deviation shall contain the following information:

(a) A statement of the deviation desired, including identification of the specific paragraph number(s) of the contract;

(b) A description of the intended effect of the deviation;

(c) The reason why the deviation is considered necessary or would be in the best interests of the Government;

(d) The name of the owner or generator seeking the deviation and nuclear power reactor(s) affected;

(e) A statement as to whether the deviation has been requested previously and, if so, circumstances of the previous request;

(f) A statement of the period of time for which the deviation is needed; and

(g) Any pertinent background information will contribute to a full understanding of the desired deviation.

§961.5 Federal agencies.

Federal agencies or departments requiring DOE's disposal services for SNF and/or HLW will be accommodated by a suitable interagency agreement reflecting, as appropriate, the terms and conditions set forth in the contract in §961.11; *Provided, however*, that the fees to be paid by Federal agencies will be equivalent to the fees that would be paid under the contract.

Subpart B—Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste

§961.11 Text of the contract.

The text of the standard contract for disposal of spent nuclear fuel and/or high/level radioactive waste follows:

U.S. DEPARTMENT OF ENERGY CONTRACT No. ——

Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste

THIS CONTRACT, entered into this — day of ——— 19—, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), represented by the UNITED STATES DEPARTMENT OF ENERGY (hereafter referred to as "DOE") and ————, (hereinafter referred to as the "Purchaser"), a corporation organized and existing under the laws of the State of ——— [add as applicable: "acting on behalf of itself and ———."].

Witnesseth that:

Whereas, the DOE has the responsibility for the disposal of spent nuclear fuel and high-level radioactive waste of domestic origin from civilian nuclear power reactors in order to protect the public health and safety, and the environment; and 1

Whereas, the DOE has the responsibility, following commencement of operation of a repository, to take title to the spent nuclear fuel or high-level radioactive waste involved as expeditiously as practicable upon the request of the generator or owner of such waste or spent nuclear fuel; and

Whereas, all costs associated with the preparation, transportation, and the disposal of spent nuclear fuel and high-level radioactive waste from civilian nuclear power reactors shall be borne by the owners and generators of such fuel and waste; and

Whereas, the DOE is required to collect a full cost recovery fee from owners and generators delivering to the DOE such spent nuclear fuel and/or high level radioactive waste; and

Whereas, the DOE is authorized to enter into contracts for the permanent disposal of spent nuclear fuel and/or high-level radioactive waste of domestic origin in DOE facilities; and

Whereas, the Purchaser desires to obtain disposal services from DOE; and

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Whereas, DOE is obligated and willing to provide such disposal services, under the terms and conditions hereinafter set forth; and

Whereas, this contract is made and entered into under the authority of the DOE Organization Act (Pub. L. 95-91, 42 U.S.C. 7101 *et seq.*) and the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425, 42 U.S.C. 10101 *et seq.*)

Now, therefore, the parties hereto do hereby agree as follows:

ARTICLE I—DEFINITIONS

As used throughout this contract, the following terms shall have the meanings set forth below:

1. The term *assigned three-month period* means the period that each Purchaser will be assigned by DOE, giving due consideration to the Purchaser's assignment preference, for purposes of reporting kilowatt hours generated by the Purchaser's nuclear power reactor and for establishing fees due and payable to DOE.

2. The term *cask* means a container for shipping spent nuclear fuel and/or high-level radioactive waste which meets all applicable regulatory requirements.

3. The term *civilian nuclear power reactor* means a civilian nuclear powerplant required to be licensed under sections 103 or 104(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2133, 2134(b)).

4. The term *Commission* means the United states Nuclear Regulatory Commission.

5. The term *contract* means this agreement and any duly executed amendment or modification thereto.

6. The term *Contracting Officer* means the person executing this contract on behalf of the Government, and any other officer or civilian employee who is a properly designated Contracting Officer of the DOE; and the term includes, except as otherwise provided in this contract, the authorized representative of a Contracting Officer acting within the limits of his authority.

7. The term *delivery* means the transfer of custody, f.o.b. carrier, of spent nuclear fuel or high-level radioactive waste from Purchaser to DOE at the Purchaser's civilian nuclear power reactor or such other domestic site as may be designated by the Purchaser and approved by DOE.

8. The term *disposal* means the emplacement in a repository of high-level radioactive waste, spent nuclear fuel, or other highly radioactive waste with no foreseeable intent of recovery, whether or not such emplacement permits recovery of such waste.

9. The term *DOE* means the United States Department of Energy or any duly authorized representative thereof, including the Contracting Officer.

10. The term *DOE facility* means a facility operated by or on behalf of DOE for the purpose of disposing of spent nuclear fuel and/or high-level radioactive waste, or such other facility(ies) to which spent nuclear fuel and/or high-level radioactive waste may be shipped by DOE prior to its transportation to a disposal facility.

11. The term *full cost recovery*, means the recoupment by DOE, through Purchaser fees and any interest earned, of all direct costs, indirect costs, and all allocable overhead, consistent with generally accepted accounting principles consistently applied, of providing disposal services and conducting activities authorized by the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425). As used herein, the term *cost* includes the application of Nuclear Waste Fund moneys for those uses expressly set forth in section 302 (d) and (e) of the said Act and all other uses specified in the Act.

12. The term *high-level radioactive waste* (HLW) means—

(a) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and

(b) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.

13. The term *electricity (kilowatt hours) generated and sold* means gross electrical output produced by a civilian nuclear power reactor measured at the output terminals of the turbine generator minus the normal onsite nuclear station service loads during the time electricity is being generated multiplied by the total energy adjustment factor. For purposes of this provision, the following definition shall apply: 1

a. The term *Total Energy Adjustment Factor (TEAF)* means the sum of individual owners' weighted energy adjustment factors.

b. The term *Weighted Energy Adjustment Factor (WEAF)* means the product of an owner's energy adjustment factor times the owner's share of the plant.

c. The term *Owner's Energy Adjustment Factor (OEAF)* means the sum of the individual owner's adjustment for sales to ultimate consumers and adjustment for sales for resale.

d. The term *Owner's Share of the plant (OS)* means the owner's fraction of metered electricity sales, the owner's fraction of plant ownership, or the sponsor company's fixed entitlement percentage of the plant's output. This definition includes joint owners of generating companies or participants in a generation and transmission cooperative.

e. The term *Adjustment for Sales to ultimate Consumer (ASC)* means the owner's fraction of sales to the ultimate consumer multiplied by the owner's sales to ultimate consumer adjustment factor.

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PATRICIA C. MCCRACKEN
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Exhibit D

Historical Nuclear Weapons Test Film Festival

Clark County Library, 1401 E. Flamingo, Las Vegas, NV

June 10, 1998

11:30 a.m. - 12:30 p.m.	Footage from Nevada Test Site historical operations -- "Operation Buster/Jangle" and "Operation Tumbler-Snapper"
12:35 p.m. - 1:25 p.m.	Film Set Overview -- 30 to 45 second clips from each video currently available, including the new set of films being released today.
1:30 p.m. - 2:15 p.m.	Footage from peaceful nuclear explosions in Nevada, New Mexico, and Colorado -- "Nuclear Excavation, Excavating with Nuclear Explosives", "Plowshare", and "Project Rulison".
2:25 p.m. - 3:15 p.m.	"Atomic Filmmakers" -- Learn about Hollywood's Top Secret film studio and the cameramen who worked the photographing nuclear weapons tests from 1945 until 1963. This video is produced and directed by Peter Kuran, the filmmaker for the award winning motion picture "Trinity and Beyond".
3:20 p.m. - 4:10 p.m.	"This Little Ship"-- 1952 British film which describes the United Kingdom's first nuclear detonation; "Target Nevada" -- a Lookout Mountain film about the Nevada Test Site; and footage from Civil Defense test operations at the Nevada Test Site including nuclear explosion effects on bomb shelters, electrical substations, propane storage tanks, weigh stations, cars, family houses, and mannequins.
4:15 p.m. - 5:00 p.m.	Two new films -- "Exercise Desert Rock" and "Tonopah Test Range".
5:00 p.m. - 6:00 p.m.	BREAK
6:00 p.m. - 6:15 p.m.	Welcome and introduction of guest speakers -- Pat Bodin, Classification Officer, U.S. Department of Energy, Nevada Operations Office.
6:15 p.m. - 6:40 p.m.	Film Declassification Project -- Charles Demos, Classification Officer, U.S. Department of Energy, Albuquerque Operations Office.
6:40 p.m. - 8:00 p.m.	Atomic Cinematographers -- Peter Kuran, director/producer of "Trinity and Beyond" showing excerpts from the famous movie, as well as from "Doomtown", and discussing restoration efforts for old, deteriorating films.

Throughout the day, there will be exhibits, promotional material available, and interactive demonstrations.

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GEORGIA-CAROLINA COURIER
PATRICIA C. McCRACKEN, EDITOR
OFFICE (706) 738-9451
FAX (706) 738-0637

Exhibi

Nuclear Waste Fund Status
(Billions of dollars, data as of September 30, 1997)

OCRWM Calculation:

Fees Paid	$ 8.5
Investment Earnings	$ 2.6
Total	$11.1
Disbursements	$ 4.9*
Net Balance	$ 6.2

Utility Calculation:

Fees Paid	$ 8.5
Investment Earnings	$ 2.6
One Time Fees Accrued:	
Principal	$ 0.9**
Interest	$ 1.3**
Defense Fees Owed	$ 1.0**
Total	$14.3
Disbursements	$ 4.9*
Net Balance	$ 9.4

* Total NWF disbursements only, does not reflect DNWD disbursements of $.7B. Total Program costs, including NWF & DNWD funding, through the end of FY 1997 equal $5.6B.

** The utility calculation includes one-time fees and interest not yet paid to the Nuclear Waste Fund. It also includes the accrued fees that the Department owes to date for the disposal of defense high-level waste, based upon cost share computed in the 1995 total system life-cycle cost analysis.

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GEORGIA-CAROLINA COURIER
PATRICIA MCCRACKEN
PAGE 1 OF 4

To: Inspector General
Department of Justice

From: Patricia McCracken
Georgia-Carolina Courier
413 Scotts Way
Augusta, Georgia 30909
706-738-9451
fax 738-0637

August 12, 1998

Dear Sir:

The electric consumers of America have not been properly informed regarding the events associated with their Nuclear Waste Fund litigation.

This news organization has previously written to Mrs. Reno regarding the lack of information and legal spokespersons at major nuclear gatherings publicizing and promoting various legal positions that impact our nation. We should not have to depend on the reliability of nuclear tabloid publications or utility attorneys with current litigation against the government for our information.

We have requested press releases from the Justice Department in Washington concerning the Nuclear Waste Fund litigation for quite some time and have been unable to get any information from the press or public relations office. The DOE Internet site could not locate any information with the search word lawsuits, nuclear etc. Meanwhile, it appears that lawsuits have been very active at the DOE and Justice. Interested persons attending the various public meetings at the DOE would have no reason to contact the Justice Department for information because that information has not been given through the many DOE outreach and public affairs offices. 1

Perhaps our United States Attorney's office in Augusta needs to represent the consumers and other government interests of our district. At the very least we would want them to review the pleadings, transcripts and decisions regarding electricity consumers. Furthermore, the Department of Energy's public comment documents and Environmental Impact Statements may not contain all the information known to the Justice Department and the Department of Energy because they are not being sent to the proper parties involved.

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FD262–1 **Other**

DOE acknowledges the commentor's concerns about the NWPA. The status of the Nuclear Waste Fund implementation is beyond the scope of this SPD EIS.

The Department of Defense has a law school. They should study this litigation. If the Justice Department has inadequate funding to defend the DOD, DOE and electric consumers then they could help in the endeavor. Some arrangement could be made regarding some payments they apparently owe to the Nuclear Waste Fund.

The consequences of the decision or decisions regarding the Northern States Power Company verses the United States appear to fall under the NEPA laws. We hope that all the information has been presented to the appropriate groups for action and review. This review should also include information gathered in discovery. If that information is being withheld because of litigation, then no Record of Decisions should be made without all the information known to the agencies. We wonder if various agencies have already made some Record of Decisions without all the necessary information to make a proper conclusion.

The General Accounting Office and other Congressional reporting groups seem to differ on the status of the Nuclear Waste Fund. We hope that the Justice Department and our public attorneys have been able to investigate the status of the fund now involved in litigation. We do not believe that the Justice Department has received all the information or proper expert consultation to conduct this case. We would all like to review the positions of our attorneys and how well and courteously they are being treated by our judges at hearings, but apparently no transcripts are available. 1

Our news organization has been suspicious that the government's funding for our defense may be inadequate. The complexity of the NWF requires much staffing. We are quite puzzled as to some of the information we have received under FOIA requests regarding your litigation connected to the Nuclear Waste Fund. Some of the questions are quite obvious even to an untutored investigator. We certainly hope that our judges are asking some questions.

Our news organization has been seeking the actual legal documents regarding the Northern States Power Company litigation and any other litigation regarding the Nuclear Waste Fund. It appear: hat i the only way to find out what is really going on ... these cases. I would appreciate assistance in obtaining the pleadings, transcripts, discovery and decisions regarding these cases. Also we would like to know if the attorneys were citizens of the United States and their qualifications for such an important case.

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PAGE 3 OF 4

We have obtained some verbal information that indicates that our government has not been very successful in the courts. Your strategy team might want to set up a task force of US attorneys to help with this strategy.

Our current verbal information regarding the status of the Northern States Power Company versus the United States of America indicates that the appeal time clock is ticking. We hope that our attorneys are clicking around and working on our case. Our appeal brief is due by September 2, 1998. Please check on the status of our legal representation. There may be some new information surfacing regarding this case.

The legal representatives for the Northern States Power Company appear to be rather "cocky" about their position at industry meetings. We would like to be sure that their position is correct.

We have learned that all the necessary information regarding the Nuclear Waste Fund litigation have not been received at the Justice legal department working on the case. We suspect that pertinent evidence lists and other information is not currently available at the Justice department for proper decision making sessions. Please check to see if the agency has all the necessary appeals consultants (and that representation reflects all stakeholders) to make a decision. Would you please expedite the legal departments need for information through some emergency fund. Please make that information available for press releases and the public. And please inform the persons or voice message instigators to have a system for inquiries. 1

Some persons might want to go and see who is representing the government and what questions were being asked at the proceedings. Today's media might even be interested in our officials fashion mode for litigation.

We would also appreciate some assistance and review of the activities of the Nuclear Regulatory Commission regarding their intent and actions developed from the Memorandum of Understanding Between the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission dated 10/20/97 and the pilot programs external regulation. Portions of our comment dated August 12th, Work Plan for the Receiving Basin for Offsite Fuels at the Savannah River Site draft June 25, 1998, under a public comment process states:

> The NRC regulations call for antitrust language for Pre-licensing Antitrust Review of Production and Utilization Facilities and to

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Effectuate Certain Other Purposes Pertaining to Nuclear Facilities. In accord with the intent of the NRC to facilitate competition, some review is in order to determine the degree in which your agency would become the monopoly for all the commercial and government nuclear facilities under the current activities outlined in the NRC Memorandum of Understanding between the DOE and NRC. Did the antitrust section of the Justice Department give any review of this work? They have historically notified NRC about such action in court cases. The public would like for the NRC to abide by the same guidelines as the Justice Department uses for other nuclear situations.

Some legal findings have even used language that can mean even setting up a situation that might lead to monopolization. This plan is a monopoly report without input from other agencies with responsibility at DOE. NRC is engaging in unfair monopoly reporting power without allowing access of other reports available in the government market or peer review in the proper fields. The appropriations set up a monopoly reporting power structure and the people are not protected from this monopoly. The work plan should be set up to remedy this situation. The NRC can use the same type of remedies that they have recommended themselves to other parties. 1

We urge the public get relief from the draft plan of the DOE/NRC.

According to some legal opinions, the Atomic Energy Act was amended by Congress to include a procedure whereby the Department of Justice is to notify the NRC if licensing might create or maintain a situation inconsistent with the antitrust laws.

Thank you for the opportunity to report some citizen comments about our government.

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GEORGIA-CAROLINA COURIER
PATRICIA MCCRACKEN
PAGE 1 OF 6

To: DOE/NRC

From: Patricia McCracken
413 Scotts Way
Augusta, Georgia 30909
706-738-9451

Re: Comments to the proposed Pilot Program on External Regulation of DOE Nuclear Facilities by the Nuclear Regulatory Commission and the public presentation of A document called Work Plan for The Receiving Basin for Offsite Fuels at the Savannah River Site Draft June 25, 1998

Without any formal federal register notices to refer for comment, comments can only relate to the handouts from NRC.

The title to this work plan does not reflect the description of the work plan. Your work plan is much more extensive than this title.

One would like to know your distribution list for your draft as those persons such as myself who attend the public meetings(and produce a newsletter) and comment were not on your mailing list. Mr. Robert Newman was contacted and he did not receive a draft for comment. He has made several presentations at the CAB meetings regarding compliance with DOE orders. He asked me to comment on his behalf and remind DOE of his participation at public meetings and the comment process. 1

The section of the CDC conducting health studies at SRS did not receive your notice for comment.

This fact alone raises some questions as to the persons at SRS and DOE that are supplying information for this report.

The handout does not seem to have the same format as public notice documents such as the federal register. The intent of the NRC to pursue a project at the Department of Energy must have some legal position statements but they have not been presented for public comment.

Appendix D's Authorization Basis does not appear to be complete for the legal scope. We all certainly would like the NRC to look at the antitrust duties of the agency in reviewing some of the activity at SRS and proposed activity at SRS. We need more specific statutory basis to ensure that the agency covers all the issues important to stakeholders. NRC appears to be trying to establish a

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FD299–1 **DOE Policy**

DOE acknowledges the commentor's concern regarding NRC regulation of DOE facilities. Since NRC regulations are beyond the scope of this SPD EIS and the comments do not directly relate to the surplus plutonium disposition program, this comment has been forwarded to the DOE team addressing external regulation and to the DOE Savannah River Operations office.

monopoly regulatory agency, which would be in violation of its statutory duties.

We believe that you need permission from other agencies to conduct your work. This memorandum of understanding is suspected to be inappropriate for entry into a defense facility, especially with no Corps of Engineers signature.

We need to know the format for the database of information gathered(categorized to match each work plan section like a docket) for public review purposes. The CDC health studies group(SRS) has a format for collection and public review that is quite extensive and might serve as a model for this massive report.

The statutory authority of the NRC is apparently an issue often debated in the courts. Most of this plan(like page D-2 review, approval…fissionable material operations) is defense related and no related oversight persons are part of your task force. Efforts to contact the DOD oversight at Pentagon have been unsuccessful as their is no telephone answer. That could explain the situation.

The Congress has appropriated(special) money for the NRC to conduct some work at the DOE. 1

Congress has been utilizing the Nuclear Waste Fund consumers payments and interest to fund other projects such as this one. This does not appear to be legal. The DOE apparently borrows money to make payments to the NWF and then invests that money somewhere.

Your work plan and oversight duties should include an explanation of your funding. Is it part of the Nuclear Waste Fund? Please demonstrate that this money is not part of any of the money(with interest) Congress borrowed from the consumer fund.

The work plan presented does not give the signatures of the authorized representatives of each agency. The Memorandum of Understanding between the DOE and NRC is not presented with any signatures. We would like to know if the persons approving the work plan also approved the adequacy of the appropriation to conduct this work. Was the work plan presented to the persons making the recommendations for the money amounts? We would like the references for presentations.

We have made some inquiries as to the existence of documents

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GEORGIA-CAROLINA COURIER
PATRICIA MCCRACKEN
PAGE 3 OF 6

that might relate to the subject matter of the pilot project. Many other sections of our government have some oversight regarding the DOE. We did not see any reference to accumulating any of that information. Surely, some of these groups have looked at the existing regulations in our country and perhaps some comparisons internationally. And surely Congress does not have to appropriate special money to check fire extinguishers. Who is checking them now?

The public through FOIA cannot ask for qualifications(DOE Decision and order case number VFA-0348 to Patricia McCracken) of the contractors and we would like to know if NRC will be able to get restricted information regarding the contracting process. Appendix B mentions some estimates of savings associated with using licensed/qualified subs. This term needs a better explanation.

The statements under potential outcomes is really a big policy change. For example, to seek transition of some or all DOE facilities to NRC regulation prior to completion of the NRC/DOE Pilot Program is definitely something that needs more documentation than this work plan. These types of statements trigger NEPA action. Your report did not address that issue.

Your draft did not address the NRC's ability to handle such a mission. The cart is before the horse. Your draft should be explaining your funding outside the commercial licensing process. 1

We do not know if your information database is secure. We do not know if you are using contractors and if any conflict of interest may exist. We do not know who has access to your reports. Are these reports suppose to be part of the classification system? You apparently have written several reports regarding other sites but no one is allowed to review your work. Stakeholders around SRS might want to review your work.

We do not understand how you are able to come to a defense facility and propose a review of receipt, transfer and inventory of radioactive materials. Please give some exact procedures for this task. Please site the names of the reports you will be using as manuals.

Section J concerns radioactive waste management including effluents and environmental monitoring. This work plan does not give the credentials of the persons or procedures as outlined in the federal register or what. Who will be doing such highly "science specific" assessments. It is

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difficult to believe that the task force presented has all the qualifications to conduct such a massive study. OSHA persons might want to include NIOSH persons already doing work at the site.

The work plan leaves out a lot of details that are vaguely mentioned in the MOU which was not attached to the work plan. Of special importance is the MOU explanation of coordination activities. "DOE and NRC agree to enter into an interagency Agreement to reimburse NRC, where legally permitted and not otherwise covered by appropriations, for its agency cost associated with NRC activities to achieve the objectives of the MOU." DOE is currently borrowing money under the Nuclear Waste Fund program while loaning money from the fund. We would like to know the exact interest rate of both policies as it relates to paying NRC.

The part about legally permitted is not explained very well.

Some details regarding salaries is important as apparently the task force must have many credentials(not related in the work plan) and they do not need to be checking fire extinquishers at their payment rate.

1

Section K C-2 lists Transportation of Radioactive Materials with the scope of review that includes knowledge from shipment to packaging. Again this task force will need some input from other experts and those persons have not been named in this plan. This discussion could be described for so many of these broad outlines in the plan. We would like to request that NRC ask DOE where the transportation alternative plan is located for WHIPP or any other project. NRC would need that plan for reference.

This plan (C-3 O) Fire Protection Program states the review will include an assessment of the procedures for control of combustibles, inspection of portable fire extinguishers. Testing of emergency lights, inspection of chemical storage areas, emergency response and waste removal. The review will also include an assessment of the training requirements for the facility designated fire wardens. We all certainly want to see the trip reports and procedures used by this task force documenting that all these things were conducted by this group. That goes for all the other activities. What persons are already staffed to conduct these activities and why do they need you to help them? The state and local fire and emergency response persons could save you money and help in these projects.

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PATRICIA MCCRACKEN
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This work plan does not give specific check sheets to be used to assess the many programs and evaluations outlined. Your regulations probably provide guidelines for such forms utilized by your persons. In accordance with your regulations, we would want the same level of expertise assigned to each category as utilized by NRC and its hiring practices and proficiency levels. **We would want all forms and evaluation categories signed by the staff person with his credentials for making such an evaluation and** determination. The accounting part would be especially important and we would want it signed by a **certified** accountant.

The proposed environmental monitoring is not specific. Most of the outline appears to discuss the same issues that have been part of CAB meetings and other public meetings and other review groups. Are you starting these programs over? **Your claim of an independent review needs some independent contractors outside the DOE if you are going to make such a claim.**

Page 8 discusses defining similarities and differences between RBOF and other NRC licensees. The work plan should discuss your staff and the similarities and differences between what you are doing and what they are doing. Any reports should be very specific. **The nature of the licensing of the NRC and DOE work are so different in scope that one has difficulty relating the integration.** 1

The purpose of the Memorandum of Understanding to "simulate regulation" when NRC is prohibited from regulation of DOE is confusing. What was the policy for this exemption? Somebody must have had some reasons for this statutory language! **If NRC wants DOE to "gain experience", then develop a training program that NRC deems appropriate and present it to the public. Perhaps some debate is in order for who has had the most "experience" at what.**

You may want to **contact the Georgia Public Service Commission about training programs.** Apparently under our new gas deregulation plan, new marketers who cannot collect delinquent accounts as well as the current gas company can be allowed special circumstances(write-offs I think) until they learn and get better at their new service.

This program will not "provide an opportunity to develop actual information on the costs and benefits of external regulation," **because you do not(currently) have enough money**

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or staff to make the comparison. Your budget should be presented with any work plan.

The NRC regulations call for antitrust language for Prelicensing Antitrust Review of Production and Utilization Facilities and to Effectuate Certain Other Purposes Pertaining to Nuclear Facilities. In accord with the intent of the NRC to facilitate competition, some review is in order to determine the degree in which your agency would become the monopoly for all the commercial and government nuclear facilities under the current activities outlined in the NRC Memorandum of Understanding between the DOE and NRC. Did the antitrust section of the Justice Department give any review of this work? They have historically notified NRC about such action in court cases. The public would like for the NRC to abide by the same guidelines as the Justice Department uses for other nuclear situations.

Some legal findings have even used language that can mean even setting up a situation that might lead to monopolization. This plan is a monopoly report without input from other agencies with responsibility at DOE. NRC is engaging in unfair monopoly reporting power without allowing access of other reports available in the government market or peer review in the proper fields. The appropriations set up a monopoly reporting power structure and the people are not protected from this monopoly. The work plan should be set up to remedy this situation. The NRC can use the same type of remedies that they have recommended themselves to other parties. 1

We urge the public get relief from the draft plan of the DOE/NRC.

The work plan language and general intent for safety and protection are important and everyone wants to be sure that they are addressed with full input and peer review.

Thank you for the opportunity to comment on this important matter in our area. The information regarding this plan has not been fully sent to the public and we hope that more comment opportunity will exist.

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GEORGIA DEPARTMENT OF NATURAL RESOURCES
JAMES L. SETSER
PAGE 1 OF 29

Georgia Department of Natural Resources
205 Butler St. S.E. , East Floyd Tower, Atlanta, Georgia 30334
Lonice C. Barrett, Commissioner
Harold F. Reheis, Director
Environmental Protection Division
(404) 656-4713

September 21, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D. C. 20026-3786

Dear Sir or Madam:

The Environmental Protection Division (EPD) of the Georgia Department of Natural Resources (DNR) is pleased to provide the following comments on the "Surplus Plutonium Disposition Draft Environmental Impact Statement", DOE/EIS-0283-D. Attached you will find a discussion of issues related to the draft EIS that we feel are significant, as well as detailed page-by-page comments.

Thank you for the opportunity to comment on this document.

Sincerely,

James L. Setser, Chief
Program Coordination Branch

JLS:lm
Attachment

C:\WP51\DOCUMENT\PLUTCVR.LTR

MD322

Georgia Environmental Protection Division
Issues Related to
Surplus Plutonium Disposition Draft Environmental Impact Statement (DEIS)
DOE/EIS-0283-D

Use of Existing Facilities at Savannah River Site (SRS)

Many of the SRS alternatives involve utilization of the ageing facilities at SRS. Some of these facilities, particularly the F and H Canyons, have been in operation for more than 45 years. The risk of design-based accidents and the potential that a severe earthquake or other natural disaster such as a severe tornado could occur are of vital concern for the utilization of these facilities. Whereas new nuclear facilities are constructed to seismically withstand the forces of such natural disasters (i.e., 0.2g for a design-basis earthquake), the older facilities are not constructed according to these standards. The magnitude of such an earthquake would be expected to cause severe structural damage that could lead to partial structure collapse and unmitigated releases of radioactive and hazardous material to the environment. 1

Scheduling

The technology for immobilization of plutonium at SRS is unrealistic from a time schedule viewpoint. The purpose of the current Defense Waste Processing Facility (DWPF) at SRS is to convert the high level wastes in the tank farm to a borosilicate glass form which will be shipped to a National Repository when one becomes available. Because of DOE's failure to successfully conduct In Tank Precipitation (ITF) an ion-exchange system is being considered. If implemented, this system is expected to cost $500 million and require between 6 and 14 years to implement. The ITF was initially completed in 1988 at a cost of $32 million and now, more than $500 million in estimated costs have been incurred and the facility is not operational. While DOE's expectations that all high level waste tanks be emptied and completely processed by 2020, the modifications to the DWPF and related operations for plutonium immobilization at SRS will most likely cause even further delay in processing the existing 32 million gallons of high level waste. This further delay raises the question of an increased risk to public health and safety due to a failure of the old carbon steel tanks that contain the high level radioactive waste. 2

Proximity of Plutonium Processing Facilities

The separation of an MOX fuel fabrication facility from the pit conversion facility (i.e., pit conversion at Pantex and MOX facility at SRS) could lead to significant control problems related to gallium contamination in the MOX fuel fabrication process. Because hafnium and gadolinium are both neutron absorber poisons that will contaminate the MOX fuel, in a manner similar to the requirement for Hafnium removal in reactor grade zircaloy for commercial LWR's, a polishing process has to be put in place to get rid of the gadolinium. This polishing process needs to be employed at the pit conversion facility if new construction is envisioned because this contamination in the MOX fuel fabrication facility is extremely difficult to control. 3

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MD322–1 **Human Health Risk**

As explained in the *Supplement to the SPD Draft EIS*, DOE has eliminated as unreasonable the eight alternatives in the SPD Draft EIS that would involve use of portions of Building 221–F with a new annex at SRS for plutonium conversion and immobilization. It was determined that the amount of space required for the immobilization facility would be significantly larger than originally planned. These new space requirements mean that the annex to be built alongside Building 221–F would be very close in size and environmental impacts to the new immobilization facility alternatives at SRS. Therefore, this SPD EIS only presents the alternatives involving a completely new immobilization facility at SRS.

MD322–2 **Immobilization**

Proposed modifications to the in-tank precipitation (ITP) process are independent of the modifications needed at DWPF to support the surplus plutonium disposition program. The use of DWPF to support plutonium immobilization produces only a few additional glass canisters and is unlikely to delay the waste vitrification program significantly or to cause increased risks associated with liquid HLW management. DOE is presently considering a replacement process for the ITP process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared.

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MD322–3 Plutonium Polishing and Aqueous Processing

Pit disassembly and conversion is a common technology required for implementation of both the hybrid alternatives and the immobilization-only alternatives. The plutonium dioxide produced by the pit conversion facility can be used for either the immobilization or MOX approach. Neither gadolinium nor hafnium is present in pit plutonium metal in concentrations of concern for MOX fuel production. On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity (e.g., gallium) removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

Additional processing needed only for MOX fuel fabrication would occur in the MOX facility, not the pit conversion facility. Controls would be put in place to ensure that any contaminants removed during the plutonium-polishing process would not contaminate the MOX fuel fabrication line. As indicated by the analyses, the addition of this process is not expected to materially affect the ability of the candidate sites to handle MOX fuel fabrication.

Location of Facilities

The types of technical problems (i.e., the In Tank Precipitation issue) that have arisen at SRS and DOE's approach to resolving them do not instill assurance that a plutonium pit conversion facility can be developed and constructed in a timely manner at SRS within any reasonable cost estimates. The DOE tiered approach needs supplemental Research and Development (R&D) technology for conceptual design and full scale operational throughput of surplus plutonium material. 4

In addition, it is noted that Pantex with a new Pit conversions facility will provide minimal radiological impact on the population and workers, where there will be a major impact on the workers (349 person rem) and a factor of 10 increase in population radiological exposure if the facility is located at SRS. 5

Facility Accidents

The respirable fraction (the fraction of release consisting of Plutonium particles with a diameter of less the 10 microns is questioned). The DOE use of the fraction (0.1-0.01) 0.01 or smaller for the inhalation pathway to man is questioned. For inhalation of the lung; and TBLN it is noted than the fraction of respirable particles less the 10 microns does indeed affect the dose. What is left out is the fact that going from 1.0 microns to 0.1 micron, there is a 1000 fold increase in particle concentration for a 10 fold reduction in medium particle diameter for Pu-239. 6

Review of deposition and scavenging data reveal the difference for dry deposition vs. wet deposition of Pu02 particles. The average bounds for wet deposition removal rate for particles is 10-4 for stable meteorological conditions and 10-3 for unstable wind conditions. For dry deposition of Pu02 particles the deposition velocity is a constant value of 10-2 regardless of meteorological conditions. For bounding of particle deposition the maximum expected for wet deposition is 10-2 and for dry deposition 10-1. This 10 fold factor should not be overlooked in considering "respirable fraction". 7

The fraction of energy absorbed in tissue (f1) is always small for Pu02. The value of f1 equals 3x10-3 is used for plutonium oxides. The value of f1 for the other actinides is conservatively set at f1 equals 10-3. Thus, the actual value has little effect on the estimation of inhalation dose. 8

Ingestion modeling (ICRP-23 1975) indicates that direct ingestion of Pu02 particles would be a much lesser radiological impact than inhalation. It should be noted that part of inhaled material, however, would be translocated by bodily processes to the gastrointestinal tract. For sake of accuracy the model for the gastrointestinal tract must include all nuclides considered in the inhalation model. 9

The Melcor Accident Consequence Code System (MACCS2) used to calculate the consequences of facility accidents (appendix K) is a sector averaged code as opposed to the straight-line Gaussian. The sector-average equation uses the cross wind integrated model but distributes the Y-concentration evenly over a sector. The width of 10

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MD322–4 **Alternatives**

DOE acknowledges the commentor's concerns regarding the technical issues associated with pit disassembly and conversion. These issues are the subject of ongoing R&D activities at INEEL, LANL, LLNL, and ORNL. These activities are expected to reduce technical risk and ensure that design, construction, and operation of the proposed surplus plutonium disposition facilities can be conducted efficiently and effectively, and within reasonable cost and schedule constraints. The largest of these activities is the pit disassembly and conversion demonstration project at LANL, a full-scale pit disassembly and conversion line similar to what would be used in the proposed facility. This demonstration project and other R&D activities are described in *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), which is available on the MD Web site at http://www.doe-md.com.

MD322–5 **Human Health Risk**

Sections 4.4.2.4 and 4.6.2.4 present radiological impacts of operating the pit conversion facility at SRS and Pantex, respectively. As shown in the tables regarding impacts to the public, the anticipated dose to the population surrounding SRS from pit conversion facility operations would be 1.6 person-rem/yr (average dose would be 0.0020 mrem/yr), and for Pantex would be 0.58 person-rem/yr (average dose would be 0.0019 mrem/yr); this difference of about 2.8 times is due mainly to the larger population surrounding SRS. As shown in the tables regarding impacts to workers, the worker population dose at the pit conversion facility is 192 person-rem/yr whether the facility is located at Pantex or SRS. The average worker dose is expected to be 500 mrem/yr to involved workers at either site.

Regardless of where the pit conversion facility is operated, DOE policy places safety and environmental considerations above other program goals. DOE dose limit requirements (DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, and 10 CFR 835, *Occupational Radiation Protection*) have been established to protect and ensure the safety and health of the public and workers. In addition, protection of the public and workers is considered by DOE in the design, location, and construction of its facilities.

MD322–6 **Facility Accidents**

As used in this SPD EIS, the respirable fraction is the mass fraction of airborne material estimated to have less than a 10-micron aerodynamic equivalent diameter (AED). Use of this definition is common practice within DOE and is included in *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities* (DOE-HDBK-3010-94, October 1994). Section 1.2 of the handbook discusses respirable fraction in detail, citing other definitions that have been used historically by a variety of organizations, and concludes that "use of a 10 [micron] AED cut-size for respirable particles is considered conservative, and may even be overly conservative since the mass is a cube function of particle diameter."

MD322–7 **Facility Accidents**

There is no direct connection between deposition velocity and respirable fraction. Deposition velocity reflects the rate of removal of material from the plume to ground-level surfaces, whereas respirable fraction is the mass fraction of the particulate matter that can be inhaled. As implemented, respirable fraction was used in defining the source term, so that the released plume can be considered 100 percent respirable. Deposition velocity was set to zero, so that no material is assumed to be removed from the plume by this mechanism, thus increasing predicted downwind concentrations and inhalation dose (the most significant dose pathway).

MD322–8 **Facility Accidents**

MACCS2 is a standard, accepted code for analyzing the impacts of accidents in EISs and for comparison of alternatives in NEPA documents. The MACCS2 dose conversion factor of 8.33×10^{-5} sieverts/becquerel (3.08×10^{-8} rem/ci) for a 50-year committed effective dose equivalent from plutonium 239 for the inhaled chronic dose pathway to the whole body alleviated the need to assess dose on an organ-specific basis. The presence of other nuclides from the aged plutonium was accounted for by scaling the plutonium 239 dose factor against like factors for the other contributing nuclides in proportion to their presence.

MD322–9 **Facility Accidents**

Discussion on the use of the inhalation pathway for consequence estimation is in Appendix K.1.4.2. The inhalation dose as presented provides an appropriate basis for assessment of impacts and for comparison of alternatives in this SPD EIS.

MD322–10 **Facility Accidents**

The MACCS2 code does calculate the centerline ground-level plume concentration; it is not a (crosswind) sector averaged model. Perhaps the commentor is thinking of the GENII code, which is a sector-averaged code. It is not clear what the commentor means by, "DOE need to further elaborate why the MEL's (sic) maximum exposure would be 100 meters under neutral (Class D) atmospheric conditions and 500 meters under stable (Class F) atmospheric conditions."

As implemented, MACCS2 sampled over a year's worth of meteorological data. For each sample, doses were determined along the plume centerline (for MEI and noninvolved worker) and for each fine grid element within each sector under the plume (for the population dose). Appendix K discusses the assumptions used and the accident analyzes conducted.

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a sector is equal to the circumference ($2\pi X$) at distance X from the source divided by the number of Sectors, n (typically n=16 as that there are 16 22 ½ degree Sectors. The concentration in each Sector is weighted by the fraction of the time that the wind blows into the Sector of Interest (0.01 times the percentage of the time), f1 that the wind is blowing into the Sector of Interest. Sector averaging is an artifice for representing long-term meandering of the Plume. For accident considerations the center-line ground level source, and ground-level receptor may be more appropriate. DOE need to further elaborate why the MEL's maximum exposure would be 100 meters under neutral (Class D) atmospheric conditions and 500 meters under stable (class F) atmospheric conditions. 10

Direct ingestion of Pu02 is a less important dose exposure than inhalation because Pu02 is highly insoluble even in body fluids. The f1 values (i.e. fraction of a quality that is absorbed from the gastrointestinal track to blood) range from 10-3 to 10-5. The safety requirement should insure that: 11

a) accident analysis adequately consider all credible scenarios
b) all appropriate engineering safety systems which are necessary to prevent accidents or mitigate the on-site and off-site consequences of those accidents are identified
c) the fire hazards analysis be consistent with other accident analysis. 12

DOE estimates of the risk from design based accidents and natural disturbances such as a severe earthquake is judged to be adequate. The highest risk to the maximally exposed off-site individual is a bounding accident because its risk is higher than the risk of other accidents in the same frequency range. The consideration of the risks associated with bounding events or accidents for a facility can establish an understanding of the average risk to workers, members of the public, and the environment from operating the facility. The risks of different facilities can be compared relatively by comparing the risks associated with bounding accidents for each facility. DOE should provide additional consideration of bounding of risks due to accidents. 13

If the specific ground activity is associated mostly with particles of size greater than 50µm, a very small air concentration would result from the respirable size particles less than 10 microns. 14

For the Gaussian diffusion model (applicable for continuous and instantaneous sources). The vertical component of turbulence intensity is a strong function of thermal stability, which in turn may be quite variable with height above ground. 15

It is noted that the buoyancy flux is a factor in both stable & unstable meteorological conditions. However, it is questioned why DOE has used different MEI locations as a function of atmospheric stability and this should be explained further. Also it is noted that there will be no plume rise (i.e. buoyancy flux) for normal transportation accidents unless there is a fire. 16

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MD322–11 **Facility Accidents**

DOE acknowledges the comment that inhalation pathways represent the greatest risk of exposure. This is accounted for in the MACCS2 model as discussed in Appendix K.1.4.2.

MD322–12 **Facility Accidents**

The selection of accidents for this SPD EIS was done in accordance with *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements* (DOE Office of NEPA Oversight, May 1993). Design basis events were developed based on categorizing accidents into types of events, and a bounding consequence was determined for each type. The potential for accidents beyond the design basis was examined down to a frequency of 1.0×10^{-7} per year. This differs from the process-specific analysis, such as fire-hazards analysis, that would be performed in conjunction with the conceptual design package and the analysis performed for the SAR. It is these latter analyses that are used to determine the adequacy of engineered and administrative safety systems, and through which a commitment is made to preserve these protections as part of the operational safety basis.

MD322–13 **Facility Accidents**

The Facility Accidents sections in Chapter 4 of Volume I present a characterization of the spectrum of potential accident scenarios that are implicit in the particular alternatives. Each accident is conservatively developed by type, so is therefore considered to bound the accident risk.

MD322–14 **Facility Accidents**

There is no connection between ground activity and respirable-size particles. The respirable fraction is determined by the material form and scenario phenomenology and is based on recommendations in DOE-HDBK-3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities*. For example, the respirable fraction associated with fires in the MOX facility is 0.01, or 1 percent of the airborne material.

MD322–15 **Facility Accidents**

This SPD EIS uses 10-m (33-ft) meteorological data. These are the most appropriate data for use in calculating ground-level concentrations for nonbouyant plumes released at the stack heights analyzed. The vertical component of turbulence is not an important factor in determining downwind concentrations under the assumed release conditions.

MD322–16 **Facility Accidents**

All plumes released as a result of facility accidents were conservatively assumed to be nonbuoyant. This is reasonable for fires because significant cooling is possible in transit from the fire site to the release point. DOE has not used different MEI locations as a function of atmospheric stability. The MEI is located at the fence line, in the direction downwind from the release point. The MEI location changes for each run within the MACCS2 code because the wind direction changes for each run. This is why there is no single location associated with the MEI dose.

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For new construction at SRS the Design Basis earthquake, the source term is assumed to be 3.8x10-4 grams. The dose at the site boundary is 1.7x10-5 rem.

For the case of accidents resulting from ceramic immobilization in F-canyon Bldg 221 F and DWPF at SRS, the source term is 3.8 grams. The dose at site boundary is 4.1x10-1 rem. Note that a factor 4 orders of magnitude increase in the severity of the accidents dose at the site boundary. 17

Therefore new construction at SRS is recommended (design basis earthquake) because of the decreases in radioactive emissions of Pu-239. The new facilities would be designed to reduce the frequency of accidents and to mitigate the consequences.

It is noted that for facility accidents, DOE has chosen to only consider the inhalation pathway to the pulmonary region and not consider the effect of resuspension of particles (MACCS2 code). In so doing, the code sets the deposition velocity the zero so that the material that might otherwise be deposited on the ground surfaces remains airborne and available for inhalation. This may not be as conservative for some types of accidents (i.e. particular Pu02 fires and explosions). Airborne releases of Pu will be in the oxide form and contain a substantial percentage of particles in the "respirable range" (i.e. iess that 10 micron). 18

DOE has limited the duration of accidental releases from SPD facilities to 10 minutes except for fires. This may be a rather limiting value compared to actual release times from other DOE facilities accidents. For fires and explosions it is recommended that the dose pathway from respension of Pu particles be included in the dose calculations. 19

Analysis indicate that when a contaminating event occurs most of the radiation dose associated with the event is committed within a short time (a period of a few weeks or months) unless protective actions are taken. Intervention criteria are based on a projection of the ultimate consequence of the event and a judgement of how certain actions could reduce the impact. Development of intervention criteria requires advance planning, so that emergency response plans can be implemented in a minimum period of time. 20

The objective of environmental sampling and analysis is to derive information for the purpose of estimating dose rates to pulmonary lung and to bone of exposed individuals. In general, resuspension will relatively high immediately after initial deposition, gradually decrease with time, and approach a long term constant within about one year after deposition. The resuspension rate for newly deposited contamination has been estimated to be higher by a factor of 1000 or more than that for aged sources of plutonium, and therefore, represents a proportionately greater radiological hazard. 21

The principal difference between the initial phase and long-term phase is that the newly deposited contamination is generally much more mobile and more easily resuspended.

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MD322–17 **Facility Accidents**

The commentor is correct in identifying large differences between new construction and Building 221–F with respect to structural response to a design basis seismic event.

The remainder of this comment is addressed in response MD322–1.

MD322–18 **Facility Accidents**

The practice of setting the deposition velocity to zero so that the material that might otherwise be deposited on the ground surface remains airborne and available for inhalation is considered conservative for all analyzed accidents. The respirable fractions used for plutonium fires and explosions are from DOE-HDBK-3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities*, and are based on experiments of the phenomena in question. Airborne material that is not respirable will not subsequently become respirable because there is no mechanism for getting energy inside the particles to further subdivide them. The process of deposition and subsequent resuspension would tend to result in agglomeration rather than subdivision, so that the quantity of resuspended material that is respirable would be much less than that amount of respirable material in the original plume whose presence can be attributed to the neglect of deposition.

MD322–19 **Facility Accidents**

The 10-min release duration assumption does not imply that the source term has been truncated; it is simply assumed that the entirety of the source term is released at a constant rate over a 10-min duration. The effect of differing assumptions concerning release duration is discussed in Appendix K.1.4.2. The two factors affecting doses as release duration changes are plume meander and the larger variety of meteorological conditions involved in any given run for longer-duration releases. The effect on dose of these two considerations is as follows. Plume meander decreases individual dose with increasing release duration and tends to narrow the distribution of population doses with increasing release duration. A larger variety of meteorological conditions tends to narrow the distribution of both individual and population doses toward the mean dose with increasing release duration. Both factors would tend to lower (i.e., reduce conservatism of) predicted doses reported in this SPD EIS.

The remainder of this comment is addressed in response MD322–18.

MD322–20 **Facility Accidents**

As discussed in the Emergency Preparedness sections in Chapter 3 of Volume I, each candidate site has an established emergency management program, including response time requirements, that would be activated in the event of an accident.. Site hazard surveys are periodically updated and would be modified to reflect any new hazards including those based on the decisions made in the SPD EIS ROD. These modifications would include development of revised intervention criteria, if needed, in accordance with DOE Order 151.1, *Comprehensive Emergency Management System*. The MOX facility would also be required to comply with 10 CFR 70, *Domestic Licensing of Special Nuclear Material*, which requires emergency plans that include provisions for notification, response, and coordination.

MD322–21 **Facility Accidents**

The dose calculations were performed in a conservative manner. To maximize the radionuclide concentrations in the atmosphere (and thus the inhalation dose), the deposition velocity of radionuclides onto the ground from the plume was taken to be zero. While this precludes the resuspension pathway, the increased dose associated with inhaling the radioactivity in the plume from which no radioactivity has been removed by deposition, is greater than the dose that would result from inhaling radioactivity in resuspended material.

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It has been estimated that resuspension from newly deposited Pu02 material may be as high as 10-4/m, or four orders of magnitude greater than for stabilized Pu02 contamination. 21

Transportation
The DEIS discusses in detail the analysis of both incident-free transportation and the effects of transportation accidents. The discussion below deals specifically with transportation of either plutonium metal or plutonium oxide to SRS under Alternatives 3 and 5, but also applies to transportation of "pit parts" and high-enriched uranium (HEU) components from Savannah River Site (SRS) to other DOE facilities. It is assumed, based on information presented in the DEIS, that all shipments of plutonium or high-enriched uranium, including new Mixed Oxide (MOX) fuel shipments will be made using a Safe Secure Trailer (SST), operated by the Transportation and Safeguards Division (TSD) in DOE's Albuquerque office. 22

In July 1998, the DOE Deputy Assistant Secretary for Oversight issued a report titled "Independent Oversight Evaluation of Emergency Management Programs Across the DOE Complex". Included in this report is a critique of the TSD emergency management program. The Office of Oversight noted several "issues" related to TSD, including:

1) "In September 1996, TSD management mandated the removal of radiation monitoring instruments from all convoy shipments ... [s]ome Emergency Action Levels (EALs) require radiation readings.
2) "On November 1996, a TSD Safe Secure Trailer transporting nuclear weapons slid off a road and rolled over near Valentine, Nebraska. According to a Department of Defense Nuclear Command and Control System Support Staff report, almost four hours elapsed before DOE Headquarters was notified, and it was almost 20 hours before a Radiological Assistance Program (RAP) team determined that there had been no radiological release. The report recommended equipping convoys with radiological instruments to provide timely warning of potential personnel hazards. 23
3) "There is a discrepancy between an Emergency Action Level (EAL) in the TSD Hazards Assessment and the emergency management plan. One specifies an alert, while the other specifies a general emergency for the same conditions.
4) "The document provided to Convoy Commanders to provide initial protective action recommendations for the public include decision paths that cannot be completed due to lack of observable criteria (requires information not directly observable or measurable).
5) "The TSD hazards assessment (May 4, 1994) does not provide an adequate technical basis for ground transportation emergency planning, preparedness and response. No radiological assumptions, models, methodologies or evaluations for TSD convoy event hazards are documented or referenced in the TSD Hazards assessment.
6) "The emergency response organizations, procedures and training for TSD and its contractor, Ross Aviation, do not adequately support accurate and prompt

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MD322–22 **Transportation**

The commentor is correct. All shipments of plutonium and HEU, including new MOX fuel shipments, would be made using DOE's SST/SGT system. LLW and TRU waste would be shipped in commercial trucks, not SST/SGTs.

MD322–23 **Transportation**

DOE's internal and external reviews and assessments are designed to achieve a path of continuous improvement in its transportation and emergency management programs. However, the comments are beyond the scope of this SPD EIS and have been forwarded to DOE's Transportation Safeguards Division for review. DOE is currently analyzing the issues raised in the independent oversight evaluation and will take appropriate action as necessary.

categorization and classification of operational emergencies during transport of nuclear materials or devices." 23

The DEIS discusses "24-hour-a-day real-time communications to monitor the location and status of all SST shipments via DOE'S Security Communications system". For several years, state radiological emergency response organizations, including Georgia's, have had access to the TRANSCOM real-time shipment tracking system. Particularly within the past year, the TRANSCOM system has proven to be unreliable in tracking of domestic and foreign research reactor spent nuclear fuel shipments and Waste Isolation Pilot Plant (WIPP) dry run shipments. It is our understanding that the Transportation and Safeguards Division (TSD) shipments uses the same basic tracking software system, but states will not have access to the tracking information; nor will they have access to advance shipment information which normally precedes highway route controlled quantity (HRCQ) shipments of radioactive materials. 24

The text of the DEIS describes the postulated accident scenarios as "the maximum forseeable offsite transportation accident", while Appendix L describes them as "the most severe accident conditions". We agree with DOE that Accident Severity Category VIII accidents would be considered "worst case" but assuming that such an accident can occur only in a rural setting does not appear to be conservative. For example, we note that "rural" mileage accounts for approximately 78% of the route between Pantex and SRS, while "suburban" mileage accounts for nearly 20% of the route. In the Atlanta metropolitan area, suburban speed limits outside I-285 are generally 65 miles per hour (mph); rural speed limits are 70 mph. Higher traffic volumes within the "suburban" area, and nearly equivalent speeds as in the "rural" area would seem to increase the relative probability of severe vehicle accidents in the "suburban" areas, and such accidents would potentially have far greater consequences than those presented in the DEIS. 25

The discussion of vehicle accidents specifically addresses the potential for a release of plutonium from the transport vehicle, with subsequent inhalation of plutonium by persons nearby. The DEIS however, states on page L-30, that "postaccident mitigative actions are not considered for dispersal accidents. For severe accidents involving the release and dispersal of radioactive materials into the environment, no postaccident mitigative actions, such as interdiction of crops or evacuation of the nearby vicinity, have been considered in this risk assessment."

The DEIS does not present sufficient information related to recovery. In Appendix K, which in general discusses the effects of facility incidents, the DEIS states "the longer-term effects of plutonium deposited on the ground and surface waters after the accident, including the resuspension and inhalation of plutonium and the ingestion of contaminated crops, were not modeled for the SPD (Surplus Plutonium Disposition) EIS. These pathways have been studied and been found not to contribute as significantly to dosage as inhalation, and they are controllable through interdiction". In previous correspondence with DOE in other programs, we have also met with some resistance to discussing the effects of deposited radioactive materials, as these effects 26

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MD322–24 **Transportation**

DOE is working very closely with State and tribal representatives to upgrade the transportation tracking and communication (TRANSCOM) system. The shipment of special nuclear materials using SST/SGTs does not involve the use of TRANSCOM. DOE Order 5610.14, *Transportation Safeguards System Program Operations*, specifically requires independent and redundant communications systems between vehicles in an SST/SGT convoy and with SECOM (a secure communications system operated by DOE). For security reasons, State and tribal representatives are not given access to this system. DOE has a system to liaison with State transportation and safety organizations on SST/SGT shipments.

MD322–25 **Transportation**

The consequences of a Category VIII accident occurring in suburban and urban zones are shown in Tables L–8 and L–9. However, a Category VIII accident in suburban and urban zones would have a frequency of less than 1 in 10 million years and would not be a foreseeable accident. Appendix L was revised to describe the maximum foreseeable offsite transportation accident as occurring in a rural zone. Because the total mileage in urban and suburban zones is much lower than in rural zones, accidents are less likely to occur in urban and suburban zones.

MD322–26 **Transportation**

DOE acknowledges the commentor's concern about transporting surplus plutonium. The subject of emergency response and subsequent cleanup of an accident that involves the release of nuclear materials, both special nuclear material and waste, is a topic of continuing discussion and planning between DOE and State, local, and tribal officials. Several venues, such as DOE's State and Tribal Governments Working Group and the Southern States Energy Board, are being used to facilitate these discussions. DOE's Transportation Safeguards Division has a formal liaison program with the States related to the transportation of special nuclear materials.

No credit was taken for interdiction or other activities that could be taken after a transportation accident involving a radioactive release, so the doses reported in this SPD EIS are considered conservative. As indicated in

Appendix L.8.4, mitigative actions would be taken following such an accident in accordance with EPA guidelines for nuclear accidents. These actions would result in lowering the actual dose to the surrounding population. As with any transportation accident, local, tribal, and State police, fire departments, and rescue squads are the first to respond to accidents involving radioactive materials. DOE maintains eight regional coordinating offices across the country, staffed 24 hours per day, 365 days per year, to offer advice and assistance. Radiological Assistance Program teams are available to provide field monitoring, sampling, decontamination, communication, and other services as requested. Dose to emergency response personnel is accident-specific and can not be globally estimated. Responders are trained to minimize dose.

The RADTRAN computer code evaluates the dose to the public from the resuspension pathway by calculating a resuspension dose factor. The resuspension dose factor takes into account dose from deposited material that is resuspended by various mechanisms such as wind or traffic. The factor is calculated using the methodology developed by NRC in the *Calculation of Reactor Accident Consequences, Appendix VI to the Reactor Study* (WASH-1400, 1975).

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material Furthermore, as discussed in Appendixes L.3.1.5 and L.3.1.6, DOE would ship all plutonium in Type B containers which must satisfy stringent testing criteria specified in 10 CFR 71, *Packaging and Transportation of Radioactive Materials*. The testing criteria were developed to simulate severe accident conditions, including impact, puncture, fire, and water immersion.

were seen as being more "environmental" than "emergency response".

In order to plan for, equip themselves to deal with, and train their response personnel for dealing with a transportation incident involving plutonium, state and local officials need information regarding both immediate protective measures, and also information related to post-emergency issues such as resuspension and relocation of deposited radioactive materials. For example, regarding vehicular disturbances, Sehmel (1975) has examined the importance of auto and truck traffic in the increasing of resuspension. It was concluded that such disturbance, in the case of an asphalt surface with newly deposited material, will lead to increased resuspension, with a fraction resuspended of the order of 10-5 to 10-2 per vehicle passage. The higher rates occurred at speeds typical of freeway driving. After passage of about 100 cars only a small fraction of the original contamination remained on the road surface. Unless emergency officials promptly close the accident scene to vehicle traffic (an unlikely situation), emergency responders may face an incident scene that is, unknown to them, extremely hazardous due to respirable plutonium. Post-emergency actions may also be complicated due to the enhanced spread of contamination by vehicle traffic. It is worthy of note here that the DEIS presents no information regarding potential radiation doses to response personnel. 26

Public acceptance of transportation of plutonium (Pu) in the U.S. is not a given. The true risk posed by transportation of plutonium may indeed be very small, but it is not zero, and public perception regarding these risks, and public acceptance of them, is critical to the success of this program. The existence of knowledgeable emergency response personnel at the state and local level, armed with both the training and equipment which would be required to respond to a transportation incident involving plutonium is a critical component in obtaining this public acceptance.

Utilization of Mixed Oxide (MOX) Fuel

There is a major unresolved question regarding the DOE decision to build a MOX fuel fabrication facility. The answer lies with the existing 41 operating commercial nuclear utilities in the United States that DOE expects o use the MOX fuel. There is the potential need for core redesign and other stability and power dynamic provisions imposed on the utility industry. This raises the issue of whether or not rate schedules will absorb the inherent cost of conversion. This may shift the decision away from inclusion of plutonium in MOX fuel and toward the placement of surplus weapons useable plutonium directly into geologic disposal (expected to be located at Yucca Mountain). 27

Decommissioning and Decontamination of Plutonium Facilities

There is not enough attention given to the end of the plutonium fuel cycle missions in the Draft EIS. Conceptual designs should be provided indicating where decommissioning and disposal (Dad D) considerations have been a driving force in the technology development, fabrication, and operational readiness for chemical and 28

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MD322–27 **MOX Approach**

Section 4.28 was revised to discuss the potential environmental impacts of operating the reactors that would use MOX fuel. Commercial reactors in the United States are capable of safely using MOX fuel. Modifications would need to be made to the fuel assemblies that would be placed in the reactor vessel to support the use of MOX fuel, but the dimensions of the assemblies would not change. DOE has used selection criteria in the procurement process which ensure that the domestic, commercial reactors chosen would be capable of safely and successfully completing the surplus plutonium disposition program. In addition, NRC would evaluate license amendment applications and monitor the operation of the proposed reactors selected to use MOX fuel. After irradiation is complete, the spent fuel would be stored on the site pending eventual disposal pursuant to the NWPA.

The provisions of the DOE contract with DCS to use the Catawba, McGuire, and North Anna reactors would not result in additional cost to the electricity customer.

MD322–28 **General SPD EIS and NEPA Process**

As described in Section 4.31, features are being incorporated into the designs that would allow future deactivation and stabilization activities to be performed more quickly and easily to reduce the risk of radiological exposure, reduce the costs associated with long-term maintenance, and prepare the buildings for potential future use. Whether DOE would reuse or D&D the facilities following surplus plutonium disposition cannot be determined at this time. DOE will perform engineering evaluations, environmental studies, and further NEPA review to assess the consequences of different courses of action.

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nuclear material. There is inadequate assurance that the consideration of risk trade offs in reducing and separating risks, along with well-intended costly measures, will deliver, the expected protection of the environment, safety, and health (i.e., the cumulative risk of 50 tons of plutonium immobilization with that of up to 33 tons of plutonium in MOX fuel). DOE's historical approach to evaluating D&D options or the reuse of the facilities only at the end of the useful life of plutonium facilities is unacceptable and serves to detract from the true cost of the front end decisions for facility siting and construction. 28

Chemical Form and Safety
There are concerns about the final chemical and physical form of Plutonium Oxide in the proposed immobilization process. DOE should indicate what technical analyses have been provided to show that plutonium will be uniformly dispersed and subcritical, with no hot spots, eutectics, heat transfer peaks and with acceptable geometric configuration. It is interesting to note that DOE did use values for the airborne release fraction of up to 0.1 and respirable fractions of up to 1.0 for some of the severe accident scenarios; however, DOE failed to include justification for their use of these values for airborne release fraction, respirable fractions, leak path factor, and material at risk. 29

Malevolent Acts
Several of the facility incidents discussed in Appendix K of the DEIS, particularly those events for which the initiating event is an "operator error", could also be intentionally initiated by an operator with malicious intent (an informed insider). It is unclear that the analyses presented in this DEIS consider malicious intent as an incident initiator. A knowledgeable operator with malicious intent could disable or bypass systems which normally would be used to detect or mitigate an incident.

The transportation section of the DEIS, Appendix L, dismisses the possibility of malevolent acts with these words — "[i]n no instance, even in severe cases such as discussed below, could a nuclear explosion or permanent contamination of the environment leading to condemnation of land occur. ... [s]uch attacks would be unlikely to occur ... [o]ther materials, including uranium hexafluoride, uranium oxide, TRU waste and LLW, are commonly shipped, and to not represent particularly attractive targets for sabotage or terrorist attacks". 30

We disagree with the conclusions drawn in this section of the EIS, and request that DOE perform calculations of the consequences of incidents initiated by malevolent acts, including transportation incidents. Results of these analyses should be classified as appropriate, as recommended by DOE Order 151.1, and incorporated into both this EIS and the Emergency Preparedness Hazard Assessment (EPHA) documents for both TSD and the plutonium facilities.

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MD322–29 **Immobilization**

Numerous R&D studies of the immobilized plutonium forms have been conducted by DOE and the national laboratories, in part to ensure that all environmental health and safety requirements are met. Several technical studies continue. For enhanced readability of this SPD EIS, supporting documentation and detailed analyses of the chemical, physical, and nuclear properties of the immobilized forms were published separately. Information on specific technical aspects of the immobilized forms can be found in the following documents: (1) the immobilization data reports published in conjunction with this SPD EIS; (2) *Report on Evaluation of Plutonium Waste Forms for Repository Disposal* (DI: A-00000000-01717-5705-00009, Rev. 00A, March 1996); (3) *Immobilization Technology Down-Selection Radiation Barrier Approach* (UCRL-ID-127320, May 1997); and (4) *Fissile Material Disposition Program Final Immobilization Form Assessment and Recommendation* (UCRL-ID-128705, October 1997). These documents are available to the public at DOE sites and regional reading rooms; the latter two are also available on the MD Web site at http://www.doe-md.com.

The airborne release fractions/rates and respirable fractions used in this SPD EIS for accident analysis are consistent with those stated in DOE-HDBK-3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities*. Appendix K contains scenario-specific summaries detailing the material at risk, damage ratios, airborne release fractions, respirable fractions, and leakpath factors used in the analysis of facility accidents. Additional information supporting values of material at risk, damage ratio, and leakpath factor can be found in the data reports referenced in Appendix K.

MD322–30 **Facility Accidents**

Sabotage scenarios are considered conjecture and not reasonably foreseeable. Although they were excluded from this SPD EIS, the results of such sabotage (including sabotage by an "insider" and transportation incidents) would be bounded by the accidents presented in Appendixes K and L. The possibility of sabotage would be controlled through the safeguards and security provisions including security requirements associated with facility workers.

The proposed surplus plutonium disposition facilities would be designed and operated in accordance with DOE Orders 470.1, *Safeguards and Security Program* and 151.1, *Comprehensive Emergency Management System*. The MOX facility and proposed reactors that would use the MOX fuel would be subject to similar NRC requirements.

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Georgia Environmental Protection Division
Specific Comments Related to
Surplus Plutonium Disposition Draft Environmental Impact Statement (DEIS)
DOE/EIS-0283-D

Pg 1-2	What is DOE's rationale for the alternative of converting 33t of surplus plutonium to MOX fuel? Is there a useful energy recovery goal for the surplus plutonium?	31
Pg 1-3	Why does DOE not further discuss the ultimate D&D of the three types of facilities? DOE has a vast experience of the technology and operation of Pu production facilities.	32
Pg 1-5	When will DOE provide the separate cost study (DOE 1998a) that should be analyzed along with this SPD EIS.	33
Pg 1-5	What will be the cost to the utilities and rate payers for MOX fuel utiliz on? Will it be similar to spent fuel charges under the NWPA provisions? Are all of the process development costs for MOX fuel a responsibility of DOE?	34
Pg 1-8	Why is the lack of homogeneity in less favor than the mobilization and vitrification in the ceramic can-in-canister approach? Has the criticality and heat transfer impacts been fully evaluated?	35
Pg 1-9	Why hasn't the Disassembly and Conversion Demonstration Environmental Assessment and Research and Development Activities Report (DOE 1998b) not accompany this SPD EIS?	36
Pg 1-9	Why does the ceramic can-in canister approach provide greater proliferation resistance than the glass can-in-canister approach? What lesser environmental impacts justify the ceramic over the glass can-in-canister approach?	37
Pg 1-9	DOE states that Hanford's cleanup mission is the site's top priority. Does SRS not have the same top priority of weapons site remedial site cleanup?	38
Pg 1-10	Why does the postirradiation examination of the MOX lead test assemblies not be a most desired requirement? This examination is most important in the determination of fuel defects, contamination, neutron absorber capability, hydrogen embrittlement and lastly physical characteristics of creep and swelling of the fuel material.	39
Pg 1-11	Will the pit conversion facility commence about 2001 before final evaluation is completed of the DOE/EA-1207 which intended to last up to four years?	40

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MD322–31 **MOX Approach**

Under the hybrid alternatives analyzed, up to 33 t (36 tons) of surplus plutonium would be made into MOX fuel. DOE reviewed the chemical and isotopic composition of the surplus plutonium and determined in the *Storage and Disposition PEIS* ROD that about 8 t (9 tons) of surplus plutonium were not suitable for use in making MOX fuel. Furthermore, DOE has identified an additional 9 t (10 tons) for a total of 17 t (19 tons) that have such a variety of chemical and isotopic compositions that it is more reasonable to immobilize these materials and avert the processing complexity that would be added if these materials were made into MOX fuel. The criteria used in this identification included the level of impurities, processing requirements, and the ability to meet the MOX fuel specifications. If at any time it were determined that any of the 33 t (36 tons) currently proposed for MOX fuel fabrication was unsuitable, that portion would be sent to the immobilization facility. While there is a benefit gained from the use of this MOX fuel in domestic, commercial reactors, the goal of the surplus plutonium disposition program is not energy recovery, but instead disposition of the plutonium in a safe, timely, and cost-effective manner.

MD322–32 **General SPD EIS and NEPA Process**

This comment is addressed in response MD322–28.

MD322–33 **Cost**

The cost analysis report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009), was issued in July 1998. Another report, the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013) was issued in November 1999. These reports are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MD322–34 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium

as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

The utilities will continue to pay the standard surcharge per kilowatt-hour of electricity used for spent fuel under the NWPA, as amended, regardless of whether the spent fuel is from commercial MOX fuel or LEU fuel. There are no known process development costs for MOX fuel.

MD322–35 **Immobilization**

The immobilization analysis included in the *Storage and Disposition PEIS* focused on the use of technologies that would blend the surplus plutonium directly with either HLW glass or ceramic in a homogenous mixture. Based on public comments on the *Storage and Disposition PEIS* and technology developments, DOE accelerated research, development, and testing of various aspects of the can-in-canister approach to establish the optimum plutonium concentration and chemical composition of a form that could be readily processed, satisfy nonproliferation concerns, and perform well after emplacement in a potential geologic repository. Included in these efforts were evaluations of criticality and heat transfer issues in addition to those that had been conducted for the homogenous forms. In the *Immobilization Technology Down-Selection Radiation Barrier Approach* (UCRL-ID-127320, May 1997), LLNL recommended that DOE pursue only the can-in-canister immobilization approach based upon its superiority to the homogenous approaches in terms of timeliness, higher technical viability, lower costs, and to a lesser extent, lower environmental and health risks. Based on further recommendations from a committee of experts representing DOE, the national laboratories, and outside reviewers, DOE subsequently determined that immobilizing surplus plutonium materials would be best accomplished using the ceramic process. NAS is also currently studying the ability of the immobilization approach to meet the Spent Fuel Standard, including the heat transfer impacts of this approach.

MD322–36 **Pit Demonstration EA**

There is no need for the *Pit Disassembly and Conversion Demonstration EA* (DOE/EIS-1207, August 1998) and its FONSI (August 1998) to accompany this SPD EIS because the environmental impacts of the pit demonstration will not affect the cumulative impacts of dispositioning surplus plutonium. This EA is referenced in this EIS for the purpose of keeping the decisionmaker and the public fully informed about all aspects of the surplus plutonium disposition program.

MD322–37 **Immobilization**

This SPD EIS considers the immobilization of surplus weapons-usable plutonium in two forms, ceramic and glass; both would be produced using similar processes based on a can-in-canister approach. Past analyses have indicated that both ceramic and glass would be acceptable for immobilizing surplus plutonium. Recently, DOE completed a series of evaluations to determine whether the properties associated with ceramic or glass would be better suited for immobilizing plutonium (*Fissile Material Disposition Program Final Immobilization Form Assessment and Recommendation* [UCRL-ID-128705, October 1997]). These studies indicated that the use of ceramic would be more resistant to the threat of theft, diversion, or reuse, due to the greater difficulty associated with trying to chemically extract and separate plutonium from the ceramic form than is required for the glass form. The studies also found that ceramic form would likely be more durable over a longer period of time under geologic repository conditions, would require less shielding to protect workers, and would potentially provide significant cost savings. Only minor differences between the two forms are expected in terms of potential environmental impacts, as described in Section 4.29. Whereas the ceramic form would result in slightly higher potential offsite radiological exposures from normal operations, facility accident impacts, and water and electricity requirements, the glass form would result in higher routine and accidental transportation impacts. Overall radiological exposure to workers, as well as anticipated waste types and volumes, would not be expected to differ appreciably between the two forms.

MD322–38 **Alternatives**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities; however, no decision has been made. While it is true that SRS also has cleanup activities underway, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

MD322–39 **Lead Assemblies**

At the time the SPD Draft EIS was issued, the DOE procurement process to acquire MOX fuel fabrication and reactor irradiation services was not completed. DOE was unsure whether the team that would be selected would be able to use its existing knowledge to determine MOX fuel performance, or if the team would require lead assembly testing to ascertain fuel performance. In consultation with DCS, the team selected during the procurement process, DOE believes that limited lead assembly fabrication and postirradiation examination will be required.

MD322–40 **Pit Demonstration EA**

Should DOE decide to build a pit conversion facility, this facility would begin operating about 2004 by which time the pit disassembly and conversion demonstration would be completed. Facility design, however, would take place during approximately 1999 through 2001. While the pit demonstration would continue for up to 4 years, the information from the demonstration would be generated, gathered, and available on an ongoing basis. This means that information transfer regarding the fine-tuning of the operational parameters of a pit conversion facility could be provided on a continuous basis throughout the facility design phase. Also, because the information from the demonstration would be used to supplement other information developed to support the design of a pit conversion facility, it would not be necessary for the demonstration to be completed before beginning facility design and construction.

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Pg 1-12	Is D and D a major category in the direction of DOE's blueprint for waste cleanup (DOE/EM-0342) ? To what extent does this SPD reflect the implications of waste management and environmental restoration in the paths to closure document?	41
Pg 1-14	The SRS Actinide Packaging and Storage Facility is a planned facility, not in operation at this time according to DOE. What is the specific relationship between this planned facility at SRS and SPD? Special concerns relating to the environmental impacts for stabilization of the neptunium-237 aqueous solutions is required.	42
Pg 1-15	Has DOE completed further study and evaluation for safety and final thermal loading for the HLW canisters, using the criterion (ie, surrounding radiation barrier for immobilized plutonium)?	43
Pg 2-8	DOE needs to indicate the potential environmental impacts of the ceramic and glass can-in-canister technologies based on generic designs and compare to those impacts of the homogeneous facilities. DOE needs to evaluate the conceptual design and modifications required by full operational readiness of these facilities. The (DOE 1996a) Storage and Disposition Final PEIS is not adequate in present form for SPD facilities siting.	44
Pg 2-10	DOE's development of alternatives should clearly state that useful fissile material energy resource is either to be immobilized and buried as long-term HLW in geologic repository or that a portion of the surplus plutonium is to be utilized as MOX fuel for commercial LWRs.	45
Pg 2-12	DOE Feed Preparation Methods for immobilization is considering a major change from the wet-feed preparation process (aqueous processing) to a dry-feed process. It is stated that the dry-feed process requires less quantity of water and generates less amounts of waste, and has been chosen for use in this SPD EIS. This decision based on actinide removal from waste streams needs further evaluation primarily based on the long experience and operations for aqueous processing.	46
Pg 2-13	DOE needs to state clearly that for plutonium processing and storage considered in this SPD EIS, material unaccounted for (MUF) will not be allowed for the special nuclear material. The accountability must satisfy the proliferation concerns and inspections of IAEA.	47
Pg 2-13	DOE needs to further evaluate to determine if the Pit Disassembly and Conversion is adequate for the removal of gallium. The fuel poison will result in impurity in plutonium dioxide feed for MOX fuel fabrication. This	48

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MD322–41 **Waste Management**

Comments on the draft and final *Accelerating Cleanup: Paths to Closure* documents (DOE/EM-0342, February 1998 and DOE/EM-0362, June 1998) are beyond the scope of this SPD EIS, although Section 1.8.2 of this SPD EIS describes the relationship between this EIS and those documents. Section 1.8.2 states that this EIS reflects the proposals in *Accelerating Cleanup: Paths to Closure*, to the extent possible, and that subsequent versions of that document will reflect the waste management and environmental restoration implications of the decisions made as a result of this EIS.

MD322–42 **Waste Management**

DOE has recently decided to delay the construction of APSF, and the *Supplement to the SPD Draft EIS* reflects modifications to disregard any benefit to the proposed facilities of APSF being built at SRS. Stabilization of neptunium 237 solutions would not occur within APSF, if built, and this process is not required to support the disposition of surplus plutonium.

MD322–43 **Immobilization**

This comment is addressed in responses MD322–35 and MD322–37.

MD322–44 **Immobilization**

DOE believes the analyses presented are adequate to support the decisions being addressed in this SPD EIS, including the facilities' siting. As a means of bounding the estimate of potential environmental impacts of the immobilization approaches to surplus plutonium disposition, the *Storage and Disposition PEIS* analyzed in detail the construction and operation of generic homogeneous ceramic immobilization and vitrification facilities. Although generic designs were the focus of the study, these designs were analyzed against parameters specific to each of the candidate sites to determine potential site-specific environmental impacts. Several variant immobilization technologies were also discussed in the *Storage and Disposition PEIS*. The subsequent ROD for that EIS states that DOE would make a determination on the specific technology on the basis of "the follow-on EIS" (this SPD EIS). In the tiered SPD EIS, the can-in-canister approach was identified as the preferred

immobilization technology and evaluated in detail as part of each alternative. As a basis for evaluating the alternative immobilization technologies and forms presented in the two documents, the environmental impacts associated with operating the ceramic and glass can-in-canister immobilization facilities evaluated in this SPD EIS were compared with the impacts associated with operating the homogenous ceramic immobilization and vitrification facilities evaluated in the *Storage and Disposition PEIS*. This comparison is presented in Section 4.29.

MD322–45 Alternatives

In Volume I, Chapter 1 discusses the purpose of the proposed action and Chapter 2 describes the development of the alternatives.

MD322–46 Plutonium Polishing and Aqueous Processing

DOE does not agree that aqueous processing for immobilization feed preparation requires further evaluation in this SPD EIS. In addition to higher water consumption and waste generation cited as examples in this EIS, the aqueous process would also present a higher potential for worker exposure to radioactive materials and greater risk to the public. An aqueous process for the conversion of plutonium for immobilization would also require much more control to provide adequate protection against proliferation and to provide for proper oversight by IAEA. Therefore, aqueous processing/wet feed for immobilization is not a reasonable alternative.

MD322–47 Nonproliferation

Security for the proposed surplus plutonium disposition facilities would be implemented commensurate with the usability of the special nuclear material in a nuclear weapon or improvised nuclear device. At any time, the total amount of special nuclear material in each facility, or in any material balance area within each facility, would be known and so material unaccounted for would be avoided. Physical inventories, measurements, and inspections of material both in process and in storage would be used to verify inventory records. In addition, each of the proposed facilities includes design requirements for space, and to varying degrees, access for an international body to verify compliance with international nonproliferation policies.

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However, the actual implementation process for ensuring international safeguards of the Russian and U.S. material is not as yet fully defined. That process is part of ongoing sensitive negotiations between the two countries. Under the details of those negotiations, the verification process for compliance of the proposed facilities with international nonproliferation policy could be conducted by a bilateral arrangement that includes access to the proposed facilities only by members of the U.S. and Russian governments, or it could include access to the facilities by an international body, such as IAEA.

MD322–48 Plutonium Polishing and Aqueous Processing

On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

	is a major problem and may require a separate Plutonium Polishing Process. DOE has not made a decision on the Plutonium Polishing Process or whether, if needed, it would be placed in the facilities for Pit Conversion or at the MOX fuel fabrication facilities. Gallium contamination, like other neutron absorbing poisons, is a major concern in MOX fuel fabrication.	48
Pg 2-23	DOE needs to develop accident scenarios for the case of HEPA filter failure. The occurrence will not provide the DF of 10-4 that is required for 99.99% particle removal as small as 0.3 micron in a flowing airstream. DOE has postulated a LPF value of 1.0X10-5 for two HEPA filters. This is an operational problem and if sand filters are not used in conjunction, will the HEPA filter provide an LPF of 1X10-5 and will not be maintained.	49
Pg 2-23	DOE needs to clearly state that SRS has the edge over other facilities by providing the least transportation impacts and necessary experience in plutonium production.	50
Pg 2-27	DOE needs to clearly state the time schedules for construction and operation of the MOX Facility Description. Depending upon DOE's decision on immobilization of surplus plutonium, the DOE decision on MOX fuel fabrication depends on a number of other considerations (ie, lead test assemblies, utility acceptance, etc.). The tiered approach of SPD EIS is barely appropriate for siting of MOX fuel fabrication when so many other variants exist.	51
Pg 2-30	It is vital that a homogeneous mixture exists in the mixed oxide (ie, blending and milling the PuO2) to achieve the required enrichment and isotopic concentration of the uranium and plutonium powders and to adjust the particle size of the MOX powder. The determination of accurate particle size of the MOX fuel is a most important factor in estimation of severity of facility accidents.	52
Pg 2-32	DOE notes that the dose from pit-handling activities at Pantex could be reduced by 40% because the majority of pits are already in storage at Pantex.	53
Pg 2-56	DOE needs to determine if the time schedules, reduced cost, infrastructure and other advantages of using the 44-year-old contaminated and aging F-canyon Bldg 221-F outweighs the new building construction at SRS. It is also noted that use of Bldg. 221-F would result in about 0.5 LCF for a designed basis earthquake at SRS.	17
Pg 2-98	DOE needs to stress what is the meaning of site limit 10 mrem/year from all facility sources. This is the annual effective dose equivalent to the MEI	54

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MD322–49 **Facility Accidents**

The assumed leakpath factor of 1.0×10^{-5} for operational HEPA filters is achievable and conservative. However, this SPD EIS also analyzed a number of accidents that involve various degrees of containment failure, including HEPA filter failures. Two of the most significant are the beyond-design-basis seismic event and the beyond-design-basis fire. Details on these and other scenarios are provided in Appendix K and the Facility Accident sections in Chapter 4 of Volume I. None of the proposed surplus plutonium disposition facilities are planning to use a sand filter, so credit has not been taken for that in the accident analysis.

MD322–50 **Alternatives**

In Volume I, transportation impacts at SRS are summarized in Chapter 4 and described in Appendix L. Infrastructure is also discussed in Chapter 4. As indicated in Chapter 1 of Volume I, the existing infrastructure at SRS is one of the reasons SRS was chosen as the preferred site for the proposed surplus plutonium disposition facilities. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

MD322–51 **Purpose and Need**

Appendix E includes schedules for each of the three proposed surplus plutonium disposition facilities and the lead assembly facility. This SPD EIS is tiered from the *Storage and Disposition PEIS* because the latter evaluated the disposition of weapons-usable fissile materials at a programmatic level. DOE committed in the ROD on the *Storage and Disposition PEIS* to do follow-on, site-specific NEPA analyses to determine the exact locations for the disposition facilities. The *Storage and Disposition PEIS* considered a broad range of technology options and candidate sites for the disposition of surplus plutonium, and the ROD narrowed the options to those evaluated in the SPD EIS.

The MOX approach includes the testing of up to 10 lead assemblies. However, the facilities where these assemblies would be built and tested already exist and can be quickly modified to support the MOX approach. Utility acceptance has already been addressed with the award of a contract

to DCS and the proposal to use the Catawba, McGuire, and North Anna commercial reactors with partial MOX cores.

MD322–52 **Facility Accidents**

DOE agrees that accurate particle size of the MOX fuel is an important factor in estimation of severity of facility accidents. The issue of MOX powder particle size was considered in the course of analysis for this SPD EIS as documented in the memorandum, *Particle Size of PuO_2 Generated by HYDOX-Ga Removal Process and Impact on Usability of DOE-HDBK-3010-94 ARF and RF Values* (personal communication from J. Mishima to J. Eichner, Science Applications International Corporation, December 15, 1997). The conclusion was that the values in DOE-HDBK-3010-94 were conservative and appropriate for use in the SPD EIS analysis. This is discussed in Appendix K.1.5.1.

MD322–53 **Human Health Risk**

Decisions on the repackaging of pits at Pantex have been revisited since the SPD Draft EIS was published. Section 2.18 and Appendix L.5.1 were revised to incorporate a modified transportation dose analysis. If the pit conversion facility is located at Pantex, the dose associated with repackaging the pits for shipment off the site could be avoided, thus eliminating approximately 10 person-rem/yr in worker exposure.

MD322–54 **Human Health Risk**

In the Human Health Risk portions of Section 4.32, the 10-mrem/yr limit is described in detail. It is stated that there is a 10-mrem/yr NESHAP dose limit from total site airborne emissions, as required by the Clean Air Act regulations and DOE Order 5400.5, *Radiation Protection of the Public and the Environment*.

	at the site boundary. This places a limit on the lifetime risk for maximally exposed individuals and average individuals in large population groups.	54
Pg 2-99	This is not one of DOE's best examples of commitment for removing spent fuel from the utility storage by January 1998.	55
Pg 2-102	With the exception of sulfur dioxide in the ceramic can-in-canister process all criteria pollutant emissions associated with either can-in-canister technology is within limits. If DOE determines that if scrubbers for the sulfur dioxide are required in the conceptual design, it should be clearly stated.	56
Pg 3-142	The radiation doses to workers from normal SRS operation in 1996 yields a total effective dose equivalent of 19 mrem for the average radiation worker from on-site releases and direct radiation. This same value of 19 mrem is shown for the Hanford workers in 1996; however, a lower person-rem does of 237 for SRS vs 266 for Hanford.	57
Pg 3-152	It is noted that DOE must exhibit constant attention and vigilance to reduce off-site liquid pathway radionuclide contamination. There is widespread contamination on-site at SRS.	58
Pg K-1	If the frequency of the initiating event is known, then the point estimate of increased risk of LCF per year may be helpful in understanding individual risk instead of population risk.	
Pg K-1	One type of risk, average individual risk is the product of the total consequence (if known) experienced by the population and the accident frequency, divided by the population.	59
Pg K-2	It is noted that the MACCS2 accident model code is capable of calculating individual consequences at the point of maximum consequences but it is not configured to calculate individual risk at the point of maximum risk.	
Pg K-5	It is noted that the accident factors for source term (ie, MAR, DR, ARF, RF and LPF) as indicated by DOE Handbook 3010-94 is questioned. DOE needs to justify the use of these factors in realistic accident scenarios. If the value of each of these factors depends on the details of the specific accident scenario postulated, then that detail must be provided to compare accident risk. Otherwise, the factors are judged to provide source term reduction without justification.	60
	It is most appropriate to use realistic model input parameters; conservative parameters should be used only to the extent necessary to compensate for uncertainties.	

MD322

MD322–55 **Waste Management**

Section 4.28 was revised to discuss the potential environmental impacts of operating the reactors that would use the MOX fuel. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. Issues related to a potential geologic repository for HLW and spent nuclear fuel are beyond the scope of this SPD EIS, but are being evaluated in the *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999).

MD322–56 **Air Quality and Noise**

The sulfur dioxide emissions for the ceramic can-in-canister process are within limits as shown in the immobilization sections of Appendix G (e.g., Table G–9).

MD322–57 **Human Health Risk**

The reason for the difference in total number of person-rem between the two sites is due to the different number of workers at SRS and Hanford. Total workforce dose (in units of person-rem) is calculated by multiplying the average worker dose by the number of workers at a given site. Thus, for SRS, 19 mrem multiplied by 12,500 workers yields 237 person-rem (237,000 person-mrem). At Hanford, 19 mrem multiplied by 14,000 workers yields 266 person-rem (266,000 person-mrem).

MD322–58 **Water Resources**

DOE acknowledges the commentor's concerns regarding contamination at SRS. Although beyond the scope of this SPD EIS, activities to remediate existing contamination at SRS are ongoing. In addition, SRS maintains an aggressive waste minimization and pollution prevention program as described in Section 3.5.2.7. Analyses presented in Section 4.26.4.2 indicate that there

would be no discernible impacts to groundwater or surface water quality at SRS from construction and normal operation of the proposed surplus plutonium disposition facilities. If all the proposed facilities were located at SRS, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products, fisheries, and water sources (i.e., the Savannah River). This dose (about 1.6 person-rem/yr) would be 0.0007 percent of the radiation dose that would be incurred annually from natural background radiation. It has also been estimated that a small fraction of this dose (about 0.10 person-rem/yr) would be specifically due to the consumption of aquatic biota (fish or crustaceans) and drinking water (i.e., from the Savannah River) from minute quantities of air deposition and/or from any potential wastewater releases. This estimation is based on historical characteristics associated with F-Area releases to Savannah River outfalls. Nevertheless, public doses incurred from the uptake of these sources were determined to be well below Federal, State, and local regulatory limits.

MD322–59 **Facility Accidents**

Appendix K.1.1.2, Uncertainties and Conservatism, presents the rationale for preserving the consequences and frequency metrics as the primary accident analysis results, as opposed to risk metrics. However, to assist the interested reader in using the results to calculate average individual risks, the discussion of risk measures was revised to include reference to population figures, which are needed for calculating average individual risk for those living within 80 km (50 mi) of the site. As discussed in Appendix K.1.1.1, average individual risk is sensitive to the choice of the population that is included in the calculation, so care must be taken when interpreting such results.

MD322–60 **Facility Accidents**

DOE-HDBK-3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities*, is the accepted standard for determining ARF and RF values. The values specified in that handbook are phenomenology dependent. Application of the values to a specific accident scenario requires characterization of the phenomena associated with that accident and matching of those phenomena with like phenomena in the handbook. Where phenomena do not match exactly, scaling of values may be needed to better characterize the accident. Chapter 7 of the handbook

contains application examples that can be reviewed to clarify the appropriate use of the values. The recommended values in the handbook are bounding, which adds an element of conservatism to any analysis in which they are used but they are also considered realistic for analysis in this SPD EIS. MAR, DR, and LPF factors are developed purely in the context of the analyzed accidents and do not originate from DOE-HDBK-3010-94. Appendix K.1.5 provides information on the specific accident scenarios postulated. Further details are provided in the referenced data reports which are available in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

GEORGIA DEPARTMENT OF NATURAL RESOURCES
JAMES L. SETSER
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Pg K-12	For an aircraft crash scenario, the DOE Handbook 3010-94 recommends values for debris impact in powder and recommends bounding ARF and RF values of 1X10-2 and 0.2 respectively. However, DOE attempts to justify use of a value of 3X10-2 for RF and a value of 1X10-2 for ARF corresponding to a decreased source term of 104g for the MOX facility and 18g for pit conversion facility accident.	61
Pg K-22	It is interesting to note that for an explosion in sintering furnace a bounding ARF of 0.01 and RF of 1.0 is assumed and based on an LPF of 1x10-5 for two HEPA filters, a stack release of 5.6X10-4 g of Pu-239 (in the form of MOX powder) is postulated.	62

MD322

MD322–61 **Facility Accidents**

While, from a risk standpoint, the use of an arithmetic average RF is appropriate, the use of this method is inconsistent with the use of bounding values from DOE-HDBK-3010-94 for other accidents. Appendix K.1.5 was revised to use a respirable fraction of 0.2 and an airborne release fraction of 1.0×10^{-2} for aircraft debris impact into plutonium dioxide powder.

MD322–62 **Facility Accidents**

DOE acknowledges the comment.

AUG-11-98 TUE 07:40 P.02

Mr Mike Holgate
DOE

I'm Charles Walker and I am fortunate enough to represent the people of Burke and Richmond Counties as Senate Majority Leader of the Georgia State Senate. A good deal of these people are touched by the Savannah River Site each day.

Now that the Cold War is over, the United States and the former Soviet Union have agreed to dismantle their nuclear arsenals. The people at SRS and the CSRA contributed to our Nation's nuclear deterrent efforts for over four decades and now these same people are prepared to take on the new, critical mission of plutonium disposition. In particular, the Savannah River Site's unique history make it the logical choice for the pit disassembly and conversion mission.

Why would DOE consider another possible site for this mission? Well, perhaps another facility has the experience that SRS has had handling plutonium. However, DOE acknowledged that SRS was uniquely qualified to handle plutonium when it named SRS as the site of choice for Mixed Oxide Fuel Fabrication.

Perhaps another facility can accomplish the mission at a lower cost to taxpayers. Well, DOE's own cost report that accompanied the draft EIS for Surplus Plutonium Disposition acknowledged that locating the pit disassembly facility at SRS would save taxpayers at least $60 million. However, the potentials savings could reach $715 million. 1

Well, if SRS has the experience, infrastructure and can accomplish the pit disassembly mission at a lower cost to taxpayers, perhaps it is a safety issue. Well, how could that be because we know that SRS has the best safety numbers of the entire DOE complex.

Perhaps as Frederico Peña indicated on his visit to SRS and CSRA, community support is a major portion of the decision making process. I myself was part of a delegation that met with the Secretary, both here and in Washington, to express the community's support of the plutonium disposition mission at SRS. Other groups have met with DOE to state the overwhelming support that SRS has in the community. In fact, we invite Secretary Richardson to visit SRS and the CSRA to obtain a sense of this tremendous support.

I believe that these hearings will provide overwhelming arguments as to why DOE will decide that SRS is the preferred site for the Pit Disassembly Mission.

Thank you for this opportunity to express my comments.

SCD53

SCD53–1 **Alternatives**

DOE acknowledges the Senator's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses for alternatives associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

GEORGIA SENATE
HONORABLE CHARLES W. WALKER
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CHARLES W. WALKER
District 22
Post Office Box 1282
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MAJORITY LEADER

COMMITTEES:
Appropriations, Secretary
Health and Human Services, Secretary
Insurance and Labor
Reapportionment
Rules

The State Senate
Atlanta, Georgia 30334

June 26, 1997

To the Department of Energy & concerned Citizens of the Central Savannah River Area:

I appreciate the opportunity to comment on the proposed decision to consolidate plutonium missions at the Savannah River Site.

The Savannah River Site continues to play a key role in this community and has the only large-scale plutonium processing facility in the country. From a business perspective, why would you spend the dollars to transport components to SRS? It is only logical to keep all the plutonium handling operations at one site. Furthermore, the Savannah River Site has maintained a good safety record for more than 40 years with the technical experience and expertise in handling plutonium.

The community fully supports SRS for the entire plutonium mission as the lowest cost alternative overall with the least adverse environmental impact. You will find that the level, breadth and depth of support is found at no other site in the complex. 1

I support this effort and am committed to work diligently to do whatever is within my power to assist in stabilizing the workforce and increase employment opportunities at the Savannah River Site.

I ask you to seriously review the request and appreciate the time allotted to address you this evening. Thank you.

Sincerely,

Charles W. Walker
Senate Majority Leader

SCD104

SCD104–1 **Alternatives**

DOE acknowledges the Senator's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

United States Department of Energy

Comment Form

NAME: (Optional) Joseph Gilkson
ADDRESS: 3302 LOBLOLLY TRAIL, MARIETTA, GA 30062
TELEPHONE: (___)
E-MAIL:

I want to go on record as being in favor of building and operating the Pu Immobilization Facility, MOX Facility, and the Pit conversion facility at the Savannah River Site. Locating these facilities at SRS appears to be the most economical alternative. The SRS currently have the trained work force and infrastructure for these missions. In addition, the SRS is currently involved with handling and storage of Pu.

The alternative site for the Pit conversion Facility at Pantex does not make sense to me. PANTEX does not currently have the trained and experienced work force for handling Pu. Further, start-up of Pu handling at PANTEX will open that site to new hazardous waste streams not currently being handled by that site. 1

In my opinion, the Savannah River Site is the obvious better choice for all three missions.

SCD54

SCD54–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

HARDEMAN, JAMES C., JR.
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I am pleased to have the opportunity to provide comments to DOE on an issue of such global importance as the disposition of weapons surplus plutonium. The following statements represent my personal positions on the "Surplus Plutonium Disposition Draft Environmental Impact Statement" (DOE/EIS-0203-D), and should in no way be construed as being representative of the positions of my employer or any organization that I represent in any official capacity. All of the following comments should be considered in the context of my personal belief that consolidation of all aspects of the plutonium disposition mission at a single site has decided cost, management, environmental and safety advantages over other alternatives. 1

As brought out by several commenters at public hearings on this draft EIS, public support, or at least public acceptance, of plutonium disposition missions will require the highest level of public and worker safety and environmental protection. The overall success of plutonium disposition missions will require that vigorous environmental management (including both on-site and off-site environmental monitoring) and emergency preparedness programs are conducted as integral and vital parts of the mission, not as "overhead" functions as they seem to be currently viewed by DOE. Independent participation in these programs by agencies of affected state and local jurisdictions is essential to their success, and DOE should facilitate realistic participation in these programs through new or existing Agreements in Principle (AIP's) with affected juristictions. 2

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WD023–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at one site. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

WD023–2 **DOE Policy**

DOE Order 151.1, *Comprehensive Emergency Management System*, contains requirements for emergency-related offsite interfaces addressing accident conditions. This order states that Hazards Survey/Assessment results should be used to generate a listing of all services which may be needed to respond to postulated accident conditions. Examples of services which may be required include hospitals, fire departments, law enforcement, accident investigation, analytical laboratory services, ambulance services, coroners, suppliers, contractors, and others. Services needed should be checked against the capabilities of the identified interface organizations and agencies to ensure all are addressed. An interface should be established with each entity from which support will be needed and appropriate agreements prepared. For multiple-facility/sites, the contractor and operations/field office with site-wide responsibility should provide centralized point of coordination. The agreement should contain, at a minimum, the following information (1) the specific service to be provided; (2) point of contact and information required to initiate the service; (3) any constraints which might preclude the organization from meeting its obligation; (4) public information release protocols; (5) financial arrangements, including commitments by the facility/site to provide training, equipment, and facilities to the entity providing the service (considerations include indemnification for injury to persons or loss and damage to property); and (6) periodic re-examination of the provisions and a renewal or termination date.

If a facility/site is to provide support to an offsite agency under the good neighbor policy or through mutual aid agreements, those support interfaces should be documented. In addition, DOE radiological emergency response

Public perception of the risks related to the transportation of plutonium between DOE facilities, and public acceptance of them, is critical to the success of the entire plutonium disposition mission. The existence of knowledgeable emergency response personnel at the state and local level, armed with both the training and equipment which would be required to respond to a transportation incident involving plutonium is a critical component in obtaining this public acceptance. State and local response personnel, however, do not have ready access to specialized equipment and training required to make a radiological assessment of a transportation accident involving weapons-grade plutonium. It is incumbent on DOE to make such equipment and training available to response personnel in jurisdictions through which plutonium would be shipped under this EIS. 2

The EIS discusses in some detail both the postulated effects of plutonium disposition facility accidents and accidents during transportation of plutonium between DOE sites. The information presented, however, is incomplete, and does not present a true picture of the potential severity of an accident involving weapons grade plutonium. Some of the issues that I feel need to be addressed in the final EIS are: 3

1) The EIS does not present sufficient information regarding the short-term and long-term effects of the deposition of plutonium either during a transportation accident or a facility accident. The EIS does mention that long-term effects of plutonium deposition, including the resuspension and

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assets are available to support offsite officials in the event of a radiological incident. Facilities/sites should coordinate with offsite officials to provide information on the availability and capabilities of DOE radiological emergency response assets. Facility/site plans should describe integrated support from other offsite response organizations responding to emergencies. The organizations may include groups from outside the facility/site (emergency planning zone) that respond under provisions of the Federal Radiological Emergency Response Plan for radiological emergencies; the National Oil and Hazardous Substances Pollution Contingency Plan, also known as the National Contingency Plan, for oil and nonradiological hazardous material emergencies; or the Federal Response Plan, if the situation is declared an emergency or major disaster by the President. If the county(ies) is declared a Presidential disaster area and the Federal Response Plan is activated, FEMA will establish a Disaster Field Office, from which Federal and State personnel will coordinate activities.

WD023–3 **Facility Accidents**

Appendix K.1.4.2 provides the rationale for focusing on the inhalation pathway when calculating plutonium dose. This is the pathway of significance for estimating doses due to the postulated accidents analyzed in this SPD EIS. While these accidents would deposit plutonium on the ground, there would be ample opportunity to interdict any potential significant doses from resuspension or through food or water pathways. The consequences, therefore, would be mainly economic rather than health related. The transportation analysis deals with the risk of all accidents along a route, rather than the consequences of a single accident at a specific location. Appendix L.8.4 presents a description of the uncertainties inherent in this approach. Appendix L.6.3 was revised to include a description of specific impacts of hypothetical accidents.

In general, economic costs can not be calculated with any reasonable degree of accuracy. Because of this, as well as the very low probability of accidents of the magnitudes considered for purposes of analysis, the impacts on natural-resource-related economies were regarded as beyond the scope of analysis. Long-term effects of contamination following a facility or transportation accident were not analyzed in detail for this EIS because the

HARDEMAN, JAMES C., JR.
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inhalation of plutonium and the ingestion of contaminated crops are controllable through interdiction. In previous discussions, DOE has indicated that it views the effects of deposited radioactive materials as being more in the "environmental" arena than the "emergency response" arena. DOE should fully discuss the potential for ground contamination resulting from facility or transportation accidents, and discuss the short-term and long-term effects of such contamination, including the need for interdiction of lands and agricultural restrictions. 3

2) The EIS does not discuss the potential for facility incidents initiated by malevolent acts. The EIS does briefly discuss malevolent acts related to transportation of plutonium by Safe Secure Trailer (SST), and dismisses them with the statement that "in no instance, even in severe cases ... could nuclear explosion or permanent contamination of the environment leading to condemnation of land occur." I find this view, particularly in today's environment of global unrest, to be particularly troubling. I strongly urge DOE to revisit both the facility and transportation accident sections of the EIS, and to specifically consider the effects of incidents initiated by malevolent acts. If necessary, this analysis could be presented as a classified appendix to the final EIS and an unclassified summary for publication. 4

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risk would be much lower than that associated with inhalation. Moreover, quantitative analysis of low-level contamination would require significant accident-, weather-, and site-specific analysis. In the unlikely event of an accident, DOE would thoroughly investigate potentially affected areas and determine the need for interdiction or other specific actions.

WD023–4 **Facility Accidents**

The possibility of malevolent acts is controlled through the DOE safeguards and security provisions that are associated with facility operations. Guidance in *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements* (DOE Office of NEPA Oversight, May 1993) states that impacts should be analyzed if they are reasonably foreseeable. The definition of reasonably foreseeable requires that the analysis is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason. Malevolent acts are considered conjecture and were therefore excluded from analysis. Appendix L.6.5 was revised to expand the qualitative description of the consequences of malevolent acts during transportation.

3) The EIS does not discuss potential doses to emergency personnel responding to either facility or transportation accidents. Transportation accidents pose several challenges, particularly since Transportation Safeguards Division (TSD) convoys no longer carry radiation detection equipment. In the recently published report "Independent Oversight Evaluation of Emergency Management across the DOE Complex" (DOE Office of Environment, Safety and Health, July 1998), the DOE Office of Oversight notes that it took some 20 hours for a Radiation Assistance Program (RAP) team to determine that there had been no radiological release from a 1996 SST accident in Valentine, Nebraska involving nuclear weapons. As mentioned above, state and local response personnel do not typically have ready access to specialized equipment required for monitoring for weapons-grade plutonium, and the lack of a timely and credible radiation monitoring capability may significantly hamper response efforts, and may endanger response personnel. 5

4) The above-referenced report by the DOE Office of Oversight noted several complex-wide generic "weaknesses" in DOE emergency preparedness, including event classification and the determination of protective actions. The report noted that "(t)he Savannah River Site (SRS) emergency management program is fundamentally sound and includes the essential elements required by DOE orders." The report, however, does note that "the emergency 6

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WD023–5 **Facility Accidents**

The estimation of doses to emergency response personnel is not within the scope of the SPD EIS analysis. Response personnel are trained, protected, monitored for exposure, and restricted to specific dose limits. As discussed in Appendix K.1.4.1, calculation of specific doses to emergency response personnel is subject to the same analytical difficulties as calculation of doses to facility workers, so is not considered meaningful.

Transportation of special nuclear materials would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo, including pits, over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

For emergency response planning, all shipments are coordinated with appropriate law enforcement and public safety agencies. If requested, DOE would assist these officials with response plans, and, if necessary, with resources in accordance with DOE Order 5530.3, *Radiological Assistance Program*. DOE has developed and implemented a Radiological Assistance Program to provide assistance in all types of radiological accidents. Through

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operations center lacks an effective process and mechanisms to perform timely and accurate assessments of emergency event consequences", and recommends that SRS " (i)mprove the consequence assessment process to ensure that source term estimation, dispersion modeling, consequence assessment, and formulation of protective actions can be completed in a timely manner". The report further recommends that SRS "(p)rovide additional policy, guidance, and training to improve prompt and conservative classification decision-making by responsible emergency response organization personnel." The report did not discuss emergency management capabilities at Pantex. 6

Thank you for the opportunity to provide comments on this draft EIS.

James C. Hardeman, Jr.
431 Meadowfield Trail
Lawrenceville, GA 30043
hardeman@mindspring.com

WD023

this coordination and liaison program DOE offers in-depth briefing at the State level. These activities would ensure that State and local officials are prepared for the initial response and that specialized equipment commensurate with the potential severity of the accident would be available. In the event of an accident, if requested by a State, tribal, or local agency, DOE would send a radiological monitoring assistance team from the closest of eight DOE regional offices located across the country.

WD023–6 **Facility Accidents**

It is not within the scope of this SPD EIS to address independent reviews of site-specific programmatic areas such as emergency preparedness. The existence of recommendations to improve what has been judged to be a "fundamentally sound" emergency management program at SRS does not invalidate the analyses performed for this EIS.

As part of the development of a transportation plan, details of emergency preparedness, security, and coordination of DOE with local emergency response authorities would be addressed before any hazardous material was shipped. Any additional training or equipment needed would be provided as part of the planning process. In addition to direct Federal assistance to State, tribal, and local governments for maintaining emergency response programs, there are national emergency response plans under which DOE provides radiological monitoring and assessment assistance. Under these plans, DOE provides technical advice and assistance to the State, tribal, and local agencies who might be involved in responding to a radiological incident.

This comment is being submitted by J., the initial J, Larry Harrison, 4175 Quinn Court, in Evans, Georgia 30809, work phone area code 803-208-7182. I'm commenting on the Surplus Plutonium Disposition, in particular, the pit disassembly and conversion process. Before I transferred to the Savannah River Site in 1992, I was involved with process development optimization for a production of commercial nuclear fuel for over 20 years. And despite all of the political pressures at work in determining the location of the pit disassembly and conversion facility, the final decision should be made on the basis of which location will provide the safest most efficient operation of all facilities involved in the disposition effort. I 'd like to provide some input based on my commercial nuclear fuel fabrication experience. 1
Though this, this experience was with uranium oxide pellets, the only type utilized in U.S. commercial reactors for power generation. It is still pertinent to mixed oxide (MOX) fuel pellets made from a blend of primarily uranium oxide with some plutonium oxide. I have worked for two different fuel fabricators, one where the conversion to uranium oxide powder was performed within the same facility as the fuel fabrication and another where the conversion process was located several hundred miles away from the fuel fabrication plant. The problems observed with the latter situation brings to mind some factors which need to be considered when selecting a site for the conversion facility. The manufacture of nuclear fuel is very difficult and an exacting process. The

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PD058–1 **Alternatives**

DOE acknowledges the commentor's support for siting both the pit conversion and MOX facilities at SRS. DOE appreciates the commentor sharing technical reasons for collocating the pit conversion and MOX facilities, based on many years of working in fuel fabrication. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

final acceptance or rejection of fuel may hinge on the particle side of distribution of the starting powder, parts per million of impurities, the impurity of the atmosphere gas in the furnace used to thermally treat the pellets, or a few ten thousandths of an inch in the pellet diameters after grinds, is to name just a few variables. Properties of oxide powder have a significant impact on the process fuel in fabricating pellets. It is difficult to write specifications for the powder to cover all variables which can impact the pelleting process and ultimately the acceptability of the fuel. It is a combination of the powder properties and variables and pelleting process which determine the final pellet characteristics. With MOX fuel the powder properties are particularly important as the blend of uranium and plutonium oxides must be extremely uniform. It is also difficult to perform testing in a lab scale equipment and reliably predict the outcome when the same material is processed through a production line because of many variables which influence final pellet characteristics. Location of the conversion facility in close proximity to the MOX fabrication plant would provide the opportunity for testing of material when needed. A hypothetical situation might be a batch of plutonium oxide powder which is barely out of specification. If a sample can be run through the nearby MOX facility and is determined acceptable pellets can be made, the cost of scraping and remaking powder can be avoided. This 1

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potential would not exist if the conversion and MOX plants are hundreds of miles apart. Due to the safety and security concerns associated with transporting plutonium, it would not be practical to build a MOX production line at the conversion facility solely for testing purposes. Due to the difficulty in detecting subtle changes in plutonium oxide powder properties, the problem may not be detected until the material is processed in the MOX facility. If the conversion facility site is distant from the MOX plant there will probably be more material in the "pipeline" with the same problem than if, if operations were adjacent to each other, again, due to the problems associated with transporting plutonium. DOE should carefully consider what capabilities are needed for purification, if any, to make acceptable plutonium oxide powder for fabricating commercial nuclear fuel and whether that processing is performed at the conversion or MOX facility or both. Also the capability to recycle and purify MOX scrap must be addressed. There are advantages in locating the purification capabilities at the conversion facility, and, if aqueous versus dry purification is deemed necessary, SRS is the obvious choice for conversion due to the existing capability to handle associated waste streams, while Pantex has none. Other considerations in selecting the pit disassembly and conversion site is analyzing the risks and costs associated with transporting plutonium in a form of pits to SRS, if the facility is located there versus transporting plutonium oxide from Pantex to SRS if the facility is at Pantex. 1

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HARRISON, J. LARRY
PAGE 4 OF 4

Also even though there is a lot of experience with fabrication of MOX fuel outside the U.S., the plutonium oxide source was the recycle process versus weapons material. This difference will almost assuredly have some impact on MOX fuel fabrication require additional process development. This is another reason for co-locating the conversion and the MOX fuel fabrication facilities. Given that SRS is the site of choice for the MOX facility, above reasons and others clearly show that the pit disassembly and conversion should be located there also. I will submit a written copy of this by mail. Thank you very much. Bye. 1

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HYDE PARK AND ARAGON PARK IMPROVEMENT COMMITTEE, INC.
CHARLES N. UTLEY
PAGE 1 OF 2

HYDE PARK AND ARAGON PARK
IMPROVEMENT COMMITTEE, INC.
2024 Golden Rod Street
Augusta, Georgia 30901

August 13, 1998

Department of Energy Public Hearing
North Augusta, South Carolina

The Hyde Park, Aragon Park and Virginia Subdivision communities consist of approximately 1,500 to 2,000 residents. We are in favor that Surplus Plutonium Disposition be awarded to the SRS site with the following request: 1

-That jobs be given to qualified persons living in the CSRA (Central Savannnah River Area) first before importing workers form outside the area.

-That DOE put in place safe-guards against political savotage, for example; that budget restraints don't leave the area with undesirable contamination. That political parties Democrats/Republican don't abandoned the project for party sake. That the Department of Energy keep this process in place until **all** phases of the process is completed to include clean-up. 2

-That SRS/DOE continue to consider the highest/safest method of transporting material through communities, be at it's highest quality at all times. This is to assure that the communities that the route will be taken will be the most excluded route to avoid contact with communities. 3

-That workers safety will never be abandoned for the sake of the production. That workers safety continue to a number one priority for DOE/SRS as it has been in the past. 4

-That DOE/SRS remove the finish product in a reasonable time frame and that SRS never becomes a permanent storage place. 5

Sincerely,

Charles N. Utley
President

SCD11

SCD11–1 **DOE Policy**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. The proposed facilities would be built and operated based on a competitive contract award. DOE would defer to the winning contractors to hire and train the people needed to build and operate the proposed facilities. As such, DOE cannot mandate that all the positions be filled by people living within the Central Savannah River Area, but it is likely that many of the positions would be filled by local hires.

SCD11–2 **DOE Policy**

DOE acknowledges the commentor's concern that the surplus plutonium disposition program has the support necessary to reach completion. The U.S. Congress will continue to appropriate the funds necessary to honor the agreements made by Presidents Clinton and Yeltsin regarding mutual reduction of plutonium stockpiles. When the missions have been completed and the surplus plutonium disposition facilities are no longer needed, deactivation and stabilization would be performed. As discussed in Section 4.31, features are being incorporated into the designs that would allow future deactivation and stabilization activities to be performed more quickly and easily to reduce the risk of radiological exposure; reduce the costs associated with long-term maintenance; and prepare the buildings for potential future use. DOE will evaluate options for D&D or reuse of the proposed facilities at the end of the surplus plutonium disposition program. At that time, DOE will perform engineering evaluations, environmental studies, and further NEPA review to assess the consequences of different courses of action.

SCD11–3 **Transportation**

DOE acknowledges the commentor's concern about transportation. As described in Appendix L.3.3, transportation of nuclear materials would be performed in accordance with all applicable DOT and NRC transportation requirements. Interstate highways would be used, and population centers avoided, to the extent possible.

The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear

materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

SCD11–4 **DOE Policy**

DOE acknowledges the commentor's concern regarding worker safety at SRS. The health and safety of both workers and the public is a priority of the surplus plutonium disposition program. DOE would comply with all pertinent Federal, State, and local laws and regulations and would meet all required standards. Chapter 5 summarizes the pertinent environmental regulations and permits required by the surplus plutonium disposition program.

SCD11–5 **DOE Policy**

It is not DOE's intention to make SRS a permanent storage site for surplus plutonium disposition material. MOX fuel would be transported to commercial reactors to be used. The resulting spent fuel would be temporarily stored at the reactor sites until it is sent to a potential geologic repository for permanent disposal. Immobilized plutonium would be temporarily stored at SRS until it is sent to a potential geologic repository for permanent disposal as and when the repository becomes operational. For purposes of this SPD EIS, DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

INGHAM, ROBERT
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Robert Ingham
ADDRESS: 311 Windsor Ct, Hephzibah, GA 30815
TELEPHONE: (706) 771-9100
E-MAIL:

PUBLIC AWARENESS ALLOWS FOR PUBLIC RESPONSIBILITY 1

SEE RICHMOND COUNTY DEMOCRATIC COMMITTEE FOR E-MAIL ROBERT INGHAM -

or GEORGIA EDUCATORS

SCD64

SCD64–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on the value of public awareness in connection with the surplus plutonium disposition program. DOE used several means to solicit comments on the surplus plutonium disposition program from the public; State, local, and tribal officials; special interest groups; and other interested parties. These include mail, a toll-free telephone and fax line, and the MD Web site. In addition, DOE has conducted public hearings in excess of the minimum required by NEPA regulations on the weapons-usable fissile materials disposition program and discussed materials disposition in many other public forums. Moreover, MD has produced fact sheets, videos, reports, and other information on issues related to surplus fissile materials disposition to enable the public to participate in a meaningful way.

INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS
T. S. YARBROUGH
PAGE 1 OF 1

International Brotherhood of Electrical Workers

LOCAL UNION 1579
1250 REYNOLDS STREET
AUGUSTA, GEORGIA 30901
Phone: (706) 722-6357 • Fax: (706) 724-9792

August 13, 1998

MOX & PIT DISASSEMBLY & CONVERSION PROJECTS

- The Augusta Building & Construction Trades Council is a major stakeholder of SRS. Our construction workers are the true cold war warriors.

- I want to voice the Building Trades unequivocal support for SRS to be the DOE's choice as the site for plutonium disposition. Our craftsmen not only have built nuclear and chemical operating facilities but they also have performed millions of hours of work under radiological conditions. They understand the strict discipline it requires to safely perform under these conditions.

- Speaking of safety, we in the South have good manners and we will not talk badly about another DOE site. However, I do want to let you know what our construction crafts have achieved in an extremely hazardous industry. Working with our contractors, our goal is "**Zero Accidents**". This means we view "no injury" to be acceptable. Since 1989 we have achieved the following records:

  1. **1,000,000 million SAFE hours = 29 times**
  2. **2,000,000 million SAFE hours = 9 times**
  3. **2,500,000 million SAFE hours = 4 times**
  4. **5,000,000 million SAFE hours = 1 time**

- **SAFE Hours** means we did not experience any lost workday cases. It means our members came home to their families every evening the same way they left for work in the morning – with all of their fingers, with both hands, with both arms, with both legs and with a smile on their face because they know that **SAFETY** is important at the Savannah River Site! 1

Working with Bechtel, we established the **S. A. F. E. – T** process (Self-Awareness for Employees Team). Our craft stewards and workers designed a **NO NAME – NO BLAME** process that heightens worker awareness of safe and at-risk practices. We have Craft Workers observing work activities and provide feedback to reinforce positive or safe actions, and to help bring attention to at-risk work practices through discussion with the worker at the conclusion of the observation. We encourage comments to identify strengths and weaknesses in our safety effort.

I challenge you to find a better construction safety environment in the DOE complex.

- I don't want to take all of your time, so let me just summarize by saying that both **MOX** and the **PIT DISASSEMBLY** projects should be located here. The Building Trades and the entire community of the CSRA have supported SRS since the first shovel of dirt. We have the skilled workforce to **SAFELY** build and operate these facilities.

All we need is y'all to make a quick decision and let's go to work!

Thank you,

T. S. Yarbrough,
Business Manager & Financial Secretary

SCD10

SCD10–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

My name is Joan King. I'm living in White County, North Georgia. I followed nuclear issues for some time and have attended numerous DOE hearings. I'm familiar with the disposition problem. I've been down to Savannah, down to Augusta when they were discussed and I am opposed to using MOX fuel. I think this is a very slippery path that will lead to many many more problems in the future. I know we have to dispose of this stuff. I think we have the ability to glassify it to do a number of things. I know the government promises a once through process but there is no way they can control this in the future. We don't have the institutional consistency to be able to assure people that this will take place. 1

We need to immobilize this in glass and get it underground. We do not need to promote the nuclear industry by giving them another form of fuel. That if heading toward a plutonium economy which will be disastrous for the rest of the world and for future generations. My number is area code 706-878-3459. I appreciate this and I am going to try follow it up with a fax to restate these so you will have a hard copy for the record. Thank you very much. Bye. 2

PD001

PD001–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

PD001–2 **Alternatives**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

KING, JOAN O.
PAGE 1 OF 1

ATTENTION: DOE, Department of Storage and Disposition of Fissile Materials

This fax is a follow-up to a comment made by phone from Joan O. King made today, July 22, 1998

I have followed nuclear issues for many years and have attended DOE hearings of the Storage and Disposition of surplus fissile material. I am opposed to the use of plutonium as reactor fuel__the MOX option.

We have adequate methods for immobilizing fissile material taken from dismantled nuclear weapons. We had adequate sources of uranium for new fuel. We do not need to do anything that would promote a "plutonium economy" or encourage reprocessing by any nation including our own. 1

I have heard the arguments in favor of burning plutonium in U.S. reactors and the government's promise of a "once through" process. These are good intentions, but there is no way the present government can control what is done in the future. History has proved the fragility of promises like this. 2

DO NOT PROMOTE ANY PROGRAM THAT USES PLUTONIUM AS FUEL.

Joan O. King
304 Manor Drive
Sautee, GA 30571

(706) 878-3459

FD001

FD001–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

FD001–2 **DOE Policy**

For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

RESOLUTION
SUPPORTING THE SAVANNAH RIVER SITE'S MAJOR PLUTONIUM MISSIONS

WHEREAS, *the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and*

WHEREAS, *plutonium disposition represents one of the most certain future missions of the DOE for the next 20 to 30 years; and*

WHEREAS, *the Department of Energy has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and*

WHEREAS, *the Savannah River Site has produced approximately 40 percent of all U.S. weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on the workers, the public or the environment; and* 1

WHEREAS, *the Department of Energy in its Record of Decision recognizes the Savannah River Site as "a plutonium competent site with the most modern, state-of-the-art storage and processing facilities...with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and*

WHEREAS, *the Lower Savannah Region strongly supports continued plutonium missions for the Department of Energy's Savannah River Site;*

NOW BE IT RESOLVED THAT *the Lower Savannah Council of Governments strongly endorse major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.*

APPROVED THIS 13th DAY OF MARCH 1997, BY THE BOARD OF DIRECTORS OF THE LOWER SAVANNAH COUNCIL OF GOVERNMENTS.

Chairman
Lower Savannah Council of Governments

Executive Director
Lower Savannah Council of Governments

SCD87

SCD87–1 **Alternatives**

DOE acknowledges the commentors' support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

LOWER SAVANNAH COUNCIL OF GOVERNMENTS
HONORABLE S. J. ROBINSON ET AL.
PAGE 1 OF 1

RESOLUTION SUPPORTING THE SAVANNAH RIVER SITE'S MAJOR PLUTONIUM MISSIONS

WHEREAS, the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS, plutonium disposition represents one of the most certain future missions of the DOE for the next 20 to 30 years; and

WHEREAS, the Savannah River Site has produced approximately 40 percent of all U.S. weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on the workers, the public or the environment; and

WHEREAS, the Department of Energy has expressed its confidence in the Savannah River Site by designating SRS as the preferred location for MOX fuel fabrication and immobilization; and

WHEREAS, the Department of Energy in its Record of Decision recognizes the Savannah River Site as a "plutonium competent site with the most modern, state-of-the-art storage and processing facilities...with the only remaining large complex"; and

WHEREAS, the Lower Savannah River Region strongly supports continued plutonium missions for the Department of Energy's Savannah River Site, including pit disassembly and conversion.

NOW BE IT RESOLVED THAT the Lower Savannah Council of Governments strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its preferred facility for plutonium pit disassembly and conversion. 1

APPROVED THIS 10TH DAY OF AUGUST 1998, BY THE BOARD OF DIRECTORS OF THE LOWER SAVANNAH COUNCIL OF GOVERNMENTS.

S. J. Robinson
Chairman, Lower Savannah Council of Governments

Executive Director, Lower Savannah Council of Governments

SCD07

SCD07–1 **Alternatives**

DOE acknowledges the commentors' support for the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

United States Department of Energy

Comment Form

NAME: (Optional) GREG LOWRY
ADDRESS: 2212 RICHARDS ROAD AUGUSTA, GA. 30906
TELEPHONE: (706) 796 1942
E-MAIL:

- DOE SHOULD LOCATE ALL OF THE PLUTONIUM MISSIONS AT SAVANNAH RIVER SITE, INCLUDING THE PIT DISASSEMBLY OPERATIONS.
- SRS HAS THE PEOPLE WITH THE BACKGROUND NEEDED FOR THESE PROJECTS, COMMUNITY SUPPORT, AND AN UNPARALLELED SAFETY RECORD. 1
- LOCATING ALL THE PLUTONIUM DISPOSITION ACTIVITIES AT SRS WOULD BE COST EFFECTIVE.

SCD55

SCD55–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

LOWRY, NANCY J.
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Nancy J Lowry
ADDRESS: 3212 Richards Road, Augusta, GA 30906
TELEPHONE: (706) 796-1942
E-MAIL:

- SRS has the technical expertise needed to safely conduct the plutonium pit disassembly + conversion. SRS' safety record is one of the best in the world — another important consideration. SRS people know how to manage plutonium.

- SRS has safely managed more varied and complex programs than Pantex.

- It makes sense to consolidate all the plutonium disposition activities at SRS. The logistics are better than they would be if the pit disassembly operations were located at Pantex. It would be more cost effective as well.

- DOE would show both technical wisdom and financial responsibility by locating the plutonium pit disassembly operations at SRS. 1

SCD56

SCD56–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

United States Department of Energy

Comment Form

NAME: (Optional) Larry Milton
ADDRESS: 242 Napa Dr. Augusta, GA 30909
TELEPHONE: (___)
E-MAIL:

Overall an excellent public meeting.

Concerning the EIS report:
Why has aqueous processing been left out of the alternatives being considered. Specifically, aqueous dissolution of pits directly, versus the dry process should be more thoroughly evaluated for the pit disassembly and conversion option. 1
Aqueous processing is a proven technology versus the dry processing technology which is in development and has not been proven.
Also, use of the existing aqueous processing facilities at SRS would be very cost effective versus construction of a new facility.

SCD94

SCD94–1 Plutonium Polishing and Aqueous Processing

Use of the F-Canyon at SRS to convert plutonium for use in either the immobilization or MOX facilities would require reconfiguring the canyon and keeping it in operation for another 10 years or more. DOE has already made a commitment to the public, the U.S. Congress, and DNFSB to shut the canyon down. DOE presented the SRS Chemical Separation Facilities Multi-Year Plan to Congress in 1997. This plan provides the DOE strategy for the expeditious stabilization of SRS nuclear materials in accordance with DNFSB Recommendation 94-1, and provides for the early stabilization of certain limited quantities of plutonium materials from RFETS. Once this stabilization effort is complete, the canyon would be shut down and D&D activities would begin.

The *Storage and Disposition PEIS* evaluated a homogenous ceramic immobilization facility that used an aqueous plutonium conversion process similar to that used in the SRS canyons. As shown in Section 4.29 of this SPD EIS, this process would require much larger quantities of water and other resources, and generate significantly more waste (between 2 and 191 times more depending on the waste category [see Table 4–224]) than the proposed processes included in this EIS. Based on this information, the aqueous plutonium conversion process was not considered to be reasonable and was eliminated from further study in this EIS.

NOAH, CHRISTOPHER
PAGE 1 OF 4

Surplus Plutonium Disposition Draft Environmental Impact Statement
Public Meeting
August 13, 1998
North Augusta Community Center

Comments by Dr. Christopher Noah

Thank you for the opportunity to provide comments on this draft EIS. My comments center on land use and environmental suitability of siting this project at the Savannah River Site. I do not make these comments **only** because I believe SRS is the best place for this project but because I have a background in examining the impacts of large-scale facilities.

In the 1970's I lead a team that planned the future use of the State of Alaska.

Also, for the eight years in Alaska I was an environmental planner, Director of the Council on Science and Technology and Deputy Commissioner of Environmental Conservation. During that time I had the responsibility for determining the environmental suitability for many large-scale projects such as the Trans-Alaska pipeline, a world-class molybdenum mine and one of the largest lead mines in the world.

I am past chair of the Federal Planners Division of the American Planning Association

I have taught NEPA and Environmental Policy courses.

I have been involved in approximately 20 siting studies of potential new missions at SRS.

SCD31

I wrote a comprehensive report on the future of SRS, including new missions and environmental impacts.

Finally, my education includes a masters degree in environmental affairs and a doctorate in environmental policy.

Land Use Qualities of SRS

From a land use perspective SRS is ideal. One of its most important land use attributes is its size. It is 310 square miles - Compared to this project's competitor's 25 square miles. From a land use perspective, this is significant. The size of the site ensures safety, security and enhances project diversity. Also, SRS possesses a complete suite of infrastructure for large scale projects, including: a recently upgraded water system (and access to additional water if needed through the intakes from the Savannah River), a state of the art communications system, newly constructed bridges, more than adequate electricity, upgraded roads, and a state of the art weather center, to name a few. 1

In 1996, I completed a large study of SRS – examining the potential future uses of SRS in light of the potential downsizing associated with the ending of the Cold War. For the report, I used SRS as a model. My conclusion from the 3-year study was that SRS was the perfect site to use as an example of how multiple, major industrial projects could co-exist. Complementing one another, thus saving money.

SCD31

SCD31–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

Environmental Qualities of SRS

From an environmental perspective, SRS ranks high. SRS does more than competently and safely produce nuclear weapons components and clean up the nuclear legacy that won the Cold War. It has a large cadre of scientists who conduct ecosystem studies, environmental impact research, cultural investigations, weather studies, and technological remediation demonstrations.

Over the past decades, SRS staff and management have ensured that site operations and environmental programs exist in a symbiotic relationship. Site operations, endangered and threatened species, the forest ecosystem, and cultural resources have all complemented each other. This is not by accident. SRS management has made a concerted effort to instill the multiple use planning concept at the site. What this means is that at SRS, new projects are not viewed narrowly. They take in the entire spectrum of site activities – studying how new missions and the environment can supplement each other. This approach has salutary side benefits as well. The Savannah Ecology Laboratory, of the University of Georgia, the U. S. Forest Service, and the University of South Carolina, not only conduct extensive research at SRS but profile its environmental and cultural attributes through educational programs. One example is SRS's scout "Camporee" to teach thousands of girl and boy scouts about the environment. Many other regional and national universities work with the site on environmental, cultural and economic impacts – including many HBUCs (Historically Black Universities and Colleges). 1

So, no matter what you hear from SRS's detractors, SRS is environmentally safe - a productive, diverse set of ecosystems and programs that promote environmental stewardship. In fact, many have called SRS an "environmental island" as the attachment indicates.

SCD31

Finally, I would like to quote a short passage from the end of my three year report regarding new missions for SRS:

> "As this study has detailed, weapons facilities can and should be used for environmental research, biodiversity, environmental technology demonstration, recreation, environmental education and resource management - and *still* produce nuclear materials.
>
> Imagine a weapons site with an industrial core producing nuclear components…The central industrial core would be surrounded by environmental uses which were compatible with the industrial mission. In some cases the environmental uses would even complement the industrial mission. Examples of these uses would be experimentation with plants that passively remediate contaminated areas, bio-remediation technology demonstration, and materials recycling. The environmental uses would also *complement each other* and in some cases even be symbiotic (i.e., conducting recreation in a natural resource area or simultaneously undertaking research and public education). The environmental uses would draw in the public from surrounding communities, providing environmental and economic opportunities ..."

1

In conclusion, SRS is environmentally compatible with the Surplus Plutonium Disposition project. Additionally, it has the land use qualities which a professional planner looks for in such a project: a significant buffer, quality infrastructure, support facilities, little environmental impact, no social disruption, and room for expansion.

SCD31

NSC DISCOVERY CENTER, INC
PHYLLIS H. HENDRY
PAGE 1 OF 1

The National Science Center

A public-private partnership with the United States Army

My name is Phyllis Hendry and I am President of the National Science Center's Fort Discovery in Augusta, Georgia. As a citizen of this community, I am writing this letter to support the Savannah River Site (SRS) and its effort to obtain the third element of the DOE plutonium disposition mission - pit disassembly and conversion.

The Savannah River Site has a proven history in the handling of plutonium. Since SRS has been assigned as the Site of the Mixed Oxide Fuel Fabrication and immobilization missions, it only makes sense that the plutonium disposition mission, including pit disassembly and conversion, be located in the same place. The Pantex facility in Texas that is also being considered for the plutonium mission has never processed plutonium; therefore, there is no plutonium handling infrastructure in place. As a taxpayer, I understand that locating the plutonium mission at SRS can save taxpayers at least $1.6 billion based on avoided costs of new structures and equipment that would be required at other DOE sites. 1

On a recent trip to Washington with the Metro Augusta and Aiken Chambers of Commerce and three other area Chambers, we visited with Frederico Pena and he indicated that community support would play a major part in the decision-making process. Several groups from our two-state area have met with the Secretary to express overwhelming support that the Savannah River Site has in this community. The Savannah River Site has a proven record that makes it the logical choice for the plutonium mission.

I appreciate the opportunity to support the Savannah River Site.

Sincerely,

Phyllis H. Hendry

Phyllis Hennecy Hendry
President
NSC Discovery Center, Inc.

Fort Discovery

The National Science Center's Fort Discovery

One Seventh Street on the Riverwalk
Augusta, Georgia 30901

Tel. 706.821.0200 or 800.325.5445
Fax 706.821.0288

www.nscdiscovery.org

SCD04

SCD04–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

August 13, 1998

Dear Mr. Nulton
US Department of Energy
Materials Disposition

It has been noted that the concern for severity and frequency of aircraft incidents decreases in the series of EIS documents published by DOE-MD compared to certain earlier studies including the PANTEX EIS. It is noteworthy that LANL studies on the same issue for DOE-DP and others are highly concerned with this issue and in particular with respect to Zone 12 and Zone 4. Zone 4 is where you plan to place the PDCF facility. Zone 12 or Zone 4 is not material since the entire PANTEX site is only 16,000 acres or roughly 5 by 5 miles.

In further support of this puzzling situation, the DNFSB in it's weekly reports has on several occasions highlighted the fact that even DOE and M&H do not fly radiological over-flights of these two zones for fear of the consequences of a helicopter crash. Now their concern is based upon the storage of metal pit parts and HE explosives. They have never had to consider the consequences of plutonium powder processing. 1

It is well known that the Amarillo area air facilities not only routinely service large commercial aviation aircraft – flights, storage depot, etc.; but, they also service a significant contingent of air force B-1s and tankers.

What has been the basis for your analysis? Does DOE intend to follow the US NRC protocol (NUREG – 0800)? The NUREG – 0800 protocol is the standard official US criteria for nuclear facilities and has been a cornerstone of nuclear regulation for years. If you have deviated from this protocol, please explain the rationale especially in light of the DOE thrust to become NRC regulated and to meet the same criteria. 2

I submit this letter to you with NUREG – 0800 attached to help in simplifying the process of future conformance to NRC regulations and in the hope of avoiding a major dispersal of PuO_2 over the landscape of a major food processing area of the US.

B.R. Seward

Blake Seward
Evans, Georgia

Attachment: NUREG-0800 (US Nuclear Regulatory Commission Standard Review Plan, Office of Nuclear Reactor Regulation.)

SCD02

SCD02–1 **Facility Accidents**

DOE acknowledges the commentor's concern regarding aircraft accidents. Decreases in aircraft crash frequency in this SPD EIS relative to other documents such as the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage with Nuclear Weapon Components* (DOE/EIS-0225, November 1996) are largely due to the smaller effective target area of the pit conversion and MOX facilities as compared with the entirety of Zone 4 or Zone 12. The possibility of plutonium powder processing is indeed new at Pantex, and this EIS addresses this concern in the accident analysis primarily in the higher fraction of material that becomes airborne as a result of the hypothesized accidents. The resulting potential impacts will be considered in the decisionmaking process.

SCD02–2 **Facility Accidents**

The primary basis for the accident analysis is *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements* (DOE Office of NEPA Oversight, May 1993). The methodology is based on that outlined in *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports* (DOE-STD-3009-94, 1994). In accordance with that standard, radiological releases were analyzed in terms of the specific release phenomenology as documented in *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities* (DOE-HDBK-3010-94, October 1994). *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants* (NUREG-0800, July 1981), is not directly applicable to nonreactor facilities.

SHERER, CAMERON
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Cameron Sherer
ADDRESS: 4634A Hard, McManus Rd., Evans, Ga, 30809
TELEPHONE: (706) 863-9487
E-MAIL: C Sherer @ peachnet. com

I Appreciate DOE holding these meetings And willing to listen to the public, elected officials, And concerned citizens. I never was A member of the U.S. Armed Forces And I look back on this with regret. I feel A need to give something back to this nation that has given so much to me. As An employee At SRS for over 17 years I Am proud of the fact that SRS was An important factor in the ending of the Cold war. The production of PU At SRS helped bring down the Iron Curtain I Ask DOE to bring All the PU disposition missions to SRS And let us finish what we started. 1

Thank you
Cameron Sherer

SCD66

SCD66–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

Bill Thompson, President and CEO
Sun Trust Bank, Augusta

As a member of the business community in this area, I would like to welcome our visitors from the Department of Energy Headquarters to SRS country.

We are extremely proud of SRS, its contribution to our National Security, its history of unmatched safety and production performance, and the many employees who have worked there and those who work there today. This pride and support extends throughout this area and joins our two states in common interest and objectives.

The Plutonium Disposition Program is important to our Nation and to the world. DOE should be commended for its leadership and progress on this program. SRS and this community support this program and stands ready to accept full responsibility for its successful completion. We are proud that SRS has been selected as the preferred site for the Mixed Oxide Fuel and Immobilization missions of this program. We now focus our attention to the third mission of the program, Plutonium Pit Disassembly and Conversion.

Many of us do not understand the finite technical details of plutonium and other nuclear materials. But, we do understand concepts of infrastructure, experience, expertise, and demonstrated performance in safety and environmental protection. We also understand that to duplicate at Pantex what already exists to support this mission at SRS will cost hundreds of millions of dollars. This unto itself is enough to declare that SRS is preferred over Pantex. 1

As a taxpayer, it makes clear sense to me to consolidate all of the missions for Plutonium Disposition at SRS. I encourage DOE not to overlook the hundreds of millions of dollars in savings which would be realized through this consolidation. ~~I encourage DOE to~~ go ~~back and~~ review this draft EIS ~~to correct the many cost and logic errors which appear~~ to ~~have been~~ generated ~~in an attempt to level the field between SRS and Pantex. The errors are many and too numerous to delineate here, but once corrected, it will be clear that SRS is the preferred site for Pit~~ Disassembly and Conversion.

Consolidation at SRS is the right thing to do for our Nation, this community and the taxpayers.

Thanks you for this opportunity to provide comments on this extremely important program.

SCD20

SCD20–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. Further, DOE appreciates the support it has received from the local communities surrounding the candidate sites for the proposed facilities. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

WILCOX, ROBERT H.
PAGE 1 OF 2

711 Pevero Abbey Circle
Martinez, GA 30907
E-Mail: RBTHWILCOC@aol.com
September 11, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC20026-3786

This is in reply to your request for comments on the "Surplus Plutonium Disposition Draft Environmental Impact Statement," dated July 1998.

I have reviewed this document and essentially have no comments, other than to rephrase and reiterate some which I provided before the document was prepared, in my letter to Mr. Bert Stevenson on July 6, 1997:

1. The EIS process, as currently practiced by DOE, remains unduly expensive and time consuming. In my opinion, it goes far beyond the intent of Congress when it enacted the original NEPA. 1

2. DOE's decision in this matter should be driven primarily by considerations of national security. 2

3. DOE and others should most carefully consider the extent to which it would be prudent to concentrate a high percentage of the nation's plutonium at any one site. 3

4. The conversion of as much as possible of the unneeded plutonium into MOX fuel remains the logical and responsible course of action for the Government to take and the sooner the better. 4

5. The SRS should be utilized to the maximum that it makes strategic and economic sense to do so. 5

I urge DOE to get on with this important job as expeditiously as possible.

Sincerely,

Robert H. Wilcox

MD176

MD176–1 **General SPD EIS and NEPA Process**

DOE strives to control costs in implementing the NEPA process. This SPD EIS was prepared in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively).

MD176–2 **DOE Policy**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of the surplus plutonium in the United States in an environmentally safe and timely manner. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD176–3 **DOE Policy**

DOE acknowledges the commentor's concern that a high percentage of the nation's plutonium might be concentrated at any one site. As summarized in the *Storage and Disposition PEIS* ROD, the nonproliferation assessment concluded that each of the options under consideration for plutonium disposition could potentially provide high levels of security and safeguards and effective international monitoring for nuclear materials during the disposition process thus mitigating the risk of theft. Accordingly, the proposed DOE surplus plutonium disposition facilities are all at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Security for the proposed facilities would be implemented commensurate with the usability of the material in a nuclear weapon or improvised nuclear device. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance

investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed inside are adequately protected. Closed-circuit television, intrusion detection, motion detection, and other automated materials monitoring methods would also be employed. Furthermore, the physical protection, safeguards, and security for the MOX facility and domestic, commercial reactors would be in compliance with NRC regulations.

MD176–4 **MOX Approach**

DOE acknowledges the commentor's support for the MOX approach.

The remainder of this comment is addressed in response MD176–2.

MD176–5 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at SRS.

The remainder of this comment is addressed in response MD176–2.

TALKING POINTS FOR PUBLIC HEARING ON MOX DRAFT ENVIRONMENTAL IMPACT STATEMENT—08/20/98

1. Disposing of plutonium no longer needed for nuclear weapons is vital to our national policy.

As the world leader, the U. S. must do this disposal rapidly and effectively. 1

The Russian must do the same. Such actions will send a clear message to India, Pakistan, and others that want the bomb. These nations will see that both Russia and the U. S. are serious about nuclear disarmament.

2. Using this plutonium in mixed oxide (MOX) fuel for nuclear power reactors makes it quite difficult to recover for use in nuclear bombs.

Most plutonium should be turned into MOX. Some plutonium is too impure for either bombs or MOX. Only such impure plutonium should be put into glass and buried directly. 2

3. We are unhappy that DOE has already chosen Savannah River as the preferred site for MOX production. DOE could have delayed the decision until the Record of Decision following the Final Environmental Impact Statement.

By then WIPP might be open. Waste from Rocky Flats—not of our making---would finally be moving out of Idaho after three decades of promises. Our political leaders could then show that the Settlement Agreement on Nuclear Wastes is working. They could then support new projects, such as MOX, in good faith. 3

4. Even though MOX will not come to Idaho, DOE must show without doubt that the impacts of MOX on the INEEL environment would be minor. In this EIS DOE must answer all concerns of those who give independent oversight (State of Idaho) and stakeholder advice (Citizens Advisory Board). Failure to do so will make it harder for the State and the public to accept the next nuclear project at INEEL. 4

5. From this EIS, DOE will pick the site that will make the prototype fuel (termed lead assemblies) and will examine it after nuclear testing. The private company chosen for the MOX project will help decide whether it needs this Research and Development step. We support Argonne-West for this work. It has better facilities and better technical talent than the other sites DOE is considering. 5

IDD05

IDD05–1 **Nonproliferation**

DOE acknowledges the commentor's views on the need to disposition surplus plutonium in the United States and in Russia. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. The disposition activities proposed in this SPD EIS would enhance U.S. credibility and flexibility in negotiations on bilateral and multilateral reductions of surplus weapons-usable fissile materials inventories. Actions undertaken by the United States would generally be coordinated with efforts to address surplus plutonium stockpiles in Russia. For example, the construction of new facilities for disposition of U.S. plutonium would likely depend on progress in Russia.

IDD05–2 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach: to disposition up to 50 t (55 tons) of surplus plutonium that uses both ceramic can-in-canister immobilization and MOX fuel fabrication. Approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. The remaining 17 t (19 tons) of impure plutonium would be sent to the immobilization facility, thus avoiding extensive characterization and purification of the materials. Both of these approaches would meet the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

IDD05–3 **DOE Policy**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). In accordance with CEQ Section 1502.14(e), DOE identified its preferred alternative in the SPD Draft EIS so the public could understand DOE's orientation and provide comment. Decisions on the surplus plutonium disposition program at INEEL will be based on public input, environmental

analyses, technical and cost reports, and national policy and nonproliferation considerations. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

IDD05–4 General SPD EIS and NEPA Process

The analyses in Sections 4.14 and 4.26.2 indicate that impacts of constructing and operating the MOX facility at INEEL on public health and the environment would likely be minor. This Comment Response Document contains the comments of interested stakeholders and DOE's responses to those comments.

IDD05–5 Lead Assemblies

DOE acknowledges the commentor's support for siting lead assembly and postirradiation examination activities at ANL–W. As discussed in Section 2.17, ANL–W was considered as one of several candidate sites because it would require only minimal alteration of interior spaces, is authorized to handle plutonium, and has existing facilities that meet the standards for processing special nuclear material.

As discussed in the revised Section 1.6, based on consideration of capabilities of the candidate sites and input from DCS on the MOX approach, DOE prefers LANL for lead assembly fabrication. LANL is preferred because it already has fuel fabrication facilities that would not require major modifications, and takes advantage of existing infrastructure and staff expertise. Additionally, the surplus plutonium dioxide that would be used to fabricate the lead assemblies would already be in inventory at the site. Decisions on lead assembly fabrication will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

IF NOT NOW...

140 ARBORWAY, STE. 6, BOSTON, MA 02130-3522 USA
(617) 524-1342 • fax (617) 524-1347 • contact@ifnotnow.com

To: DOE, Fax 18008205156
From: If Not Now: A Citizens Lobbying Tool, EMail rep-info@ifnotnow
Date: Sep 10, 1998 13:44 GMT
Subject: Plutonium Disposal By Burning In Nuclear Reactors

If Not Now is a web-based citizen's lobbying tool. We are forwarding to you a letter from some of your constituents. At the end of this message there is a description of how our service works and how you can respond to your constituents.

Signatures as of Sep 10, 1998:
There were 2 new signers. Total signers to date: 2.

TOPIC: Plutonium Disposal By Burning In Nuclear Reactors

Dear DOE (Fissile Materials Program),

I am writing to oppose the current Department of Energy plan for plutonium disposition, which is based on mixed-oxide (MOX) fuel. MOX fuel is a bad idea. It is unproven technology as far as commercial reactors in the U.S. are concerned. MOX techniques for plutonium disposal are also slower and more expensive than immobilization techniques. In addition, the treatment of plutonium as an energy source sets a dangerous precedent for nuclear proliferation and the development of plutonium fuel economies. It is essential that the DOE do everything possible to discourage this proliferation. 1

New signers and comments:

Scott Bonner, Boise, ID 83702
Amy Hobbs, Springfield, MO 65806

DESCRIPTION OF IF NOT NOW SERVICE

Subscribers use If Not Now (www.ifnotnow.com) to get information about political and social issues of concern to them. The service also enables them to sign letters about these topics, which we then forward in consolidated form to officials such as yourself. It is important to emphasize that our subscriber list is authenticated through credit card verification, and only those signers who belong to your specific constituency are included in the signature list that you receive.

FD300

FD300–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. While it is true MOX fuel has not been produced commercially in the U.S., it has been produced in Western Europe. MOX fuel fabrication is not a new technology. This experience would be used for disposition of the U.S. surplus plutonium. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Any difference between the cost of the hybrid approach and that of the immobilization-only approach would be marginal. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

BONNER, SCOTT
PAGE 2 OF 2

IF NOT NOW...

140 ARBORWAY, STE. 6, BOSTON, MA 02130-3522 USA
(617) 524-1342 • fax (617) 524-1347 • contact@ifnotnow.com

An important feature of If Not Now is that we follow up on every action letter that we send, and we report how representatives, officials and others have acted on the issue. We also provide you with the opportunity to respond to your constituents (via a password-protected web server, to ensure that only legitimate responses are posted). Follow the directions below. Your letter will be posted without editing; your constituents will be able to view your response when they check the results of that action. (We regret that we cannot process responses received via fax or US mail.) We strongly encourage you to send us a response! Our subscribers are active, involved citizens who want to hear from you.

To respond to an action letter: fill out the form at http://www.ifnotnow.com/respond.html -- you will need to use your special key: PeeTJlwV. This key is valid for one-time use only. Please send questions or comments via email to: rep-info@ifnotnow.com.

FD300

BRADY'S

C.A. Brady II
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Idaho Falls, Idaho 83401
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Telephone (208)522-6763
Fax (208)522-6787

August 17, 1998

We must find a way to dispose of the plutonium no longer needed for nuclear weapons. The U.S. must take a leadership position in accomplishing this goal. The best use for this plutonium is to use it in mixed oxide fuel (MOX) for nuclear power reactors. This would also make it more difficult to recover for use in nuclear bombs.

Even though the decision to place this project in Savannah River has virtually been made and the I.N.E.E.L. was not given a fair opportunity because of political reasons to bid effectively for the MOX programs, I support the MOX project. If the waste from Rocky Flats was moving out of Idaho as promised over the last thirty years, our political leaders here in Idaho could support new projects such as MOX. 1

Though MOX won't be coming to Idaho, DOE must still show that MOX would have little environmental impact in Idaho, otherwise the next nuclear project would run into problems being placed at the I.N.E.E.L. The DOE, I hope, will pick Argonne-West to make the prototype fuel. Argonne-West has the best facilities and talent to do this job.

Respectfully,

C. A. Brady II
Owner

sds/plutonium.wps

IDD03

IDD03–1 **Alternatives**

DOE acknowledges the commentor's support for the MOX approach and for siting lead assembly fabrication at INEEL. However, DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

CITIZENS ADVISORY BOARD, INEEL
CHARLES M. RICE
PAGE 1 OF 11

Citizens Advisory Board

Idaho National Engineering and Environmental Laboratory

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Charles M. Rice

Vice Chair:
Max Dakins

Members:
Bob Bobo
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Bill Davidson
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Jason Staff:
Carol Cole
Lori DeLuca
Amanda Jo Edelmayer
Wendy Green Lowe
Kevin Harris

98-CAB-206

September 16, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

Dear Sirs:

Enclosed you will find a copy of a recommendation developed by the Idaho National Engineering and Environmental Laboratory Citizens Advisory Board (INEEL CAB). The recommendation was achieved through consensus at the September 1998 meeting of the CAB. It transmits the Board's comments and recommendations to the U.S. Department of Energy on the Draft Environmental Impact Statement (EIS) for Surplus Plutonium Disposition.

It is our intention that our comments and recommendations will help DOE produce a Final EIS that is sufficiently improved to withstand legal challenge and to support the Secretary of Energy's selection of the most appropriate path forward for this important mission of nonproliferation.

We look forward to DOE's response to all of the comments received on the Draft EIS during this comment period. In addition, we would like to receive a copy of the Final EIS along with all supporting documentation (including the *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* document).

Sincerely,

Charles M. Rice
Chair

cc: James Owendoff, DOE-HQ
Martha Crosland, DOE-HQ (EM-22)
Larry Craig, U.S. Senate
Dirk Kempthorne, U.S. Senate
Mike Crapo, U.S. House of Representatives
Laird Noh, Chair, Idaho Senate Resources and Environment Committee
Golden C. Linford, Chair, Idaho House of Representatives Resources and Conservation Committee
Dolores Crow, Chair, Idaho House of Representatives Environmental Affairs Committee
Stan Hobson, Chair, INEEL CAB Plutonium Committee
John Wilcynski, DOE-ID
Gerald Bowman, DOE-ID
Kathleen Trever, State of Idaho INEEL Oversight
Wayne Pierre, U.S. Environmental Protection Agency, Region X

Jason Associates Corporation • 477 Shoup Avenue, Suite 201 • Idaho Falls, Idaho 83402
Phone • (208) 522-1662 Fax • (208) 522-2531
http://www.ida.net/users/cab

FD318

Citizens Advisory Board
Idaho National Engineering and Environmental Laboratory

Surplus Plutonium Disposition Draft Environmental Impact Statement

The Idaho National Engineering and Environmental Laboratory (INEEL) Citizens Advisory Board (CAB) reviewed the U.S. Department of Energy (DOE)'s Surplus Plutonium Disposition Draft Environmental Impact Statement (EIS), although it was difficult to obtain copies to support our review. We regret that the INEEL CAB was not on the distribution list for the document—despite the fact that we submitted a recommendation addressing the ongoing EIS in the fall of 1997. Our request for copies of the Draft EIS (sent via the DOE's National Environmental Policy Act Internet homepage) similarly did not affect a response. 1

We submit the following recommendations and comments to support DOE's efforts to develop legally defensible environmental documentation for decision making related to the nonproliferation mission. **We recommend that the Department respond to all comments on the Draft EIS received during this comment period in order to ensure that the Final EIS will be able to support a decision by the Secretary of Energy on this important mission.**

GENERAL COMMENTS

The INEEL CAB notes that Chapter One of the Surplus Plutonium Disposition Draft EIS includes the following quotation:

> "The Record of Decision for the *Storage and Disposition Programmatic Environmental Impact Statement* (PEIS) issued January 14, 1997 outlines DOE's decision to pursue an approach to plutonium disposition that would make surplus weapons-usable plutonium inaccessible and unattractive for weapons use. DOE's disposition strategy, consistent with the preferred alternative analyzed in the *Storage and Disposition* PEIS, allows for both the immobilization of some (and potentially all) of the surplus plutonium and use of some of the surplus plutonium as mixed oxide (MOX) fuel in existing domestic, commercial reactors."

2

The statement suggests that DOE believes that both approaches would render surplus plutonium (weapons-usable plutonium that has been deemed surplus) inaccessible and unattractive for weapons use, thereby achieving DOE's objectives.

Our analysis of the information presented in the Draft EIS leads us to a conclusion that DOE conducted a less-than-rigorous analysis of the full immobilization alternatives. We note that DOE conducted more extensive analysis for all of the hybrid alternatives (those that would involve implementation of both approaches). This leaves the reader with an impression that DOE decided to pursue the MOX disposition option without the benefit of adequate analysis.

RECOMMENDATION # 46 SEPTEMBER 15, 1998

FD318

FD318–1 General SPD EIS and NEPA Process

DOE regrets the difficulties encountered by the INEEL CAB in obtaining copies of the SPD Draft EIS. Copies of the document or an NOA letter were sent to each member of the Board at that person's address on record. This approach was adopted in favor of a bulk mailing directly to the Board's address, which would probably have delayed the receipt of copies by the individual members. (Presumably, someone would have had to forward the documents by mail or wait until the next Board meeting to distribute them.) The public comment period on the SPD Draft EIS was extended from 45 days to 60 days. During this comment period, public hearings were held in areas that would be directly affected by implementation of the alternatives. DOE also accepted comments submitted by various other means: mail, a toll-free telephone and fax line, and the MD Web site. The various channels of communication were open to all interested individuals and organizations, and provided for regional and nationwide comment on the EIS. DOE did consider all comments received after the close of that period. All comments were given equal consideration and responded to.

FD318–2 Alternatives

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for the proposed surplus plutonium disposition facilities. As discussed in Section 2.1, the disposition facility alternatives, immobilization technology alternatives, and MOX fuel fabrication alternatives evaluated are consistent with the decisions given in the ROD for the *Storage and Disposition PEIS*. Impacts for both technologies and all alternatives are summarized in Chapter 4 of Volume I, and complete analyses are provided in the appendixes. Alternatives 11 and 12, the 50-t (55-tons) immobilization cases, are fully analyzed.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Because the Russians have expressed concern that immobilization would not destroy any plutonium, it is conceivable that the Russians would not disposition their surplus plutonium stockpile if the United States were to implement an immobilization-only approach.

Similarly, the INEEL CAB notes that the description of the alternatives is unclear regarding how immobilization would achieve the standards set the National Academy of Sciences. It has not been demonstrated, for example, that high-level waste can be used in the can and canister immobilization method to achieve a radiation barrier. **The INEEL CAB recommends that the total immobilization options be given full consideration and rigorous discussion in this EIS.** Such an analysis will make the Final EIS less vulnerable to legal challenge and allow the Secretary of Energy greater leeway in selecting the most appropriate path forward for the disposition of surplus plutonium. 3

The members of the INEEL CAB are divided on whether national and/or international interests would be better served by selection of the total immobilization or the hybrid approach, partly because we lack confidence in the adequacy of the analysis. Improved analysis may reveal that the hybrid approaches will result in greater impacts on the environment, human health, and security. The hybrid alternative could also take a much longer period of time, require more transportation of radioactive materials, and produce greater quantities of wastes. We note that some of the alternatives propose using a 1954 facility for plutonium conversion and immobilization, which could involve permitting challenges that are not adequately addressed in the EIS. 4

Because our review of the Draft EIS left us without answers to questions about the true impacts of the various alternatives, we concluded that the Draft EIS does not allow comparison of the two approaches, much less comparison of the full range of alternatives. **The INEEL CAB recommends that the Final EIS resolve these major issues by conducting additional analysis.** 2

The Draft EIS and presentations by DOE related to the document imply that the international community will not be satisfied with U.S. nonproliferation efforts in the absence of MOX. **In light of the fluid political situation in Russia, the INEEL CAB recommends that the assumptions (that the U.S. has no choice but to pursue the MOX alternative in order to ensure that Russia will take reciprocal action) should be periodically confirmed. The INEEL CAB further recommends that implementation of U.S. actions, regardless of which alternative is selected, should proceed concurrently with implementation of comparable actions in Russia.** 5

While the entire INEEL CAB wholeheartedly supports DOE's efforts to achieve nonproliferation objectives and would not argue in favor of a decision that would jeopardize Russian cooperation, the INEEL CAB recommends that DOE base its decisions on complete information and sound analysis. In the spirit of the National Environmental Policy Act, this EIS must document the decision in a publicly defensible manner. 2

COMMENTS ON THE *COST ANALYSIS IN SUPPORT OF SITE SELECTION FOR SURPLUS WEAPONS-USABLE PLUTONIUM DISPOSITION* DOCUMENT

The INEEL CAB regrets that the cost analysis of the various alternatives presented in the Draft EIS was provided in a separate document that was relatively unavailable. The absence of cost information in the Draft EIS itself leaves the reader to a conclusion that either (1) the costs of implementing the alternatives do not differ or (2) DOE will not consider costs in selecting from the various alternatives. Neither conclusion seems realistic or appropriate. **The INEEL CAB recommends the inclusion of more information about costs in the body of the Final EIS.** 6

FD318–3 **DOE Policy**

In the *Nonproliferation and Arms Control Assessment Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), DOE identified two potential liabilities of the immobilization alternatives relative to the Spent Fuel Standard. These liabilities involve ensuring sufficient radiation levels and removal-resistant can-in-canister designs. Since that time, DOE has modified the can support structure inside the canisters and has focused its research on the ceramic form of immobilization. As part of the form evaluation process, an independent panel of experts determined (*Letter Report of the Immobilization Technology Peer Review Panel*, from Matthew Bunn to Stephen Cochran, LLNL, August 21, 1997) that the can-in-canister design would meet the Spent Fuel Standard. In addition, NAS is currently conducting studies to confirm the ability of the ceramic can-in-canister immobilization approach to meet the Spent Fuel Standard. DOE is confident that immobilization remains a viable alternative for meeting the nonproliferation goals of the surplus plutonium disposition program.

FD318–4 **Alternatives**

This SPD EIS identifies and analyzes potential environmental and human health impacts that might result from the construction and normal operation of proposed surplus plutonium disposition facilities. The hybrid approach would produce some additional potential impacts, as described in Chapter 4 of Volume I.

DOE acknowledges the commentor's concern about the preferred approach of using both immobilization and MOX fuel fabrication to disposition surplus plutonium.

DOE eliminated as unreasonable the eight alternatives in the SPD Draft EIS that would involve use of portions of Building 221–F (the 1954 building referred to in the comment) for plutonium conversion and immobilization. It was determined that the amount of space required for the immobilization facility would be significantly larger than originally planned. These new space requirements mean that the Building 221–F alternatives would now be very close in size and environmental impacts to the new immobilization facility

alternatives at SRS. Therefore, this SPD EIS only presents the alternatives involving a completely new immobilization facility at SRS.

FD318–5 **Nonproliferation**

DOE agrees with the commentor's recommendation and has maintained a close working relationship with Russia to develop technical solutions for plutonium disposition. The United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain surplus plutonium disposition activities in order to encourage the Russians and set an international example.

FD318–6 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following

locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

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Review of the cost analysis document allows an improved understanding of the costs associated with implementation of the surplus plutonium disposition decision. The INEEL CAB believes the cost analysis is based on a questionable methodology, as it appears that the costs were not fully evaluated. We question why the estimates of total costs do not appear to include certain categories of costs (nuclear reactor modifications and irradiation services, for example) based on an assumption that they will apply uniformly across all alternatives. It is hard to believe that nuclear reactor modifications will be required under the full immobilization alternatives, however. Calculation of fuel offsets and inclusion of those offsets in the estimates of total costs is questionable and the definition of those offsets is not clear, which further complicates the reader's ability to understand the analysis of costs for the various alternatives.

Similarly, we have concerns about the adequacy of cost estimates for immobilization as they are based on less thorough process design and experience than the MOX option. We also noted that they do not include cost estimates for several undetermined aspects of the plutonium ceramic fabrication process. Potentially significant costs that would be required to ensure that the glass product can meet the National Academy of Sciences "spent fuel standard" for making weapons plutonium "sufficiently unattractive to proliferation." Finally, recent developments at the Savannah River Site indicate that it could be significantly more expensive to meet nonproliferation standards using the immobilization approach than with one of the hybrid approaches. 7

The INEEL CAB recommends that the cost analysis include calculation of all expected costs associated with each of the alternatives—including appropriate offsets (those that result in real reductions in the costs to the U.S. government). The INEEL CAB further recommends an independent review of the cost estimates by competent cost analysts following the suggested recalculation. Improved cost estimates are imperative to support selection of the most appropriate alternative for inclusion in the Record of Decision following completion of the Final EIS.

COMMENTS REGARDING THE SITING OF THE LEAD TEST ASSEMBLY FABRICATION AND POST-IRRADIATION EXAMINATION PHASES

If DOE decides to pursue a hybrid approach, review of the analysis of the candidate sites for the lead test assembly phase reveals that Argonne National Laboratory - West (ANL-W) is well qualified. We noted that ANL-W was the only site that did not fall short in at least one of the site selection criteria considered.

With regard to the post-irradiation examination of the lead test assemblies, the INEEL CAB believes that ANL-W is uniquely qualified for conducting the needed examinations. The Hot Fuel Examination Facility has successfully completed similar missions and has appropriate facilities to handle all aspects of the work. 8

The INEEL CAB recognizes that fabrication of lead test assemblies will involve transportation of plutonium to the INEEL and fabricated fuel rods to the commercial power plant where irradiation will occur. In addition, we recognize that the post-irradiation evaluation phase will involve shipment of irradiated fuel rods to and from the site. The shipments to and from ANL-W, if the facility is selected to conduct either phase, will likely cross the Fort Hall Indian Reservation. 9

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FD318–7 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

FD318–8 **Lead Assemblies**

DOE acknowledges the commentor's support for siting lead assembly and postirradiation examination activities at ANL–W. As discussed in Section 2.17, ANL–W was considered as one of several candidate sites because it would require only minimal alteration of interior spaces, is authorized to handle plutonium, and has existing facilities that meet the standards for processing special nuclear material.

As discussed in the revised Section 1.6, based on consideration of capabilities of the candidate sites and input from DCS on the MOX approach, DOE prefers LANL for lead assembly fabrication. LANL is preferred because it already has fuel fabrication facilities that would not require major modifications, and takes advantage of existing infrastructure and staff expertise. Additionally, the surplus plutonium dioxide that would be used to fabricate the lead assemblies would already be in inventory at the site. DOE prefers ORNL for postirradiation examination activities. ORNL has the existing facilities and staff expertise needed to perform postirradiation examination as a matter of its routine activities; no major modifications to facilities or processing capabilities would be required. In addition, ORNL is about 500 km (300 mi) from the reactor site that would irradiate the fuel. Decisions on lead assembly fabrication and postirradiation examination will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

FD318–9 **DOE Policy**

It is DOE's policy that plutonium shipments comply with DOT and NRC regulatory requirements. The highway routing for commercial shipments of nuclear material is systematically determined using primarily interstate highways and shipments in accordance with appropriate DOT regulations at 49 CFR 171 through 179 and 49 CFR 397. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS.

It is possible that shipments to INEEL or ANL–W could cross the Fort Hall Reservation. The Fort Hall Reservation was contacted by DOE to discuss this issue during October 1998 and in March 1999 but no response has been received to date.

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The INEEL CAB recommends that DOE-ID develop an agreement with the Shoshone-Bannock Tribes to allow and appropriately manage the transport of plutonium and other radioactive materials across the reservation. We further recommend that such an agreement be achieved before decisions are made on the siting of the lead test assembly fabrication and the post-irradiation evaluation phases. 10

With regard to the potential siting of both the lead test assembly and the post-irradiation examination phases at ANL-W, the INEEL CAB makes the following recommendations to help ensure that neither will jeopardize compliance with the Idaho Settlement Agreement: 11

1. The INEEL CAB understands that the plutonium involved in both of the phases can meet residence limitations imposed by the Settlement Agreement. **We recommend that DOE confirm that interpretation with Governor Batt's office.**

2. **The INEEL CAB recommends that the timing and quantities of plutonium shipments to and from ANL-W for the lead test assembly fabrication and the post-irradiation examination phases should be clearly defined in the final EIS.** 12

3. **The Board recommends that disposition plans should be in place for all waste streams from all activities before the Record of Decision is signed to ensure that the decision will be consistent with the Idaho Settlement Agreement.** The Draft EIS reports that the fabrication of lead test assemblies would produce 132 cubic meters of transuranic waste, 736 cubic meters of low-level waste, and 4 cubic meters of mixed low-level waste. No estimates of waste streams produced were included for the post-irradiation examination mission; the final EIS should specify that information. **In addition, the INEEL CAB recommends that DOE provide a clear exit path and timetable for all waste streams, as well as residual plutonium, before it enters Idaho if ANL-W is selected for either phase.** 13

4. With regard to the disposal of the lead test assemblies after the post-irradiation examination has been completed, how will the irradiated and archived fuel rods be managed and disposed? Will the INEEL be expected to store the rods until Yucca Mountain opens? What will happen if Yucca Mountain doesn't open? **The Board recommends that the Final EIS answer these questions.** 14

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FD318–10 **Transportation**

After DOE selects an alternative, a transportation plan (in which State, tribal, and local officials in addition to DOE, the carrier, and other Federal agencies would be involved) would be prepared to address the details of implementing the actions analyzed in this SPD EIS, including prenotification of States. The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com. Until the decision to use INEEL for any of the surplus plutonium disposition activities is made, it is premature to develop an agreement with the Shoshone-Bannock Tribes.

FD318–11 **DOE Policy**

Should the SPD EIS ROD identify ANL–W as the lead assembly fabrication or postirradiation examination site, DOE would consider taking this recommended action. Until then, it is premature to contact the Governor's office, in this regard, although the State of Idaho was provided with the SPD Draft EIS for review and comment. As discussed in Section 2.4.4.4, any postirradiation examination activities and associated material shipments would comply with the Consent Order and Settlement Agreement in Public Service Company of Colorado v. Batt (if the work were

performed at ANL–W), and all other applicable agreements and DOE orders, including provisions concerning removal of material from the applicable examination site.

FD318–12 **Lead Assemblies**

As described in the revised Section 1.6, DOE prefers LANL and ORNL for lead assembly fabrication and postirradiation examination activities, respectively. Therefore, if the preferred alternatives were selected in the decision, shipments to ANL–W would not be made. Table E–25 indicates planned lead assembly operation from 2003 to 2006. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Plutonium is routinely and safely transported in the United States every day. All shipments of surplus plutonium other than MOX spent fuel and immobilized plutonium would be made by the DOE SST/SGT system. The transportation analysis results are presented for each alternative in Chapter 4 of Volume I and detailed in Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

FD318–13 **Waste Management**

If ANL–W were selected, the wastes generated by lead assembly fabrication and postirradiation examination would be managed in accordance with the Batt Agreement, the FFCA Agreement, and decisions made in RODs for the WM PEIS and the *WIPP Disposal Phase Final Supplemental EIS*. As described in Section 4.27.1.2 and Appendix H, wastes generated by lead assembly fabrication could be managed using existing and planned waste management facilities with little impact to these facilities. Section 4.27.6.2 was revised to discuss wastes from postirradiation examination at ANL–W should that site be chosen to provide those services in the SPD EIS ROD.

FD318–14 **Waste Management**

DOE acknowledges the commentor's concerns regarding spent nuclear fuel management at INEEL. As described in the supporting report, *ANL–W MOX Fuel Lead Assemblies Data Report for the Surplus Plutonium Disposition Environmental Impact Statement* (ORNL/TM-13478, August 1998), unirradiated archived lead assemblies would be managed at the lead assembly facility until lead assembly and postirradiation activities were completed, after which the archives would be shipped to the MOX facility. The bulk of the irradiated lead assembly fuel rods would be stored in the spent fuel pool at McGuire, the reactor where the lead assemblies would be irradiated. Of the rods actually shipped to the postirradiation examination site, one of which is INEEL, some of the wastes from postirradiation examination activities would be considered TRU waste; remaining intact rods and pellets would be managed as spent nuclear fuel. Spent nuclear fuel left over after postirradiation examination would be stored at INEEL until disposed of in a potential geologic repository. This is consistent with the ROD for the *DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final EIS* (DOE/EIS-0203-F, April 1995). The spent nuclear fuel generated by this activity would be a very small fraction of the approximately 1,186,800 kg (2,616,419 lb) of spent nuclear fuel currently stored at ANL–W and INEEL. The small amount of spent fuel generated by postirradiation examination would not drive future decisions on spent nuclear fuel management at INEEL or the potential geologic repository.

The remainder of this comment is addressed in response FD318–11.

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LOWELL A. JOBE
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COMMENTS ON SURPLUS PLUTONIUM DISPOSITION DEIS August 20, 1998

DOE is to be congratulated on their efforts to incorporate in this DEIS suggestions and answers to various issues raised during earlier public comment periods for the Scoping and Storage & Disposition PEIS.

There are, however, some salient points that need to be made or emphasized at this time:

1. World peace is extremely questionable with the current potential for proliferation of nuclear weapon materials. Thus, disposition of surplus plutonium by both the U.S. and Russia is of immediate importance.

2. Russia intends to utililze their surplus as MOX (Mixed Oxide) nuclear fuel for power production. The U.S. should likewise be using their pure plutonium for energy production with MOX fuel elements. There is ample information available on MOX from the 1970's to the present. After use in nuclear reactors, it would be thus be rendered equivalent to other Spent Nuclear Fuels. Only the plutonium too impure for either weapon or MOX fuel should be immobilized for burial. 1

3. It was unfortunate that INEEL was not selected for a new peaceful mission to convert nuclear weapon materials to peaceful energy purposes. The Idaho Falls Scoping meeting was the first and only hearing that was of a technically objective format instead of the 'we want it for jobs and economics' hearings. We are unhappy that DOE has already selected Savannah River as the preferred site for MOX production, rather than awaiting the Record of Decision following the Final Environmental Impact Statement. WIPP might then be open to receive Rocky Flats waste now stored at INEEL. This would then show that the 'Settlement Agreement on Nuclear Wastes' is working so that our political leaders and the public could support new projects at INEEL. 2

4. DOE's choice of Savannah River as the preferred site for MOX production was not based on any environmental issues at INEEL. The DEIS states (under Cumulative Impacts): "INEEL is currently in compliance with all Federal, State and local air quality regulations and guidelines, and would continue to remain in compliance even with consideration of the cumulative effects of all activities. The surplus plutonium disposition facilities contribution to overall site concentration is extremely small." In this EIS, DOE must answer all concerns of independent oversight advisers (State of Idaho) and stakeholders (Citizens Advisory Board) to assure acceptability of any future nuclear projects. 3

5. DOE's preference for siting plutonium disposition states: "DOE prefers that INEEL should focus on cleanup and nuclear technology". One example of 'nuclear technology' would be for DOE to choose Argonne-West as the site to make the lead assemblies and do post-irradiation examination if required for NRC licensing of MOX. Based on their superior equipment and expertise, we support Argonne-West for this work. We are encouraged that some of our nation's leaders are now recognizing the need for future additional environmentally-clean nuclear power, and feel sure that INEEL should and will play an important part. 4

Lowell A. Jobe
Coalition 21

IDD04

IDD04–1 **Nonproliferation**

DOE agrees with the commentor's view that surplus plutonium disposition by both the United States and Russia is of immediate importance to world peace and appreciates the support for the hybrid approach. The SPD EIS analyses include those materials suitable for immobilization and those suitable for MOX fuel fabrication. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself.

IDD04–2 **DOE Policy**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). In accordance with 40 CFR 1502.14(e), the agency shall identify its preferred alternative, if one or more exists, in the draft EIS and identify such alternative in the final EIS. DOE identified the preferred alternative, as required, so the public could understand DOE's orientation and provide comment. Decisions on the surplus plutonium disposition program at INEEL will be based on public input, environmental analyses, technical and cost reports, and national policy and nonproliferation considerations. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

IDD04–3 **General SPD EIS and NEPA Process**

Section 2.18 provides a summary of the potential environmental impacts from each alternative. The Comment Response Document provides responses to the comments on the SPD Draft EIS received from independent oversight organizations and the public.

IDD04–4 **Lead Assemblies**

DOE acknowledges the commentor's support for siting lead assembly and postirradiation examination activities at ANL–W. As discussed in Section 2.17, ANL–W was considered as one of several candidate sites because it would require only minimal alteration of interior spaces, is authorized to handle plutonium, and has existing facilities that meet the standards for processing special nuclear material.

COALITION 21
LOWELL A. JOBE
PAGE 2 OF 2

As discussed in the revised Section 1.6, based on consideration of capabilities of the candidate sites and input from DCS on the MOX approach, DOE prefers LANL for lead assembly fabrication. LANL is preferred because it already has fuel fabrication facilities that would not require major modifications, and takes advantage of existing infrastructure and staff expertise. Additionally, the surplus plutonium dioxide that would be used to fabricate the lead assemblies would already be in inventory at the site. DOE prefers ORNL for postirradiation examination activities. ORNL has the existing facilities and staff expertise needed to perform postirradiation examination as a matter of its routine activities; no major modifications to facilities or processing capabilities would be required. In addition, ORNL is about 500 km (300 mi) from the reactor site that would irradiate the fuel. Decisions on lead assembly fabrication and postirradiation examination will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

This is Lowell Jobe of Coalition 21. Our phone number is (208) 528-2161. We also have a fax 528-2199. I am asking whether there is going to be an extension on the comment period for this Plutonium Disposition DEIS. We are really tied up with many DOE related meetings here this week and it's going to be difficult to get a real meaningful comment to you. So, I noticed that there was an extension given on the advanced mixed waste treatment plan according to last Saturday's paper. And I'm hoping this will be also an extension on this. I know that the Citizen's Advisory Board is meeting today, Monday the 14th and tomorrow and this plutonium disposition is also on their agenda and I intend to be at their meeting. 1

PD046

PD046–1 **General SPD EIS and NEPA Process**

A period of 60 days was allowed for public comment on the SPD Draft EIS, and DOE accepted comments submitted by various means: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Although it did not extend the comment period, DOE did consider all comments received after the close of that period. All comments were given equal consideration and responded to.

COALITION 21
RICHARD KENNEY
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COALITION21 Supporting Tomorrow's Technologies With Facts ✦ Not Fears!
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September 16, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition
P. O. Box 23786
Washington D. C.

Subject: Additional Comments on Surplus Plutonium Disposition DEIS

The following comments supplement those submitted by Coalition 21 on September 15.

1. Coalition 21 has just completed the attached summary on the risks of plutonium. We request that it be included in the public comment record for this EIS. We ask that DOE address the accuracy of each paragraph in the summary. 1
2. We also wish DOE to consider applicable parts of this summary as the framework of its own summary on plutonium risks to be included in the final EIS. Much misinformation about plutonium resides with the general public. DOE should use this EIS and every other appropriate opportunity to put the risks of plutonium into proper perspective for its stakeholders. 2
3. We have also submitted the plutonium risk summary for the public comment record for the EIS on the Advanced Mixed Waste Treatment Project. This DEIS is out for public comment by the Idaho Office of DOE. Please ensure that DOE's responses to the summary are consistent between the two EIS's. 3

Richard Kenney, President

Attachment (4 pages)

Visit our Internet site! www.coalition21.org Printed on Recycled Paper *Send us E-mail!* facts@coalition21.org

MD240

MD240–1 **Human Health Risk**

DOE acknowledges the views expressed in the commentor's summary which is included in the public record as part of the SPD EIS. The comments on the SPD Draft EIS have been reviewed and acknowledged by DOE as shown in the following responses. The scope of this comment response process, however, focuses on the issues and alternatives related to this SPD EIS.

MD240–2 **Human Health Risk**

DOE acknowledges that there is misinformation about plutonium among the public. It has established reading rooms near DOE sites to provide easy access to information about DOE programs and encourages the use of this source of information. DOE has numerous Web sites, including the MD Web site at http://www.doe-md.com, that also provide up-to-date information about DOE programs.

MD240–3 **General SPD EIS and NEPA Process**

This comment is addressed in response MD240–1.

THE RISKS OF PLUTONIUM September 1998

Most of us recognize carbon dioxide as vital to our environment to make plants thrive. People who follow the global warming debate know that too much carbon dioxide might add to the risks of global warming. Until July 1998, few people in Eastern Idaho were aware that a single lungful of this very common gas in our atmosphere could result in death. Yet that's what happened to an employee at INEEL. Thus risks from even extremely common materials are not obvious.

Plutonium is a man-made material whose origin is linked to nuclear bombs. Like many man-made materials, including most chemicals, it can be both beneficial and potentially harmful. It has raised genuine concerns in the general public. Coalition 21 believes that some groups are opposed to nuclear benefits in any form. We recognize that some such groups deliberately fuel the genuine concerns with a campaign of misinformation.

The challenge in that climate is to describe plutonium risks in two two-sided sheets of valid and interesting information. (We concluded at once that one sheet is not enough). We must make this information factual and subject to a minimum of debate. We'll meet this challenge by addressing the most common concerns, allegations, and claims.

***Allegation:* Plutonium is the most dangerous material known to man.** That statement originated during World War II. Then plutonium was being made for the atomic bomb dropped on Nagasaki. Those responsible for plutonium worker safety wanted to make sure that this new material was not handled carelessly. Since then this now publicly disproved statement has derived its only authority from constant repetition. Experts in industrial hygiene do not support it.

A number of chemical and biological agents, such as nerve gases and botulism, are fatal to man in much smaller quantities. Even common materials such as caffeine, carbon dioxide, cyanides, lead and arsenic are, at times, more hazardous poisons.

The risk of plutonium differs from that of these other materials. Its chemical toxicity is inconsequential. Its primary hazard comes from its radioactivity if it is somehow taken into one's body. Our skin helps to protect us from this radioactivity. The danger arises from a radiation dose delivered to various organs inside the body. In general, plutonium that is inhaled is far more hazardous than plutonium that is swallowed. It is more readily absorbed into the blood stream via the lungs than via the G. I. tract. (For readers needing numbers, see the end of this fact sheet). Nevertheless, nobody is known to have died from a disease that indisputably developed from contamination with plutonium.

***Concern:* Plutonium is poisoning the Snake River Plain Aquifer.** Or "plutonium is conceivably a health risk to those drawing water from the aquifer beyond the INEEL."

Between 1954 and 1970 waste shipped in from the nuclear weapons plant at Rocky Flats was buried in about a dozen acres at the INEEL. These locations are about 500 feet above the aquifer. This industrial-type waste contains an estimated several thousand pounds of

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plutonium. Debate continues about the movement of traces of the buried plutonium downward through the 500 feet of soil toward the aquifer. Diversion dikes are preventing the repetition of past surface flooding of the burial site. This step should lessen the likelihood of further plutonium movement in the soil.

Digging up plutonium waste in Pit 9, and the soil immediately below it, will help in making future decisions. Cost and the risk of industrial accidents may not justify digging up the rest of the waste. Even if all the buried waste were dug up, the soil cannot be totally cleaned of plutonium contamination. Quantities of soil that are judged environmentally safe will need to be reburied.

Even if small quantities of plutonium reach the aquifer, they will most likely be filtered out before they reach any human. The properties of plutonium minimize its buildup in water. Its most common chemical compound, plutonium oxide, is less soluble than sand. Water does not easily dissolve or carry plutonium, a heavy metal.

Wastewater from some INEEL facilities was injected directly into the aquifer from 1953 until 1986. This wastewater contained very small quantities of plutonium. The quantities are only slightly more than can be attributed to fallout from nuclear weapons testing. Regulations apply to contaminants of water supplies. The Environmental Protection Agency has applicable drinking water standards. For plutonium, the injected water met all drinking water standards, both State and federal.

The trace quantities of plutonium move much slower than the water. Since 1953, water from the injection wells has moved in the aquifer an average of at least 20 miles in a southwesterly direction. Yet plutonium in barely detectable amounts has reached less than a half-mile from the injection wells. Thus plutonium is nowhere near the southern INEEL boundary.

Allegation: **Inhaling one particle of plutonium can cause lung cancer.** Plutonium has not been the identified cause of any cancer deaths in the U. S. Some workers who handled plutonium during World War II accidentally inhaled significant quantities. Doctors monitored one group of these workers regularly. Decades later the workers' rate of lung cancer was no greater than in the rest of American society.

Inhaled plutonium particles above a certain size do not reach the lungs. A person would need to inhale nearly one million of the largest particles reaching the lungs to become an eventual victim of lung cancer. A continuing concern expressed at public meetings is that the so-called HEPA filters used by industry to filter out extremely small plutonium particles are not as efficient as claimed. In this size range the number of particles that would cause a lung cancer, if inhaled by a person, is a billion or more.

Claim: **A sheet of paper can stop radiation from plutonium.** Essentially all radiation emitted by plutonium is of very low energy. The thickness of the human skin can therefore prevent radiation damage to the rest of the body. Plutonium can emit other forms of radiation with higher energy. However, their intensity is low and they do not

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present great dangers. Nevertheless they are a factor, now that the amount of rad permitted for industrial workers has become more conservative. A plutonium-fa plant built in Germany, but never operated, is a monument to this increased conservatism.

Allegation: **Plutonium makes a nuclear reactor accident much worse**. All nuclear power plants that make electricity produce plutonium. For a typical U.S. plant, this plutonium generates about one-third of the total energy output. It is under controlled conditions. Under accident conditions, the reactor could be sufficiently damaged to result in the release of harmful radioactivity. The main threat would not be airborne plutonium. The accident at Three Mile Island in Pennsylvania dispersed no plutonium. Only a small amount was released during the much more severe accident at Chernobyl. Under no circumstances could a reactor explode like a nuclear bomb.

Concern: **Plutonium from peaceful uses can be diverted to nuclear bombs.** Each commercial nuclear power plant discharges once-used fuel each year containing several hundred pounds of plutonium. The U. S. does not attempt to recover the plutonium from the highly radioactive fuel. Other countries are recovering plutonium.

The recovery process is technically quite difficult. It is not realistic for terrorists. It requires a major national commitment in resources. Therefore the Russians and the U. S. are talking about including our excess weapons plutonium in fuel for power reactors. Not only would some bomb material be used up in producing energy, but also the remainder would be hard to recover after use in a reactor.

The countries that do recover plutonium from reactor fuel believe they account for the plutonium very carefully. Reactor plutonium is much less pure than weapons material. A very crude and inefficient nuclear bomb could be made from reactor plutonium at great risk to the producer.

Allegation: **Plutonium can neither be transported nor disposed safely.** No one anywhere in the world has been injured by radiation from shipments of nuclear materials. Plutonium, as nuclear weapons material, has been sent around the country for fifty years without a serious accident. Likewise shipments of used fuel from the nuclear Navy and from foreign reactors have had no serious accidents. The used fuels have operated successfully at much higher temperatures than the temperatures in the shipping containers. The containers are heavy, lead-shielded casks. They have been tested under very severe simulated accident conditions and proven safe.

The main form of plutonium loses its radioactivity very slowly. To lose it all will take about 200,000 years. (Remember that poisons like arsenic never lose their toxicity.) The EPA has approved the Waste Isolation Pilot Plant (WIPP) for storage/disposal of plutonium-contaminated waste generated by the nuclear weapons program. The State of New Mexico is challenging that decision. Their concern seems to center not around the plutonium, but around the hazardous organic solvents also in the waste.

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The U. S. is intending to dispose of once-used nuclear fuel containing plutonium at Yucca Mountain in Nevada. The government has not yet certified that facility as safe for this disposal. One reason that other countries recover the plutonium from nuclear fuel is to lessen the amount of material that needs such extraordinarily long safe storage. With the plutonium and other fuel materials removed, the resulting nuclear waste loses its radioactivity in about 500 years. The ability to build storage facilities that have lasted that long dates back to the Egyptians. Witness their pyramids.

In summary, since its discovery, plutonium has been intensively studied. Its qualities are better understood than many common industrial materials. It must be handled carefully, like any other useful but potentially harmful material. It has been generally used safely. The processes for handling it have continued to become more conservative. Members of Coalition 21 believe that the plutonium risks to the general public in Idaho are minimal. In our opinion, these risks can continue to be adequately managed.

For those wanting numbers: Inhalation risk: Swallowing an estimated 500 milligrams of plutonium will cause acute fatal damage to the GI tract. That amount is 50% more than an adult aspirin weighing 325 milligrams. Inhaling 20 milligrams of plutonium dust of optimal particle size will cause death in about a month due to lung damage.

Inhaling one-tenth of a milligram of plutonium will eventually cause fatal lung cancer. The largest particle of plutonium that can be readily inhaled is about 3 micrometers in diameter. (The diameter of the human hair is up to 20 times greater.) It would require 700,000 of these particles to make 0.1 milligrams. Reducing the diameter of the average particle to 0.2 micrometer decreases its volume by 3500. This reduction in size increases the potentially fatal number of particles (in 0.1 milligrams) to over 2 billion.

Plutonium in water: Measurements of plutonium traces in natural waters have been made in many places around the world. Water in contact with sediments (soils) dissolves only about one part in 10,000 to 100,000 of the plutonium in the adjacent sediment.

Plutonium forms and radioactivity: Pu-239 is the main form of plutonium, both in weapons and in a less pure state in reactor fuel. This plutonium isotope has a half-life of 23,400 years. (Half-life means the time to lose half of its remaining radioactivity). At most, ten half-lives are needed for essentially all radioactivity to disappear. Reactor fuel contains other plutonium isotopes with much shorter half–lives. The shorter half-life make them and the reactor fuel much more radioactive than weapons-grade plutonium.

References: Furnished on request.

Coalition 21 is an all-volunteer group supporting the beneficial uses of nuclear technology. You may write us with your comments on this summary at P. O. Box 51232, Idaho Falls, Idaho 83404. The email address is facts@coalition21.com.

George Freund prepared this summary. Reviewers included Coalition 21 members Jack Barraclough, John Commander, Steve Herring, Marty Huebner, and Dick Kenney.

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COALITION21 Supporting Tomorrow's Technologies With Facts ✦ Not Fears
P.O. Box 51232✦Idaho Falls, Idaho 83405✦208-528-2161✦FAX: 528-219

U. S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C.

COMMENTS ON SURPLUS PLUTONIUM DISPOSITION DEIS Sept. 15, 1998

DOE is to be congratulated on their efforts to incorporate in this DEIS suggestions and answers to various issues raised during earlier public comment periods for the Scoping and Storage & Disposition PEIS. There remain, however, some points about which we wish to comment or question:

1. World peace is extremely questionable with the current potential for proliferation of nuclear weapon materials. Thus, disposition of surplus plutonium by both the U.S. and Russia is of immediate importance. Russia intends to utililze their surplus as MOX (Mixed Oxide) nuclear fuel for power production. The U.S. should likewise be using their pure plutonium for energy production with MOX fuel elements. There is ample information available on MOX from the 1970's to the present. We strongly feel that only the plutonium too impure for either weapon or MOX fuel should be immobilized for burial. 4

2. We are unhappy that DOE has already selected Savannah River as the preferred site for MOX production, rather than awaiting the Record of Decision following the Final Environmental Impact Statement. WIPP might then be open to receive Rocky Flats waste now stored at INEEL. This would then show that the 'Settlement Agreement on Nuclear Wastes' is working, so that our political leaders and the public could actively support new projects at INEEL. 5

3. DOE's choice of Savannah River as the preferred site for MOX production was not based on any environmental issues at INEEL. We feel that DOE should clearly state that environmental impacts of the MOX project at INEE would be extremely small and were not a basis of their preference of SRS for the Plutonium MOX Fuel Fabrication Facility. 6

4. Pantex was included as a possible site for the pit disassembly and conversion facility. This is logical since most of the MOX plutonium (as pits) is located there. The non-weapon plutonium oxide presents no different proliferation concern if it were to be shipped to INEEL. 7

5. Transportation distances to move plutonium oxide from Pantex would be essentially the same to INEEL as to SRS. Therefore, shipment to INEEL would not constitute any additional and unnecessary transportation, as claimed by DOE. 8

6. The plutonium too impure for MOX fabrication can logically be shipped directly to SRS for immobilization. 9

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MD240–4 **Nonproliferation**

DOE agrees with the commentor's view that surplus plutonium disposition by both the United States and Russia is of immediate importance to world peace and appreciates the support for the hybrid approach. The SPD EIS analyses include those materials suitable for immobilization and those suitable for MOX fuel fabrication. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself.

MD240–5 **Alternatives**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). In accordance with 40 CFR 1502.14(e), the agency shall identify its preferred alternative, if one or more exists, in the draft EIS and identify such alternative in the final EIS. DOE identified the preferred alternative, as required, so the public could understand DOE's orientation and provide comment. Decisions on the surplus plutonium disposition program at INEEL will be based on public input, environmental analyses, technical and cost reports, and national policy and nonproliferation considerations. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD240–6 **Alternatives**

As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise. DOE prefers that INEEL focus on cleanup and nuclear technology. Environmental impact analyses of the proposed surplus disposition actions discussed in Chapter 4 of Volume I show that the potential impacts of the proposed actions during routine operations are small for all DOE candidate sites.

COALITION 21
RICHARD KENNEY
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MD240–7 **Alternatives**

Proliferation issues associated with the transportation of plutonium dioxide from a pit conversion facility at Pantex to a MOX facility at either INEEL or SRS would not be the only discriminating factor for selection between INEEL and SRS for the MOX facility. As indicated in the revised Section 1.6, SRS is preferred for the proposed surplus plutonium disposition facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

MD240–8 **Alternatives**

DOE assumes that the commentor's suggestion is to locate the pit conversion facility at Pantex, the immobilization facility at either Hanford or SRS, and the MOX facility at INEEL. Transportation of pits from Pantex to INEEL rather than SRS may not involve additional, unnecessary transportation, but this arrangement would locate each of the proposed facilities at a different site. Section 2.3.1 of the SPD Draft EIS explained that a range of 23 reasonable alternatives remained after evaluating over 64 options against three screening criteria: worker and public exposure to radiation, proliferation concerns due to transportation of materials, and infrastructure cost. These 23 reasonable alternatives were evaluated in the SPD Draft EIS. After the Draft was issued, DOE eliminated as unreasonable the 8 alternatives that would involve use of portions of Building 221–F with a new annex at SRS for plutonium conversion and immobilization, thereby reducing the number of reasonable alternatives to the 15 that are analyzed in the SPD Final EIS. Options that placed each of the three facilities at a different site were eliminated as unreasonable.

MD240–9 **Alternatives**

Most of the plutonium that would be immobilized under the hybrid alternatives would be sent directly to the immobilization facility for conversion to plutonium dioxide, followed by immobilization. SRS has been announced as the preferred site for all three proposed surplus plutonium disposition facilities; therefore, all the surplus plutonium would be transferred to SRS for processing should SRS be selected.

7. The combination of items 4, 5, and 6 would make a logical alternative that should have been considered by DOE. An explanation of why it wasn't would be in order. 10

8. No reasons were stated in the DEIS for DOE's preference for siting MOX Fuel Fabrication at SRS beyond stating "DOE .....prefers similarly that INEEL should focus on cleanup and nuclear technology". We believe that the MOX project belongs in the 'nuclear technology' focus specified for INEEL. A MOX Fuel Fabrication Facility at INEEL could then continue the peaceful nuclear power technology that had its roots at INEEL. 11

9. A major example of 'nuclear technology' would be for DOE to choose Argonne-West as the site to make the lead assemblies and do post-irradiation examination if required for NRC licensing of MOX. Based on their superior equipment and expertise, we support Argonne-West for this work. 12

10. In answer to many commentators (including ourselves) for the need to analyze total costs of each alternative. DOE prepared a separate cost study (DOE/MD 0009) that will be considered , along with the SPD EIS analysis, in the decisionmaking process. This ROD must consider the cost results of that study and, at least, state that INEEL was very cost effective; the actual cost document shows INEEL lower cost than any other site or alternatives and even equal to or less than any immobilization-only alternatives. 13

11. In consideration of all the factors we have presented, based upon all SPD EIS documents reviewed, it appears to us that DOE should have given INEEL a more favorable consideration for the MOX Fabrication Facility or give the reasons for not doing so. 14

Respectfully submitted,

Lowell A. Jabe
Coalition 21

MD240

MD240–10 **Alternatives**

This comment is addressed in response MD240–8.

MD240–11 **Alternatives**

This comment is addressed in response MD240–6.

MD240–12 **Lead Assemblies**

DOE acknowledges the commentor's support for lead assembly fabrication and, if required, postirradiation examination at ANL–W. All the lead assembly candidate sites were considered because they have existing facilities that meet the standards for processing special nuclear material, would require only minimal alteration of interior spaces, and are authorized to handle plutonium. ANL–W was also identified as a potential location for postirradiation examination because of its existing hot cell facilities in which tests on fuel rods from irradiated lead assemblies could be conducted.

As discussed in the revised Section 1.6, based on consideration of capabilities of the candidate sites and input from DCS on the MOX approach, DOE prefers LANL for lead assembly fabrication. LANL is preferred because it already has fuel fabrication facilities that would not require major modifications, and takes advantage of existing infrastructure and staff expertise. Additionally, the surplus plutonium dioxide that would be used to fabricate the lead assemblies would already be in inventory at the site. DOE prefers ORNL for postirradiation examination activities. ORNL has the existing facilities and staff expertise needed to perform postirradiation examination as a matter of its routine activities; no major modifications to facilities or processing capabilities would be required. In addition, ORNL is about 500 km (300 mi) from the reactor site that would irradiate the fuel. Decisions on lead assembly fabrication and postirradiation examination will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

COALITION 21
RICHARD KENNEY
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MD240–13 **Cost Report**

DOE acknowledges the commentor's support for the cost effectiveness of siting the proposed surplus plutonium disposition facilities at INEEL. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

MD240–14 **Alternatives**

DOE acknowledges the commentor's support for siting surplus plutonium disposition facilities at INEEL.

The remainder of this comment is addressed in response MD240–6.

2025 Balboa Drive
Idaho Falls ID 83404

September 15, 1998

U. S. Department of Energy
Office of Fissile Material Disposition
P. O. Box 23786
Washington D. C.

Comments on Surplus Plutonium Disposition DEIS

1. DOE should clearly state that environmental impacts of the MOX project at INEEL would be minimal and that these impacts were not used to rule out INEEL as the preferred site for the MOX Fuel Fabrication Facility. The failure of INEEL to be the preferred site should not be used to generate opposition to future nuclear technology projects at INEEL. 1
2. To further nuclear technology at INEEL, DOE should select Argonne-West for the fabrication of the MOX lead assemblies and for their post-irradiation examination. ANL-West is the only DOE site deemed capable of doing both tasks. DOE should explain in the DEIS and/or ROD what advantages, if any, accrue from that fact. 2
3. DOE should explain in the DEIS when and why, under the hybrid option, it eliminated any alternative that would involve three separate facilities for the three tasks of (a) pit disassembly and conversion, (b) MOX fabrication and (c) immobilization. I believe an alternative involving Pantex for (a), INEEL for (b), and SRS for (c) would be competitive with other alternatives. It should not be dismissed out-of-hand and should be analyzed more thoroughly. 3

George A Freund

George A. Freund

MD239

MD239–1 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at INEEL. Chapter 4 of Volume I describes environmental impacts of the implementation of alternatives that included the construction and normal operation of MOX facilities at INEEL. DOE prefers that INEEL focus on cleanup and nuclear technology. Environmental impact analyses of the proposed surplus disposition actions discussed in Chapter 4 show that the potential impacts of the proposed actions during routine operations are small for all DOE candidate sites.

SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise. Decisions on the surplus plutonium disposition program at INEEL will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD239–2 **Lead Assemblies**

DOE acknowledges the commentor's support for siting lead assembly and postirradiation examination activities in ANL–W at INEEL. As noted in Section 2.17, ANL–W was considered as one of several candidate sites because it would require only minimal alteration of interior spaces, is authorized to handle plutonium, and has existing facilities that meet the standards for processing special nuclear material.

As discussed in the revised Section 1.6, based on consideration of capabilities of the candidate sites and input from DCS on the MOX approach, DOE prefers LANL for lead assembly fabrication. LANL is preferred because it already has fuel fabrication facilities that would not require major modifications, and takes advantage of existing infrastructure and staff expertise. Additionally, the surplus plutonium dioxide that would be used to fabricate the lead assemblies would already be in inventory at the site. DOE prefers ORNL for postirradiation examination activities. ORNL has the existing facilities and staff expertise needed to perform postirradiation examination as a matter of its routine activities; no major modifications to facilities or

processing capabilities would be required. In addition, ORNL is about 500 km (300 mi) from the reactor site that would irradiate the fuel. Decisions on lead assembly fabrication and postirradiation examination will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD239–3 **Alternatives**

Section 2.3.1 of the SPD Draft EIS explained that a range of 23 reasonable alternatives remained after evaluating over 64 options against three screening criteria: worker and public exposure to radiation, proliferation concerns due to transportation of materials, and infrastructure cost. Options placing three facilities at three different sites were eliminated from consideration because this arrangement did not meet these screening criteria. Options were not dismissed out of hand, but were eliminated as part of a methodical process to narrow the scope of this SPD EIS to a reasonable range of alternatives. Since publication of the SPD Draft EIS, DOE eliminated another 8 alternatives that would have involved the use of portions of Building 221–F at SRS and a new annex for plutonium conversion and immobilization at that site, thereby reducing the number of reasonable alternatives to 15 that are analyzed in the SPD Final EIS. The environmental impacts of these alternatives are summarized in Section 2.18 and elaborated in Chapter 4 of Volume I.

Mary Jane Fritzen
390 Lincoln Drive
Idaho Falls, Idaho 83401-4166

23 August 1998

Subject: Comments for public meeting on Surplus Plutonium Disposition

I have learned a lot about science by reading information about nuclear energy. I am not associated with the field, except to live in Idaho Falls with neighbors who work for nuclear industry. Many good people work for "the site." It has been good for this city. For example, they are peaceful citizens, who contribute to the fine arts, making Idaho Falls a place of peace, beauty and culture.

Points I see in general, which apply to the issue:

1. Need for energy independent of expendable fossil fuel. Otherwise we would depend on Middle East, where peace is insecure.

2. Need for continued good relations with Russia.

Recently (June 1998, Provo, Utah) I listened to a forum of two speakers: the U. S. General in charge of on-site inspections, and the Russian General in charge of on-site inspections. Subject with the nuclear non-proliferation treaty between the two nations. Both generals emphasized the success of such mutual inspections. They said working together makes us friends. We are only afraid of our enemies. For example, the U.S. doesn't fear Canada. The need for disarmament vanishes when we are friendly. Both speakers advocated "open skies," because fear is bred in ignorance or secrecy, while knowledge dispels fear. They said high technology is not needed for open skies. Someone with binoculars in a helicopter could detect a major military build-up. The previous build-up of warheads was caused by each fearing the other was a threat. 1

(I typed detailed notes, which I would be happy to send if requested.)

3. Need to use and value the expertise of nuclear scientists. For example, one speaker at last week's public meeting advocated converting the plutonium to metal for storage.

Because an uninformed public is fearful of nuclear energy, I believe education of students in public schools and of journalists is necessary.

Thank you,
Mary Jane Fritzen

FD199

FD199–1 **Other**

DOE acknowledges the commentor's views on the value of nuclear industry workers in Idaho Falls, nuclear power as an alternative energy source, the nonproliferation activities of the United States and Russia, and public information and education programs with regard to nuclear energy.

The United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yelstin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile.

The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain surplus plutonium disposition activities in order to encourage the Russians and set an international example.

DOE regards public education as a very high priority. Accordingly, it uses various communications resources to make information on its policies and program publicly available. DOE presents information about the disposition of fissile materials to the public in various forms. These include public hearing presentations, fact sheets, exhibits, technical reports, visual aids, and a video. Information is available from a variety of sources, including DOE reading rooms, the MD Web site (http://www.doe-md.com), and attendance at public hearings.

HAMPSON, WALTER L.
PAGE 1 OF 3

United States Department of Energy

Comment Form

9/16/98

NAME: (Optional) Walter L. Hampson
ADDRESS: 8145 Rose Lane, Boise, ID 83703-2566
TELEPHONE: (208) 853-0814; FAX-(208) 853-7528
E-MAIL: Soon

- See my comments in 1997 after attending the Idaho Falls meeting; they are all still valid today (See copy attached)

- Although I still think Hanford is the logical choice for WO_x fabrication, I see no particular objection to Savannah River. I am glad to see things progressing toward establishing U.S. WO_x fabrication soon. I think we should do the same throughout the fuel cycle and maintain "stand alone" capability in case of future needs, both military and domestic. 1

- The subject EIS material is very well done and easy to follow. However the selection of sites for specific tasks seems to be based on consideration of other works being done at those sites rather than the most suitable site for the work. That seems to be arbitrary judgment as to the sites capability to accomplish a multi-purpose mission and may not result in the proper, lowest cost, decision. Too much at one site might jeopardize security i.e. make vulnerable to enemy action?? 2

- Thank you for the opportunity to review & comment. & Good luck!

Sincerely, Walt Hampson

- Attachment: '97 Comments
- Note: FAXed on 9/16/98; will also mail on 9/16/98 well

FD311

FD311–1 **MOX Approach**

DOE appreciates the commentor's input on the MOX approach to surplus plutonium disposition. The current plan calls for maintaining the MOX fuel cycle within the United States. The MOX fuel would be fabricated in a Government-owned facility and irradiated in a domestic, commercial reactor in a once-through cycle with no reprocessing.

FD311–2 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on the selection of sites for MOX fuel fabrication. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made and DOE will continue to consider Hanford for surplus plutonium disposition programs that are compatible with the Hanford mission.

As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise.

ATTACHMENT TO 1998 Comments, 9/16/98 (1997 Copy)

Surplus Plutonium Disposition
Environmental Impact Statement

Comment Form

United States Department of Energy

NAME: (Optional) WALTER L. HAMPSON
ADDRESS: 8145 ROE LN, BOISE, ID 83703-2566
TELEPHONE: (208) 853-0414; FAX-(208) 853 7528
E-MAIL:

- MOX FUEL FABRICATION SHOULD BE DONE! IT CAN BEST BE DONE AT HANFORD WHERE EXTENSIVE R.+D. plus COMMERCIAL pilot RUNS ON MOX FUEL WAS DONE IN THE 1960'S AND EARLY 1970'S. IN ADDITION, A COMMERCIAL MOX PLANT WAS INSTALLED AND OPERATED BY EXXON Nuclear (Now A.C. Siemens) ADJACENT TO THE NUCLEAR RESERVATION. A Commercial reload of MOX FUEL WAS fabricated AND SHIPPED TO THE KAHL Test Reactor in GERMANY (By AIR) in THE EARLY 1970'S. 3
- THIS SHOULD BE DONE BY AMERICAN CONTRACTORS ON A SECURE FEDERAL NUCLEAR RESERVATION UNDER military - type CONTROL.
- ESTIMATES SHOULD BE MADE BY EXPERIENCED ENGINEERS IN THE FABRICATION OF MOX FUEL. IF NOT, ESTIMATES BY PEOPLE WHO HAVE NOT DONE it SHOULD PROBABLY BE DOUBLED OR TRIPLED! THIS IS A VERY DEMANDING BUSINESS IN EVERY WAY AND THERE IS NO SUBSTITUTE FOR ACTUAL, "HAVE DONE it" type EXPERIENCE. (Don't try "VIRTUAL REALITY" ON THIS ONE) 4
- OTHER COUNTRIES ARE PROCEEDING WITH THE TOTAL FUEL cycle, INCLUDING ENRICHMENT (CENTRIFUGE + AVLIS), REPROCESSING, MOX FUEL FABRICATION AND FAST BREEDER REACTORS, REGARDLESS OF WHAT THE UNITED STATES DOES. THEREFORE THE U.S. DECISION SHOULD NOT FACTOR IN "PERCEPTIONS" OF WHAT OTHER COUNTRIES MIGHT THINK OR DO. THEIR ENERGY NEEDS ARE, IN GENERAL, MUCH MORE ACUTE THAN THE U.S., THEREFORE THEY MAY BELIEVE THE ADDED RISKS OF NUCLEAR ARE WORTH it. PROLIFERATION MUST BE ADDRESSED EVERYWHERE — if WE WANT TO BE AN EXAMPLE, WE SHOULD DEMONSTRATE THE PROPER WAY TO DO THINGS, RATHER THAN "BACK AWAY" AND HOPE FOR THE BEST! THE "GENIE" IS OUT OF THE BOTTLE — WE PUT THE OTHERS IN this business — let's STAY IN it AND SHOW THEM HOW TO DO it RIGHT! 5

For further information contact:
U.S. Department of Energy, Office of Fissile Materials Disposition, MD-4
Forrestal Building, 1000 Independence Ave., SW, Washington, D.C. 20585
1-800-820-5156

Walt Hampson

FD311

FD311–3 **MOX Approach**

DOE has identified as its preferred alternative a hybrid approach of using both immobilization and MOX fuel fabrication to disposition up to 50 t (55 tons) of surplus plutonium. Under this alternative, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. The remaining 17 t (19 tons) of surplus, low-purity, nonpit plutonium is not suitable for fabrication into MOX fuel because of the complexity, timing, and cost that would be involved in purifying those plutonium materials.

The remainder of this comment is addressed in response FD311–2.

FD311–4 **MOX Approach**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. Although COGEMA is international, it is one of only a few companies with recent commercial MOX fuel fabrication experience, and this experience would contribute to the success of DOE's MOX fuel fabrication effort.

The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

FD311–5 **Nonproliferation**

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that

the MOX approach would be considered for higher-purity feed materials. DOE will continue to discourage Russia from reprocessing its spent nuclear fuel and starting a plutonium cycle but this issue is beyond the scope of this SPD EIS. As stated in response FD311–1, the use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input, not "perceptions" of what other countries may think or do.

NEWS RELEASE

RE: The MOX plutonium fuel refinery(or how to accidentally become the supersite)

Rumors of the death of MOX have been greatly exagerated. How long will it take for Kempthorne or Huntley to organize a rally for the nuclear project after they are elected? I'd give them 30 minutes to call their supporters on the Idaho Falls Chamber of Commerce. These people have never met a nuclear project that they didn't like. We should be prepared. We should reinstate accident analysis into our state Air Quality Permits but our politicians refuse. Please let me explain..

The first tier EIS for plutonium disposition talked about the "triple play".(1/97) For the first time the DOE stated that an accident at the nuclear reactors that will use the plutonium fuel(plus make tritium for nuclear weapons and electric power to be sold) could cause up to 7,000 cancer deaths. In the final analysis INEEL has less people living in the 50 mile area that is used to compare project sitings. The DOE admits that the choice of where to build this nuclear supersite may change in the final document.

In 1991, the DOE was passing out pink slips at the ICPP, saying fuel reprocessing was over. At the same time, the DOE was applying for 17 Air Quality Permits to prepare to reprocess 17 types of fuel rods. Thanks to the nuclear "deal" we are now receiving many types of fuel rods from around the world. The nuclear businesses that pay Kempthorne and Huntley view spent fuel rods and weapons grade plutonium as a fuel source, not a waste. 1

During the documented transcript of my appeal of that Air Quality Permit I caught the DOE lying about the accident analysis that was required for the permit. The wrong computer program, that wasn't supossed to be used for accidents, eliminated most of the radionuclides released, falsifying the results. The state responce was to look the other way and then they removed the requirement for accident analysis for permits!

So I ask you, were they protecting your children, or protecting Lockheed? Even if the MOX plutonium project goes to South Carolina, why won't Kempthorne and Huntley join me in my effort to reinstate accident analysis to the permits to protect state's rights?

My sympathy is with the family of the INEEL worker who died in their most recent accident. Doctors make mistakes, too, and fortunately this was not a big nuclear accident. Doctors can only kill one person at a time, when we make a mistake during a necessary operation. The nuclear businesses can devestate a whole area and that's why we must question if the nuclear future is on a dead end road. The people of Idaho have a right to know the truth about our nuclear future. We have a right and obligation to our children to not remain at the mercy of political salesmen like Kempthorne and Huntley. Is states right's just a cute phrase politicians use to get elected? Should we remain at the mercy of Bill Clinton's DOE ? Do Bill, Dirk, and Bob know what's best or should we put accident analysis back in our state permits ?

Dr. Peter Rickards DPM
Box 911,TF,83303
734-7941(H), 734-3338(W)

IDD02

IDD02–1 **Human Health Risk**

DOE acknowledges the commentor's concern about the MOX approach. This SPD EIS does not address the siting or operation of a "triple play" reactor. Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents. Reactors that use MOX fuel have small accident risks similar to those associated with reactors that use only LEU fuel. Were a major accident to occur at a reactor using either fuel type, there would be fatalities in the public. However, the probability of a major accident actually occurring is about 1 in 100,000 over the lifetime of the reactor; thus, the risk (consequence times probability of occurrence) of an LCF in the public is much less than 1.

Changes to Idaho air quality permit requirements are beyond the scope of this EIS; they are a State rather than a DOE issue. However, contacts have been made with the Idaho Division of Environmental Quality and with the contractor responsible for air quality permits for INEEL. There have been no State requirements to perform an accident analysis as part of the air-permitting process regardless of the type of pollutant that could be emitted (criteria pollutants, toxic pollutants, or radionuclides). Only routine operations are considered in the air-permitting process.

SUTTER, THOMAS J.
PAGE 1 OF 1

Yes. This is Thomas J. Sutter. 1414 South 35 West, Idaho Falls, ID 83402-5538. Telephone number is 529-0624. What I'd really like to know is where the workshops are at today on the Surplus Plutonium Disposition Draft Environmental Impact Statement Public Meeting. I see there is an afternoon and evening workshop, but it doesn't give where they're going to be at.

Second thing is, I just want to let it be known that I'm in favor of the MOX program and I would think that disposing of plutonium which is no longer needed for nuclear weapon should be in the best interests of our country. Also I would think that if we had the opportunity to receive any of that material from any other nation in the globe, it would be best if we did the reprocessing and particularly if we could do it here in Idaho it would make a lot of sense to me. But if we can't then I would encourage reprocessing it wherever its going to be done. And I would like to also note that this plutonium is very valuable material and it should not be placed in a depository where it could not be put to better use at some time in the future and the, only the most impure plutonium that can not have any further use should be put in the glass and buried directly. So I'd just like to talk in support of the MOX program as proposed by the Department of Energy. Thank you very much and if you would let me know where the meeting is going to be I would appreciate it. Tom Sutter 529-0624. Thank you. 1

PD033

PD033–1 **MOX Approach**

DOE acknowledges the commentor's support for the MOX approach.

It should be noted, however, that DOE is not considering reprocessing any of the surplus plutonium that is the subject of this SPD EIS. The proposed action is intended to permanently remove 50 t (55 tons) of plutonium from the U.S. weapons stockpile by converting that plutonium into proliferation-resistant forms. Reprocessing plutonium would not be consistent with that goal.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

United States Department of Energy

Comment Form

NAME: (Optional) Theodore Watanabe
ADDRESS: P O Box 2941 Idaho Falls ID 83401
TELEPHONE: (208) 523 5712
E-MAIL:

Presently weapons material of all type are stored in secure locations. The best option is maintain the Status QUO. 100 YEAR REEXAMINE the problem 1

IDD06

IDD06–1 **Alternatives**

DOE acknowledges the commentor's support of the No Action Alternative to surplus plutonium disposition, the details and environmental impacts of which are described in Section 4.2. DOE has determined, however, that no action (i.e., continued storage) would not satisfy the surplus plutonium disposition program goal: to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PEACE FARM
MARY J. NICHOLSON
PAGE 1 OF 4

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC, 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

I do not support plutonium processing at the Pantex Plant. In the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, the Department of Energy prudently decided against locating one plutonium processing facility (MOX fuel fabrication) at the Pantex Plant. For the following additional reasons, a Plutonium Pit Disassembly and Conversion facility also should not be located at Pantex: 1

Pantex Should Not Become the Next Rocky Flats

Pantex has never processed plutonium. The Pantex Superfund site has so far apparently escaped the type of radioactive contamination found at plutonium processing sites like Rocky Flats in Colorado and Hanford in Washington.

Risks That Are Unknown Are Too High

The Pantex Plant occupies an area that is a fraction of the size of other plutonium sites.

SIZE MATTERS: A Comparison of the Area of the Four Candidate Sites (Square Miles)			
Pantex	Savannah River Site	Idaho National Engineering Lab.	Hanford
23	309	890	560

2

The technologies proposed in the Plutonium Pit Disassembly and Conversion Facility are undemonstrated and unproven. It is unacceptable to have plutonium operations above the Ogallala Aquifer and only one mile from where people live and work in a vibrant agricultural producing area. The Pantex legacy already includes heavy contamination in a perched layer of groundwater less than one hundred feet above the Ogallala Aquifer. This pollution extends from under the Pantex Plant to adjacent private property and the real impacts remain unknown. The risk of any additional groundwater pollution is unacceptable in an agricultural region.

Common sense dictates that negative consequences to people and farmland from nuclear accidents are far more likely in a small, open, windy location like Pantex. The Department of Energy has acknowledged that the most visually unappealing feature of the plutonium facilities will be their smokestacks. Visual blight will be a minor inconvenience compared to the air pollutants--many of them radioactive--expected to escape into the atmosphere daily through smokestack filters. Routine air emissions of tritium, plutonium, americium, and beryllium constitute unacceptable new hazards to the Texas Panhandle. 3

MD045

MD045–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. As described in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of any of the proposed activities during routine operations at any of the candidate sites would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed surplus plutonium disposition facilities in compliance with today's environmental, safety, and health requirements. Decisions on the surplus plutonium disposition program at Pantex will be based upon environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD045–2 **Human Health Risk**

Although Pantex is smaller in overall size in comparison with the other candidate sites, analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor (e.g., see Section 4.6).

While it is true that the pit conversion facility is the first consolidated facility for accomplishing this mission on a large scale, the processes that would be used in this facility are not entirely new. Many of these processes are in use at LANL and LLNL. In addition, DOE has recently started a pit disassembly and conversion demonstration project at LANL, where processes will be further developed and tested.

Section 4.26.3.2 analyzes impacts to the environment (including contamination to the Ogallala aquifer) due to construction and normal operation of a pit conversion facility at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. Appendix J.3 includes an analysis of

potential contamination of agricultural products and livestock and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. If the proposed surplus plutonium disposition facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation. This analysis indicates that impacts of operating the pit conversion facility on agricultural products, livestock, and human health at Pantex would likely be minor.

MD045–3 **Human Health Risk**

It is DOE policy to operate in compliance with all applicable air quality requirements and to protect human health and the environment. DOE takes into consideration pollution reduction techniques to minimize air releases when designing, constructing, and operating its facilities. It also considers aesthetic and scenic resources in the design, location, construction, and operation of facilities. Potential concentrations of air pollutants at Pantex for the various alternatives have been estimated, considering appropriate local meteorology and other data associated with the area. Because the releases from the pit conversion and MOX facilities would be very small (see Appendix J.3.1.4), estimates of resultant radiological health risks are small. As indicated in Section 4.17.2.4, the maximum possible dose delivered to a member of the public during operations of the MOX and pit conversion facilities at Pantex would be 0.068 mrem/yr, 0.02 percent of the dose that individual would receive annually from natural background radiation. The estimated dose to the public from radiological emissions (e.g., americium, tritium, and plutonium) would be 0.077 person-rem/yr which would result in an increase of 2.9×10^{-3} LCFs over the 10-year operating life of the pit conversion facility. Any new facilities that might be built would be within existing site boundaries, and would be matched aesthetically with the current plant to limit potential visual impacts.

There is Valid, Strong Criticism of Safety in the Storage of Plutonium at Pantex

Since Pantex became the nation's long-term storage location for up to 20,000 plutonium pits, promises to improve safety conditions have not happened. The U.S. Government Accounting Office and the Defense Nuclear Facilities Safety Board have issued reports critical of plutonium storage safety at Pantex. Fifty million taxpayer dollars were spent on a failed plutonium pit container program (the AT-400A) and the plan to move over 10,000 pits into a safer remodeled building (Building 12-66) has also failed.

When it comes to plutonium pit storage problems, Panhandle residents are back to square one. The plutonium remains in old, unsuitable, corroding storage containers and in 35-55 year old "bunkers" that the Department of Energy promised were for "temporary" use. Plutonium that is supposed to be stored in a stable environment now sits in the bunkers--all but three without air conditioning--even as the Texas Panhandle experiences a spell of more than 40 consecutive days of 90+ degree temperatures, and more than 20 days this summer with thermometers registering 100+ degrees. If the Department of Energy cannot accomplish the job of safely storing Pantex plutonium in the most stable environment, there is no reason to accept its unsubstantiated assurances to safely process deadly plutonium powders at Pantex. 4

Thank you for this opportunity to comment.

Sincerely:

As concerns mount, I appeal to the disposition process to remove all endangering storage as well as processing further unsafe unproven commitments in Pantex site and safekeeping be initiated for the world's peoples. 5

Mary J. Nicholson
Mr. Leonard F. Nicholson

720 Westmoreland Dr.
Bensenville, IL 60106

Members of the PEACE FARM

MD045

MD045–4 **DOE Policy**

DOE acknowledges the commentor's concern regarding the safe storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposures estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed, addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

MD045–5 **Nonproliferation**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an

environmentally safe and timely manner. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile.

The remainder of this comment is addressed in response MD045–4.

JUL 28 REC'D

7-24-98

U.S. Department of Energy
Office of Fissle Material Disposition
P.O. B ox 23786
Washington, D.C. 20026-3786

RE: Fissle Materials Disposition, SPD*EIS COMMENT

The fact that we have a surplus of fissile material to dispose of would indicate that we over produced and should be cutting back on up-grading U233, Pu239 and U235.

If we have a surplus of fissile material as you maintain, the up-grading plants at Oak Ridge, Paducah KY and Portsmouth OH should shut down; thereby lessening the requirement for electric power plants (ie Indiana Kentucky Electric (IKE) government contract plant at Madison, IN). The IKE plant that furnishes power for the diffusion plant at Portsmouth OH has been burning around 4 million ton of high sulfur coal per year for 50 years (recently switched to Wyoming coal)with environmental complaints all the way to Canada. CCHW rates the plant EPA Superfund. The Ohio river is so contaminated with PCBs the fish can't be eaten, but millions of people have to drink from it. 1

Thanks for your consideration.

Sincerely,

John O'Neill

John O'Neill
1713 Oak Hill Dr.
Madison, IN 47250-1750

PH: 812-273-1600

MD003

MD003–1 **General SPD EIS and NEPA Process**

The Portsmouth and Paducah plants have not produced fissile materials since 1992; the Oak Ridge plant is shut down. These plants produced enriched uranium for commercial nuclear reactors.

The fate of the gaseous diffusion plants at Portsmouth and Paducah would not be affected by the surplus plutonium disposition program. Section 4.30.3 analyzes the conversion of depleted uranium hexafluoride, from a representative site (Portsmouth), to uranium dioxide, which would be used as feedstock for immobilization and MOX fuel fabrication. DOE currently has a large excess inventory of depleted uranium hexafluoride, therefore the gaseous diffusion plants do not need to operate to support this program. Further, DCS has the option of acquiring uranium dioxide from another source.

HUMMERT, VIC
PAGE 1 OF 1

☑ **YES!** Keep Texas Panhandle water, air, and soil safe from radioactive pollutants | 1

What does Rocky Flats have to do with

☑ **NO!** To any plutonium processing in the Texas Panhandle | 2

a workable energy policy for the USA? | 1

☑ **YES!** To minimal handling and processing of plutonium and other nuclear materials | 3

☑ **NO!** To converting military plutonium for use in mixed oxide (MOX) fuel | 4

Signed: Vic Hummert

CD0059

CD0059–1 **Alternatives**

Sections 4.17 and 4.26.3 describe the potential effects of the maximum impact alternative on air quality, water resources, and soil. These analyses indicate that the impacts of construction and normal operation of the pit conversion and MOX facilities on air, water, and soil at Pantex would likely be minor. To avoid future contamination, DOE would design, construct and operate the proposed surplus plutonium facilities in compliance with today's more stringent environmental, safety and health requirements.

CD0059–2 **Alternatives**

DOE acknowledges the commentor's opposition to the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

CD0059–3 **DOE Policy**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. DOE is committed to public and worker safety during the construction, operation, and deactivation of the proposed surplus plutonium disposition facilities, and would implement appropriate controls and procedures to ensure compliance with all applicable Federal, State, and local laws, rules, regulations, and requirements.

CD0059–4 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in weapons again.

Gary Research
Operations Research
Robert Gary, MBA, JD, Principal Investigator
2211 Washington Ave. Silver Spring MD 20910-2620 Tele: (301) 587-7147

Howard Canter
(Attn: Mr. Dave Knowlton)
Office of Fissile Materials Disposition
U.S. Department of Energy
Washington, DC 20585

July 21, 1998

Dear Messrs Canter and Knowlton,

First I would like to thank Mr. Dave Knowlton for taking the time to speak with me today by phone. I really did believe in 1997 when my book, The Case Against MOX, was presented that this ill-conceived program had been put to bed, but I was wrong. I now find that DOE is going through a whole new round of environmental impact statements to foster the program of Ex-Secretary Hazel O'Leary.

So I now have to petition DOE for redress of grievances with regard to the areas in which they were unfair to me in answering my prior questions, and in regard to systematic objections I have to their entire EIS process. I will have answers to the questions in this letter if it's the last thing I ever do in this world. It might save us all a lot of time if you just sent me a letter back with the answers. 1

(1) First of all I want to ask about the deal with Yeltsin government in the Russia. Now, if I understand that right we have to destroy our weapons grade plutonium because Mr. Yeltsin insisted on it and he wouldn't make the deal unless we agreed to do it just that way. Is this true? Isn't it in fact true that it was Mr. Clinton and the American delegation that initially proposed the MOX plan, not Mr. Yeltsin, and it was us that insisted in working this into the agreement not the Russians, and it was because of internal politics and priorities within the White House and within the newly constituted DOE with all the new appointees formerly with the Natural Resources Defense Council and other environmental groups in Washington DC? If I ask Mr. Yeltsin about this is he going to say that it was him that insisted on the MOX program as a condition of any deal, or is he going to deny that, and say it was an American proposal, and an American idea? 2

MD007

MD007–1 **General SPD EIS and NEPA Process**

DOE makes every effort to respond to each comment in a fair and appropriate manner and regrets if previous responses were not satisfactory. DOE acknowledges the commentor's opposition to the MOX approach. The *Storage and Disposition PEIS* ROD outlines DOE's decision to pursue a hybrid approach to surplus plutonium disposition that would make the plutonium inaccessible and unattractive for weapons use. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in weapons again.

MD007–2 **Nonproliferation**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. We must ensure that nuclear arms reductions cannot be easily reversed, politically or legally, by making such reuse technically difficult, time consuming, and very costly. Sensitive negotiations between the two countries have indicated that although the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials. Close cooperation between the two countries is essential to achieve the objectives of nonproliferation and arms reduction and to ensure secure management of nuclear weapons materials.

GARY RESEARCH OPERATIONS RESEARCH
ROBERT GARY
PAGE 2 of 5

(2) From my conversation with Mr. Dave Knowlton this day, I understand that only the newer of the American reactors will be used to burn MOX fuel. This seems to be a concession to the fact that embrittlement is a genuine concern in using MOX pellets in a reactor core. Is that correct. If embrittlement is not a concern of any kind, then why not use old, middle aged, and new reactors? Why limit the MOX program to the newer reactors. If embrittlement is a concern and MOX pellets are placed in new reactors won't this fuel age them prematurely. Won't it cost the utilities money to replace parts and to take extra safeguards against embrittlement? Won't the utilities pass these costs on to somebody? Would that be the ratepayers or the shareholders? Americans either way right? 3

(3) I understand that there are estimates on the total volume of low level waste that the MOX program will entail. What are they? What is the scenario for dealing with these low level wastes. Are the Governors in the states where they are generated going to be stuck with them? Is the Federal government going to take responsibility for them? Where will they be placed, Yucca Mountain not being open, and Barnwell be available only to a small a select group of utilities. Will the governors have to fend for themselves somehow? 4

(4) NASA and DOE were very unfair to me in answering my issue about the potential value of Plutonium-239 as a propulsion source for interplanetary travel in the next century. Every effort was made to create confusions between Pu-238 and Pu-239. Additional efforts were then made to create confusions between propulsion systems and onboard electrical power systems. Finally my ideas were compared to matter and anti-matter systems which is to say they were written off utterly and placed in the file of ideas that had previously been written off. Then DOE turned around and told me that they were in regular consultation with NASA about any possible uses NASA might have for nuclear materials. Well, listen I can sympathize if you don't understand my ideas. There is the Library of Congress, there are many sources of information, go get information, learn the difference between a propulsion system and an RTG and a thermionic battery. But telling me you are in regular consultation with NASA over the issues I raise is plainly untrue and unfair. It's like saying, "Your consent is not required, we know what we are doing, we are having meetings with the right people, so but out". As you well know from our Declaration of Independence governments derive their just powers from the consent of the governed. When you treat me unfairly you take the government of the United States off the path of just powers and you divert it onto the path of violent usurpations. That is not your intent, I know. So pay attention to my points and answer them as if there was a possibility that they might contain some element of intelligence outside of your previous considerations. If in the 21st century this country has to go back a refine the Plutonium-239 that you are about to destroy so that interplanetary craft can be propelled around the solar system, your efforts in the MOX 5

MD007

MD007–3 **NRC Licensing**

Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel. Commercial reactors in the United States are capable of safely using MOX fuel. In fact, several reactors in Western Europe have been operating successfully with MOX fuel for over 10 years. Although MOX fuel results in a harder neutron spectrum than LEU fuel, and thus a greater fluence of high-energy neutrons on the pressure vessel, this effect is well understood and has been shown to be within the capability of pressure vessels to withstand. It is the remaining operational life of reactors which formed the basis for DOE's selection process. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

Reactor vessel embrittlement is a condition in which the fast neutron fluence from the reactor core reduces the toughness (fracture resistance) of the reactor vessel metal. Analyses performed for DOE indicated that the core average fast flux in a partial MOX fuel core is comparable to (within 3 percent of) the core average fast flux for a uranium fuel core. All of the mission reactors have a comprehensive program of reactor vessel analysis and surveillance in place to ensure that NRC reactor vessel safety limits are not exceeded.

MD007–4 **Waste Management**

Appendixes H.1.2.3, H.2.2.2, H.3.2.2, and H.4.2.3 provide estimates of the amounts of LLW that would be generated by operation of the MOX facility and describe the LLWs that would be at Hanford, INEEL, Pantex, and SRS, respectively. These sections also describe facilities that may be used to treat, store, and dispose of LLW. DOE would be responsible for disposition of waste generated by the surplus plutonium disposition program. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic

repository. Yucca Mountain, Nevada, is being studied as a location for a potential geologic repository for HLW and spent fuel. There are no plans to place LLW in Yucca Mountain.

MD007–5 **Other**

As discussed in response MD007–1, DOE makes every effort to respond to each comment in a fair and appropriate manner and regrets if previous responses were not satisfactory. DOE acknowledges that there may be future uses of plutonium 239 as the commentor suggests, but the growing threat of nuclear proliferation is of immediate concern, requiring that attention be focused on ensuring the safe, secure, long-term storage and disposition of surplus weapons-usable fissile plutonium. The activities proposed in this SPD EIS would implement U.S. policy on disposition and nonproliferation of surplus plutonium.

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ROBERT GARY
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program will be regarded as a gargantuan piece of technology mismanagement. No one is going to want to hear about how Yeltsin made you do it -- which I expect he will deny. Ms. O'Leary will not be there to take responsibility as she is not there even now. 5

(5) The Pollyanna vision is that the MOX Program will somehow take weapons grade Plutonium out of this universe so that no bad people can make any bad bombs with it anymore. That myth may wash at the Unitarian Church but it is much too dumb for a serious government to believe or make into a basis for policy. The MOX process only destroys 40% of the Plutonium by fissioning it. The rest is still in the spent fuel. The French who are experts in reprocessing hot spent fuel just like that could and would in ten days make a contract with the U.S. to trade us weapons grade plutonium for spent fuel bundles. The Russians know this, everyone does. So the whole Pollyanna vision premise for the MOX program is a hoax. 6

(6) Another hoax is the environmental impact statement process. Here's why. When they want to know if anyone thinks the MOX program is a good idea they go to the five towns in this nation where hundreds and thousands of people will be employed, and paid, and be able to send their kids to college based on their work making MOX pellets. Of course anyone is free to come to these meetings and speak at Hanford, or at Pantex, etc, but it is a very biased crown that DOE knows is going to be there. They couldn't sell their case to a crowd that was on the level. They can only sell their case to the direct beneficiaries of the program. It would be like holding hearings on whether tobacco smoking is a good idea in Virginia. Now at the same time DOE makes sure that no information is released about which commercial nuclear power reactors are likely to get the MOX pellets. Why? Because that would tend to create a local constituency against the MOX program. People might say, "Well gee we have got enough to worry about with a nuclear reactor here we don't want to worry about taking plutonium out of nuclear bombs and putting it in the reactor." DOE says "We can't talk about what consortiums are interested in the request for proposals because that's in the RFP process". Usually the whole RFP process is public information as well it should be. But in this case it is secret information, and why? Could it be that DOE wants to have the fullest imaginable public input as long as they are singing to the choir at Hanford where people are going to make money out of MOX but DOE plans to keep the whole RFP thing secret and just slip a few MOX pellets into people's local nuclear reactors with no public input from anybody who might have a harm a danger or an injury or a cost from the MOX Program. If that selective process of revealing an collecting information doesn't make the EIS process a hoax, what would? It does. DOE is spending millions of dollars publishing millions of pages of EIS documents when in fact it is avoiding all genuine public comment from anybody that might have a reason to oppose this ill-starred scheme. 7

MD007

MD007–6 **Nonproliferation**

It is true that in the MOX approach only a fraction of the plutonium would actually be consumed in the reactor; but the remainder would be an integral part of massive spent fuel assemblies that would meet the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The spent fuel assemblies would be so large and radioactive that any attempted theft of the material would require a dedicated team willing to suffer large doses of radiation, and substantial equipment for accessing and removing the spent fuel from the storage facility and carrying it away. Recovering the weapons-usable plutonium from spent fuel could be done in a reprocessing facility, as suggested; but it should be kept in mind, however, that approximately 726 t (800 tons) of plutonium exists in spent fuel in the world today. If weapons-usable plutonium were transformed to plutonium in spent fuel, it would become only one part of a much larger inventory and would not present a significantly more attractive target for diversion than the existing plutonium in spent fuel.

MD007–7 **General SPD EIS and NEPA Process**

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected sites and thus with the populations most directly concerned. Because it was known that not everyone wishing to comment on the proposed action could attend the hearings, DOE provided several other means for providing comments: mail, a toll-free telephone and fax line, and the MD Web site. All comments, regardless of how they were submitted, were given equal consideration.

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and

It appears that the MOX program is very much alive and well at DOE, more's the pity. I want these questions answered, and I'll do what it takes to get them answered. Intellectual engagement is my only strategy for derailing this program. I don't plan to sue, to bring administrative proceedings, to call for Congressional hearings, to go to the papers, or to write a book. I only plan to talk to you, to petition you for the grievances arising from my past questions that have not been treated with respect, and to request firmly but fairly that you answer my present inquiries fully and candidly. You could not go wrong by assisting the informed consent process and supporting the idea that the powers you exercise are just powers. Snubbing me is not going to work. If it were going to work, it would have done so in the first five or ten or fifteen years of my career as an anti-nuclear lawyer. On the other hand, if you can satisfy my objections with reasonable answers, as you have sometimes done in the past, I will cease from them. If I cease, there will be very few other objectors that could or would plausibly stand in your way. 1

Sincerely,

Robert Gary
Attorney at Law

MD007

irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

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ROBERT GARY
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Mr. Dave Knowlton
Office of Fissile Materials Disposition
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

July 23, 1998

Dear Dave Knowlton,

You know I object to the MOX program and that I want DOE to be responsive to my questions, and that I am ready to make that happen. It seems fair to me that you should have a better understanding of my premises than you might have based on the very short record of correspondence between us. So in fairness I should be more complete in stating my objections and their foundations.

You have my letter of two days ago (additional copy enclosed) so you know that some of my issues pertain to the matters of embrittlement and low level waste. You also know that I am very concerned about possible misrepresentations by DOE concerning the source of the whole MOX idea which was integrated into the deal we made with Yeltsin. If there's a valid treaty I as an American am bound to respect it, but if Yeltsin is just a cover for a hairbrained scheme that needs to be questioned, I am bound to question it. As the appointees from the Natural Resources Defense Council well know and would all affirm, it is natural for the outsiders to become the insiders and one must always be cautious in the treatment of this day's outsiders lest they become tomorrow's insiders. 1

Prior to yesterday's letter, I have also raised an objection based on setting a precedent for international conduct. According to the U.S. Navy I am a fully certified and qualified international lawyer and here's what I want you to know. If we play about with plutonium in power reactors then Libya and Pakistan and Syria and Sudan and Patagonia will come around tomorrow and tell us about their sovereignty and how they have a right to do the exact same thing, and the next day it will be North Korea and Cuba. Think about the situation then. You say it's not your job. But you are the man who is going to do this deed. If you have no connection with it and no responsibility for it who does? Nobody? So we catch these guys red handed with plutonium and they say it's part of their MOX program and then what? The world, you think, will be far more secure with 15 bad

MD149

MD149–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in weapons again.

Specific domestic and international safeguards would be developed for the proposed surplus plutonium disposition facilities; these are the subject of ongoing sensitive negotiations between the United States and Russia. Because the surplus plutonium is weapons usable, the safeguards would include physical inventories as well as several active and passive measures to guard against theft and diversion.

DOE makes every effort to respond to each comment in a fair and appropriate manner. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

actor nations having the perfect cover story for their possession, transport, processing, and fabrication of plutonium in and around their nuclear reactors. You say IAEA has billions and trillions of inspectors that will straighten all of this out, separate the truth from the falsehood and undo the effects of our setting this stupid precedent. I say not. So we disagree. But you should know that the international law precedent is an issue with me even if the State Department has never thought about that, because there are more things in heaven and earth than the State Department has thought about or knows in its philosophy. 1

My ideas about space travel are truly far out. What I say is this. It is inconceivable that we could lift through the earth's atmosphere all the reaction mass needed for solar system development. If there is some valuable thing somewhere in the solar system we are going to need reaction mass from moon water and Europa water to get there, acquire it, and bring it back. But beyond that we are going to need the best energy source we know which is the hydrogen bomb. What's required is bombs the size of sandgrains made of plutonium-239, polonium, beryllium, and tritium, detonated by phased lasers at the gigawatt picosecond level. This is the heat source. The moon ice provides the reaction mass. Newton says you need both, and I'm telling you it is not possible to lift both through the atmosphere you can only lift the energy source and that has to be at least 50% plutonium 239 in sandgrain sized particles at the ends on fiberoptic laser conductors (like a hair with a grain of sand at the end). This goes into a block of ice and the whole assembly is detonated in a gattling gun arrangement at the rate of about 10 per minute to produce thrust. 2

Take away the plutonium and it doesn't work. You see plutonium is important for setting off tritium. This is the highest and best use of the stuff, not power reactors. The MOX program deprives the citizens of this country of a precious strategic mineral that they have paid for and taken risks to acquire. It takes away one of our opportunities in the 21st century.

Now, I recognize, and I did recognize when we spoke, that without plutonium you need uranium-235 to make a power reactor work, and that has to be refined at great cost and risk at the Y-12 plant at Oak Ridge, and that's not a minor consideration. So let's be candid on this one point. I know that the MOX program lends a whole new lease on life to the power reactor program in the U.S. I want the power reactors closed down based on their original lease on life and not the extended lease that the MOX program would give them. They are dangerous. They are dumb. They were an example of the same kind of "turning the bad into the good" technology mismanagement which is present in the MOX plan. What we have in the MOX plan is just a new Atomic Energy Act of 1957, and surprisingly enough the people pushing for it are not Yeltsin at all but the actual children of the scientists who pushed for the Atomic Energy Act of 1957. There are the real facts you see? 3

MD149

MD149–2 **MOX Approach**

DOE acknowledges that there may be future uses of plutonium 239 as the commentor suggests, but the growing threat of nuclear proliferation is of immediate concern, requiring that attention be focused on ensuring the safe, secure, long-term storage and disposition of surplus weapons-usable fissile plutonium. The activities proposed in this SPD EIS would implement U.S. policy on disposition and nonproliferation of surplus plutonium.

MD149–3 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Uranium is mined, milled, and converted to uranium hexafluoride before it is enriched in the 235 isotope at either the Portsmouth or Paducah gaseous diffusion plants operated by the United States Enrichment Corporation. Uranium is no longer enriched at Oak Ridge. The MOX approach is not intended to affect the viability of nuclear power. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

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I want my questions answered not because I need information but because I want you to have the information, you and Ambassador Richardson, an intelligent man, a man with no record of managerial incompetence, quite the contrary, a man of proven good judgement. You answer the technical questions and let him make the policy decisions and don't be amazed if he comes out my way.

Jefferson wrote extensively on a concept that he had called the insolence of office. This is a feature that comes on bureaucrats who are just ordinary people but once elevated into office they really don't see why they should suffer the indignity of having the respond to mere citizens. I don't even have an affiliation with an environmental group, so I am the merest of citizens. But I want you to trust me and answer me fully, candidly, and in good faith. I sense that left to your own devices, you would do this. So please, just do it. Know that you are serving the nation at least as much by answering me as by forging ahead with the MOX program while disregarding my points. I've been doing this work for 15 years. I have 10 years of training in science and a 160 I.Q. I've put a lot of thought into the points I've presented and talked about them at some length with other thoughtful people including some at NRC. Please think of me as a colleague not an opponent. I have never gone to the press, never published a book or an article on this subject, never spoken to the Congress except on radioactivity as a medical issue. So give me the benefit of the doubt ---- and real answers. 1

Thank you for your time and consideration.

Sincerely,

Robert Gary, Esq.

MD149

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Howard Canter
(Attn: Mr. Dave Knowlton)
Office of Fissile Materials Disposition
U.S. Department of Energy
Washington, DC 20585

July 30, 1998

Dear Messrs Canter and Knowlton,

I have some additional objections and questions related to the MOX scheme based on my review of DOE/EIS-0283-D which Dave Knowlton was kind enough to send to me on July 22, 1998.

As you will recall from my compilation of letters The Case Against MOX dated September 1, 1997, there was strong objection to DOE/EIS-0229 page M-403 where the chance of a serious accident was rated as 1 in 10,000,000.

This is what I call Dr. Norman Rasmussen style statistics. You break the hazardous event down into 20 parts. Then you assign the smallest conceivable number that any group of lawyers at DOE might make a case for to each of the parts. Then you multiply the parts so that 1/1000th of 1/10,000th, of 1/50th, of 1/200th etc etc until you get a figure like 1 in 10,000,000 for the probability of anything going wrong.

This is false, you see? We have about 107 reactors in the U.S. and there are about another 50 in the world, so figure 200 reactors and nuclear plants of various kinds. This is 1998, and the nuclear programs got started in about 1957 so figure 40 years of experience with 200 reactors, that's 8000 reactor years. We've had five serious accidents that released substantial radiation offsite. So figure 5 in 8000 reactor years. There's no way that you can suggest that the chance of a nuclear accident that releases substantial radiation offsite if 1 in 100 Billion, or that the maximum exposure that anybody could be exposed to is 1 ten billionth of a dental x-ray. 1

Ask yourself this question. If a reactor blew up sky high every year for the next ten years and killed 100,000 people each time, how would your figures given in your EIS change? Now you either have an answer to this or your don't. If you are honest, I think you will tell me that the figures would not change. You would still say that a nuclear accident at a facility would be projected at one every 100 billion years -- right. And why? Well,

FD108

FD108–1 **Human Health Risk**

DOE acknowledges that risk can be defined and measured in different ways. The risk assessment methodologies and assumptions employed in this SPD EIS are prepared and reviewed by qualified professionals and are also subjected to independent review. DOE believes that these methodologies and assumptions adequately predict the risk of reactor accidents. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use MOX fuel. Calculations are performed with codes that have been used and verified repeatedly over a period of several years. These codes are also periodically updated and calibrated.

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it's because your numbers have no relationship whatsoever to the real world or anything that has actually happened in the real world in the last 40 years. Your figures relate to hypothetical imaginings in the mind of Dr. Norman Rasmussen a person paid by the government to provide his version of the truth which reasonable persons of ordinary intelligence might well question. 1

Now comes the Department of Energy with it program that Dave Knowlton says is a $2 Billion program and which I say is going to cost $300 Billion. This program requires building a facility to create MOX pellets. This is a whole new venture for the USA. We don't have any plants like that. This would be a whole new kind of nuclear facility for us. 2

A concern that a reasonable person might have is, "What sort of health effects might be generated by such a novel venture?" "Could there be bad health effects?" "What is the likelihood of producing bad health effects, or maybe killing a few hundred thousand Americans by uptake of alpha emitting radionuclides, not that the government hasn't done this before, (see Johnsrud v Carter 620 F 2d 29 and Punnett v Carter 621 F 2d. 587). 3

Who carries the ball for the government on this point which no person of ordinary good sense would say is a detail. We look to Volume 1 Part B page 7-4 to discover that the Human Health Risk issue is handled by a person with a B.S. degree received in 1991.

Do I think that after collecting many trillions of dollars from U.S. citizens every year the government couldn't get a Ph.D. to say the same thing? No, I realize that in an "anything for money" world the government could get a veritable Niagara Falls of Ph.D.'s to say prosaically the same things that this very youthful Batchelor's degree holder has said, and I assume that he is operating in the best of good faith, and doing as he was taught in the best way he can. What I say is this. It's not adequate. DOE has no rational basis to do the calculations this way. There's not a trillionth of a billionth of a chance that one person could get a hundredth part of a dental x ray from this scheme and DOE knows it. This project is dangerous, and there's no way to know exactly how dangerous it is. 4

But consider this point. When Dr. Norman Rasmussen was setting the precedent for non-rational calculation of risks based on hypotheticals projected on hypotheticals projected on hypotheticals and with no regard whatsoever to actual experience in the real world, the one we live in, people were much more reliable than they are now. We live in a dysfunctional society. Over half of the jobholders in this country are marginally dysfunctional in one way or another. There's some part of their jobs that just doesn't get done, maybe they are slacking, or asleep at the switch, or corrupt nepots that got their jobs on a non-merit basis, or illiterates that weren't pick up in the training program, or one thing or another. Every serious nuclear accident so far has occurred by the dumbest and most 5

FD108

FD108–2 **MOX Approach**

It is true that MOX fuel has not been produced commercially in the United States. The fabrication of MOX fuel and its use in commercial reactors has been accomplished in Western Europe, and this experience would be used for disposition of the U.S. surplus plutonium.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

FD108–3 **Human Health Risk**

This SPD EIS identifies and analyzes potential human health impacts that might result from construction and normal operation of proposed surplus plutonium disposition facilities. The Human Health Risk and Facility Accidents sections in Chapter 4 of Volume I discuss the effects on the public due to potential radiological releases. DOE policy places public safety above other program goals, and requirements have been established to protect the safety and health of the public. The protection of members of the public against accidents is considered by DOE in the design, location, construction, and operation of its facilities. Additionally, independent external oversight of activities is provided by the congressionally mandated DNFSB. The MOX facility and the reactors selected to use MOX fuel would be licensed and monitored by NRC.

FD108–4 **Human Health Risk**

Risk assessment methodologies, assumptions, and personnel qualifications are addressed in response FD108–1.

unpredictable of human errors. But none of those people are going to be working in the MOX plant right? The MOX plant is going to be build in the Dr. Norman Rasmussen Utopia where all persons perform their functions within predictable guildlines for incompetence, stupidity, malice, and criminality. That's the world where there's a billionth of a trillionth of a chance that anybody could ever be exposed to as much a one dental x ray's worth of ionizing radiation because of the MOX scheme. 5

I have tried to be reasonable with DOE. I have offered to come and present my views in person and be questioned on them by expert members of DOE's staff. I have submitted protests against this ultra-hazardous program for three years, to no effect. I have suggested and in fact outlined in detail a higher and better use for the Plutonium-239 in question here. Furthermore, I have always supported DOE when they were right. I have vigorously supported the Yucca Mountain Project. I have vigorously supported the vitrification or filled canister or immobilization alternative (the part of the dual track that doesn't involve making MOX pellets and putting them in commercial power reactors near American cities where lots of Americans live -- so far). As a person of reason I can only appeal to other persons of reason. If I were a person of influence, perhaps I could appeal to persons of influence, but that avenue is not open to me, due to circumstances of life. 6

DOE is a law unto itself. It does what is decided by DOE. It is presently in transition because of the appointment of an extraordinarily able person -- Ambassador Richardson -- to be its Secretary. There is now an opportunity for the technology mismanagement errors of the past two Secretaries to be rectified by the use of judgement and reason and good sense, which Bill Richardson has in abundance and has proven on 100 occasions. So let's do it. Let's make changes. Let's put the red light to bad ideas of the past and let's go ahead with what's good. Please answer my questions. Please meet with me and hear me out. Please redress my grievances.,

Sincerely,

Robert Gary
Attorney at Law

cc: Ambassador Bill Richardson
Senate Energy Committee
Secretary Carol Browner

FD108

FD108–5 **Human Health Risk**

The analysis and data in this SPD EIS and the supporting conclusions of minor impacts and sufficient safeguards have been prepared and reviewed by qualified professionals and also subjected to independent review. Calculations are performed with codes that have been used and verified repeatedly over a period of several years. These codes are periodically updated and calibrated. In regard to the MOX facility, DOE intends to design, construct, and operate it in such a fashion as to provide a level of safety that meets or exceeds applicable Federal, State, and local requirements. The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

FD108–6 **DOE Policy**

DOE acknowledges the commentor's support of Secretary Richardson, as well as interest and participation in the surplus plutonium disposition program. DOE's decisionmaking process takes into account all public input, and each comment received is given equal consideration.

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Howard Canter
(Attn: Mr. Dave Knowlton)
Office of Fissile Materials Disposition
U.S. Department of Energy
Washington, DC 20585

August 3, 1998

Dear Messrs Canter and Knowlton,

I have some additional comments that I would like you to take into account when you answer my letters on the subject of MOX of the past two months.

I have criticized the mathematics used to assess the probability of a serious escape of plutonium offsite from the proposed MOX plants (three types). This offsite migration of Pu-239 might be expected to cause radiogenic cancers, particularly if Dr. Goffman and Dr. Tamplin's "hot particle" theory is true as it applies to microscopic particles taken up into the lung a delivering an alpha dose over several years with high linear energy transfer and high ionization and thus high carcinogenic potential. This has been observed in people who were at NTS in the 50's even though I know the government will not admit this truth.

It would be fair and correct for me to proposed some alternative mathematics, so here is what I suggest. In 1940 when they built Hanford they came up with very detailed mathematics to show that it was safe. The isodose curves of alpha emitters around Hanford today speak for themselves and tell a different story. Whoops, well I guess that one wasn't safe. In the 1950's and 1960's when they built Rocky Flats and Pantex, again there were mathematicians with elaborate tables of numbers to suggest that the chance of any substantial leakage of alpha emitters offsite was 1 in 10,000,000, and such a thing might be expected to happen once every 10,000,000 years at the most. Well now it's only 40 years later, not 10,000,000 years, and there's been a fire at Rocky Flats and there have been major MUF's at Pantex, and Dr. Edward Martell, of Boulder Colorado tells me that the isodose curves around the Rocky Flats facility can be charted across several states eastward from the site. Whoops, I guess those weren't safe either. 1

So here's some alternative math for you. Please remove the math that's in the environmental impact statement and put this in its place. The probability of a major escape of alpha emitters from

0RD18

ORD18–1 **Human Health Risk**

Because a "serious escape of plutonium" from a MOX facility is not defined, it is assumed to be an amount that potentially causes LCFs among the population within 80 km (50 mi) of a site. Of all the MOX facility accidents analyzed with a scenario frequency of greater than 1 in 10 million per year (Appendix K), only the aircraft crash at Pantex and the beyond-design-basis earthquake at each of the sites would be expected to cause LCFs in the public. For the earthquake, there could be up to 24 cancer fatalities; for the aircraft crash, up to 27 cancer fatalities (Tables K–8, K–9, K–13, K–11, and K–19). The probability of a serious escape of plutonium off the site for these two accidents is quite small. The probabilities have been shown to be below 1 in 1 million per year for the airplane crash and below 1 in 10,000 per year for the earthquake, based on scientifically accepted prediction methods discussed in Appendix K.

The contention that the alpha particles would cause hundreds or even many thousands of cancers has no scientific basis. The potential impacts on people living in the areas of the candidate sites for the MOX facility have been calculated using models accepted within the scientific community. The MACCS2 computer program (Appendix K.1.4.2) was used with conservative input parameters. For example, it was assumed that the meteorological conditions at the time of the accident were so severe that they would only be exceeded about 5 percent of the time. The doses predicted by MACCS2 were converted to LCFs using the risk estimators discussed in Appendix K.1.4.3. These risk estimators are probably on the conservative side (i.e., they overpredict adverse health effects), but are accepted within the scientific community as reasonable, predictive values. The basis for the "high carcinogenic potential" is not accepted by the scientific community at large.

DOE acknowledges that past practices at its sites led to environmental contamination with some potential for health effects on local residents. However, no major adverse impacts to the public or workers as the result of operations at Hanford, NTS, Pantex, or RFETS—sites specifically cited by the commentor—have been demonstrated (refer to Sections 3.2.4 and 3.4.4 of this EIS for Hanford and Pantex and to Sections 3.3.9 and 3.8.9 of the

the proposed MOX plant(s) over the next 50 years if they are built, is around 95% to 100%. The probability that substantial quantities of Pu-239 will be airborne, be suspended, and be resuspended over the course of decades after those quantities escape from the proposed MOX plant is 100%. The probability that those particles will cause cancer, specifically lung cancer, but also soft tissue cancers in hundreds, perhaps thousands, perhaps tens of thousands of Americans living in several states over the 50 year period is substantial, which is to say more than 50% at the low end of the range and more than 10% at the high end. 1

The probability that the safety assurance calculations that were given in 1940 for the Hanford Plant were correct is zero. The probability that the safety assurance calculations that were given for the Rocky Flats and Pantex Plants were correct is zero. The probability that the tables of numbers in your current EIS for the proposed MOX plant, based on the same Rasmussen style approach, are correct is close to zero.

Beyond the infirmity of its math, the EIS fails on several other points which I should make more explicit as well. I see no designs for the facilities that will contain the low level waste over the next 250,000 years. But when those hot particles get into the environment, if they do, harm is done, you see? Those millions of cubic yards of low level wastes have to be guarded too, for 250,000 years, otherwise they will be acquired by terrorists or other malefactors, or they might be, creating a national security threat, you see? That's where your $2 Billion project starts moving toward a $300 Billion project. You know when they built Hanford they said that was going to be a $2 Billion dollar project too, but we've spent $50 Billion there in 60 years and our costs there have only just begun. See your EIS is not for the whole system, it's just for the parts you wish to present, and of course there are hundreds of pages going on and on about the sociological economic and racial breakdown of the people around the proposed plants. You've done a marvelous job from a civil rights perspective, but a terrible job from an engineering perspective, but you see plutonium is very unforgiving stuff, it may respond reluctantly to our best engineering efforts but it cares not one whit about civil rights or environmental justice or any of our other fuzzy notions about what counts in disposing of it. 2

I have raised another point that I fear you will not be sensitive to. This is a macro-project. It takes place over many decades. It has consequences reaching well beyond the next century. I have said that we have a problem in that connection arising from failures in our educational system and in the entire process of inculcating ethics into young people. Included here would be the work ethic in the Puritan sense, but also the competence ethic, the truthfulness ethic, the drug-free ethic, and the scientific ethic. Our particular society is not producing the kind of people it produced from 1945 to 1969. You may think you can shrug that off, but it is an important point. It suggests that we should be 3

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Storage and Disposition PEIS for NTS and RFETS). A number of Federal and State agency agreements are in place to further reduce or eliminate sources of contamination, conduct additional research on health effects, and take corrective actions, as appropriate. DOE is committed to reducing any human health risks at its sites to ALARA levels, or levels agreed to with the appropriate regulatory agency. Any surplus plutonium disposition facilities would be designed, constructed, and operated to achieve these goals.

ORD18–2 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concerns regarding LLW disposal. Chapter 4 of Volume I and Appendix H address impacts of the construction and operation of proposed surplus plutonium disposition facilities on the waste management infrastructure at the sites. DOE has existing arrangements for LLW disposal at all of the candidate sites. Generation of additional LLW by activities associated with surplus plutonium disposition is not expected to substantially impact these existing arrangements. Impacts at the waste disposal facilities that would be used are evaluated in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and other site-specific NEPA documents.

LLW disposal facilities do not require special security to avert the diversion or theft of waste; the very low concentrations of special nuclear materials in waste (less than 100 nCi/g) would not be an attractive source of bomb-making material.

ORD18–3 **General SPD EIS and NEPA Process**

DOE acknowledges and shares the commentor's concern regarding the availability of highly qualified technical personnel. Accordingly, it has initiated a number of programs in schools throughout the United States to encourage mathematics and science literacy and to promote entry into technical fields. Fortunately, many highly qualified and dedicated people, of all ages, work in the DOE complex to support the surplus plutonium disposition program and other DOE missions.

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leery about setting in motion projects that will require a lot of people over a long period of time to perform just like the pros did in America's decades of technological and engineering preeminence. You say that the Europeans have lots of experience with this sort of technology, and I agree they do, but let's look at the Europeans, and particularly the French in this connection. Everybody that touches any control element in a French reprocessing plant is a graduate of Ecole Polytechique. This means they are the cream of the French educational system, and they are all members of the military. The French may be to the left of us politically, but in this area they are a national security state. We stopped being a national security state when the Berlin Wall came down in 1989. Since then we have been a civil rights state. Our dedication to privacy of information is so intense that it overides every other consideration for almost every job in the country, even jobs at the CIA if the Ames and Pollard cases are any indication of what goes on there. Not only are we not producing capable people to manage this technology over the next five decades, but we are not producing reliable people, or to be more precise people whose reliability is known or can be ascertained to a very high degree of certainty. You can't even trust your bag to a luggage handler at an American airport -- when they get it out of sight they take anything they find of value. You can't trust an engineer of a train to stay awake, or a truck driver to stay off pills, or an HMO or nursing home to be honest in rendering their services. We, the great "service economy" are in fact becoming a nation of negligent, sloppy, careless, untruthful, and often lazy people. This matters because good technology management requires a match between the tasks to be accomplished and the personnel who will perform those tasks, and plutonium is very unforgiving stuff -- you think your boss doesn't take any excuses -- but plutonium is the sternest taskmaster of all -- it takes no excuses. We are rapidly becoming a country of sea-lawyers who spend half our days making excuses for the things we didn't do, or didn't do right. This creates a mismatch. The mismatch creates a reliability issue on which you have no numbers. No numbers from the past will do (even if they were right, and they are not). New era, new people, new strengths, weaknesses, threats and opportunities for technology, but MOX plants are not among the realistic opportunities from this point looking forward with all the discernment that an informed, observant, intelligent mind can marshall. 3

I'm trying to clarify my issues to make them easy for you to address and deal with. If you understand my points deeply, you might be affected by them -- which, after all, is the intent of the EIS process. But even if you just want to defend MOX right down the line, at least you will be able to honestly and squarely address the gravamen of the positions I've taken in opposition.

Sincerely,

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ROBERT GARY
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Gary Research
Operations Research
Robert Gary, MBA, JD, Principal Investigator
2211 Washington Ave. Silver Spring MD 20910-2620 Tele: (301) 587-7147

2 Sept 1998

Howard Canter —

Enclosed is my memo of my meeting w/ Messrs Nutton and Cygelman at your offices today.

I am deeply impressed by the quality of these individuals.

I no longer oppose the MOX Program

You can count on my full support.

Sincerely,

Robert Gary

1

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MD150–1 **MOX Approach**

DOE acknowledges the commentor's full support of the MOX approach. It is unclear what accident the commentor is referring to in his discussion of accident frequencies. However, it seems that the figure of 1 in 10,000,000 per year is from the *Storage and Disposition PEIS*, and not the SPD EIS. There are only three instances of a 1 in 10,000,000 per year figure being used in the Facility Accidents section of the SPD EIS. It is used to exclude SRS from assessment of consequences due to aircraft crash. This is in accordance with DOE-STD-3014-96, *Accident Analysis for Aircraft Crash into Hazardous Facilities*. It is used to exclude vault material from the assessment of aircraft crash consequences into the pit conversion and MOX facilities at Pantex. This is also consistent with DOE-STD-3014-96. Finally, it is used as a lower bound for the frequency range of total facility collapse as a result of a beyond-design-basis earthquake. The upper frequency bound for this accident is assessed to be 1 in 100,000 per year. Details on accidents developed for the SPD EIS can be found in Appendix K.

Memo of Meeting at DOE (1000 Independence Avenue)
2 September 1998 (1300 hours till 1400 hours)
between
Robert Gary, Esq.
and
Mr. J. David Nulton and Mr. Andre Cygelman (DOE)

1. On the issue concerning the origin of the MOX idea: The idea was around in DOE prior to the arrival of Bob Alvarez. It pre-dated the Clinton Administration. The Russians actively selected the MOX idea over the canister and the bore hole ideas and said that it was the MOX alternative or no deal. So, we had the idea before the Clinton appointees got to DOE. The Russians knew about the MOX alternative in 1993. And they actively selected it as a basis for future negotiations to dispose of fissile materials. (This deals with interrogatories/requests 1-5)

2. On the low level waste issue it was pointed out that first the Federal government out of the Treasury would pay for on-site storage of low level wastes from the MOX plants, which are actually projected to be a fairly small volume. Low level waste from the reactors would be paid for by a consortium of utilities (indirectly by the ratepayers of participating utilities, I suppose). A second area of concern about low level waste was it use as a toxic material in the hands of terrorists. DOE representatives pointed out that for that sort of use it would be far cheaper to buy plutonium on the black market than to purloin it from a low level waste dump and then purify thousands of cubic feet of wipes, and gloves, to try to recover microscopic amounts of Plutonium. Also mentioned in this context was my position that the MOX security benefit was a chimera because the French could trade us metallic Pu for spent fuel bundles anytime, and they would make a deal to do so on 24 hours notice. This position was refuted by the fact that the reprocessed metallic Plutonium would contain Pu-240 which makes it useable for reactors but unusable for weapons. Pu-240 has an early releasing neutron which in a weapon would cause pre-detonation and thus a nuclear fizzle or misfire. The isotope Pu-240 would not be separated from Pu-239 in the French reprocessing as it currently exists. So the idea that we could trade our way back to weapons grade metallic plutonium anytime we wanted is false. Thus the security benefits of the MOX program are authentic, and I was wrong about this. (This deals with interrogatories/requests 6-12)

3. On the interplanetary propulsion issue it was pointed out that any needs that might exist in the 21st or 22nd century for plutonium-239 for interplanetary propulsion could be easily satisfied by recovering it from spent fuel using the advanced technologies that will be available in those centuries. The issue of quelling the Russian security threat posed by loose plutonium on the world market exists right now and is an immediate, clear and present danger. Therefore, since the intent of the MOX program is primarily to quell this immediate threat, which if not

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quelled will result in grave environmental consequences, it does not behoove us to worry about the precious national asset aspect of plutonium as a propulsion modality in the 21st or 22nd centuries right now. With new future technologies, we will have what we need for those (space propulsion) purposes. Right now, we need to dispose of this fissile material so that the Russians will do the same and it will not be available on a world black market. In this connection I responded, "Why not just buy the plutonium from the Russians?" DOE said, "The U.S. environmentalists don't want additional plutonium coming into the U.S." I suggested that an exchange of cash for Pu would be appropriate and any amount up to an including $100 Billion would be reasonable if it solved the problem. I also said that this would mean that we ramp up our MOX program, and it would make a Russian MOX program unnecessary (and a Russian sodium cooled breeder program impossible). [Note: I would have no objection to ramping up our MOX program if the program as practiced in the U.S were truly safe. I certainly would have no objection to bringing Russian bought Pu into the U.S. or the expenditure of funds required to do that, if the deal really got rid of the problem once and for all]. This general discussion disposed of interrogatories/requests 13 - 20.

4. On the subject of the 1 in 10,000,000 figure we had a conflict that was not resolved at this meeting. I suggested that the figure be revised in the final version of the EIS to read 1 in 1000 chance of a serious accident with significant offsite distribution of Pu. DOE said that much had been learned since the accidents at Hanford, Pantex, and the several fires a Rocky Flats, so that even though those prior accidents tend to indicate a higher probability of a major leak from the proposed MOX plants, that fact is partially offset by the fact that the way we develop safety systems and countermeasures and computer models and facility designs is by having accidents and then designing them out of new facilities. The borax experiments at the Idaho reactor were mentioned in this context. These involved intentional destructive testing of nuclear reactors -- letting them blow up in the desert to learn how and why that happens. Such experiments are not done today, but the same principle applies, which is that safety systems get better as a result of integrating data from past accidents. I said that the 1 in 10,000,000 figure was too high in light of the failures at Hanford, Pantex and Rocky Flats, and that as a prudential matter it would be unwise for DOE to present that figure to the Senate, or try to justify it. The most self-admitted non-expert Senator or staffer would feel completely comfortable rejecting that figure in light of past experience. I also said that a 1 in 1000 figure might just get by using the "better technology, better computer models, more real world experience" argument. I also said that the math should explicitly reflect a Bayesian analysis, (which is apparently the same as updating their benchmark codes), and that it should be signed off on by someone at MIT with 20 or so years of experience teaching post-docs, rather than a holder of a B.S. degree received in 1991. The math, in short, should be

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less astonishing, more intuitively credible, more explicitly presented, and presented by an authority that people feel is highly reliable. I mentioned Dr. Kemeny as an example of such a person. (This part of the discussion disposed on interrogatories 20 - 34).

One document was provided by DOE titled FY 1999 Congressional Budget Request -- Program Mission and which contains the following sentence: "The Administration will *not* construct new facilities for disposition of U.S. plutonium unless there is significant progress on plans for plutonium disposition in Russia." (emphasis added)

This was interpreted by DOE to mean that although a day for day pound for pound correspondence between the two programs was not required, the two programs were to be on parallel tracks, moving forward and making progress in parallel. This means some sort of rough equivalence of actual plutonium disposition, not day for day, pound for pound, but step by step, beginning by beginning type of parallel progress. Specifically it does not mean that the U.S. goes ahead with a facility in exchange for a Russian promise to go ahead with a facility (or otherwise dispose of their plutonium i.e. by selling it to us, for example). In other words the Russian progress is not "progress on plans" in the sense of progress in making plans, it is "progress on plans" in the sense of progress on implementing existing plans. [Note: It might be helpful to re-word the document, and future documents so that this potential semantic ambiguity is eliminated and replaced by crystal-like clarity]. The next sentence talks about "attaining reciprocal *actions* on the disposition of Russian surplus plutonium" (emphasis added)

The meeting with DOE was a success in the sense that it reduced five broad groups of objections down to one remaining objection (to the 1 in 10,000,000 figure). DOE's representatives left a strong impression of integrity, knowledge, and policy expertise. I was also impressed by the gravity of the consequences of not going ahead with MOX and by the "time is of the essence" aspect of the situation, which is obviously magnified by current developments in the past 10 days in Russia. DOE has basically converted an opponent to a supporter of the MOX program with the sole caveat that they clean up their numbers on the probability of a serious accident/offsite leak. It would be a good thing if the final version of the EIS said 1 in 1000, but DOE actually delivered a technology on the ground with a probability of 1 in 10,000 or 1 in 100,000. That way they say less but do more, and are the real good guys. I believe this is achievable. If so, it would be far better to scale the MOX program up, or extend its period of operation so that it could dispose of all U.S. and all Russian excess plutonium rather than embark on a world where the Russians start their own MOX program for light water reactors, or an even worse world where the Russians use their Plutonium in sodium cooled breeder reactors. It would be entirely fair for DOE to lay out the risks of those alternatives, and the risks of

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having Russian plutonium go on an international black market as part of the presentation on MOX and its relative merits. Whatever risks are present in MOX cannot be rationally assessed in isolation, but only in relation to the risks of the alternatives. The EIS document should be expanded to present these allelic risks even though they are not required to be presented in an ordinary EIS. This case is different. We are not the only actors in this environment, and our MOX program has as its basic purpose the control of the actions of one of the other actors whose actions might gravely affect the environment. Because of the unique circumstances in this case, the EIS should explicitly incorporate the full panoply risks and specifically the avoided Russian risks which acceptance of the U.S. MOX program entails. This would lay a foundation for the expansion of extension of the MOX program in the event that a Cash for Pu transaction with the Russians can be arranged. [Note: Time being of the essence, it might be reasonable for the President to open negotiations for such an exchange while he is in Moscow today, or in the diplomatic exchanges that will occur over the next 30 days implementing the statements made by President Clinton while he is Moscow i.e. "The U.S plans to give you money", or words to that effect -- the Russians have to stay on the course of free market reforms and sell their Pu to us for cash. They get what they need. We get what we need. MOX goes forward -- one program for all the planet earth, done by people who know what they are doing, and have been screen in a Personnel Reliability Program at the Rickover level based on a national security state not a civil rights state. Congress has to pass legislation that permits applicants to the MOX program to waive away all of their rights under all of the civil rights laws -- just like it was in Rickover's Navy. This danger of personnel unreadiness needs to be taken seriously. We don't have the same sort of people in the U.S. today as we had in 1945-1969. The culture has changed. MOX requires, not merely good people, but reliably competent people. Not merely reliably competent people, but people whose reliable competence can be established and verified to a very high degree of certainty in advance. This is impossible in a privacy oriented civil rights state. In other words if you want to build down the dangerous surplus plutonium left over from the days of the U.S. as a national security state, you need to create an enclave of people who are transported legislatively back in time to the rules, habits, laws, and rights of persons living at an earlier time -- say 1950. Only thus can the MOX program avoid the effects of modernity. Even thus recruitment will be extraordinarily difficult and hazardous from the perspective of making a reliability assessment error. The CIA and Naval Academy have already experienced this. Secretary Cohen is an expert on the subject, and I think would verify and confirm what I say here.

I affirm that this document, created from memory one hour after the meeting, is true and correct to the best of my knowledge, information and belief.

PA Atty #25552

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Memo for David Nulton at DOE
Reiterating in writing some of the more important points from our FONCON this day September 18, 1998 approx 1500 hours
From Robert Gary, Esq.

1. The EIS documents currently being produced on the MOX Program are in full regulatory compliance with the rules and statutes governing such documents but they are inadequate nonetheless.

2. NEPA and the entire body of EIS regulations came into existence during a period in American history when environmental impacts could be considered on a project centered and national basis. We are now living at a time when environmental impacts must be considered on a problem centered and global basis. There is no issue where this is more clear than the issue of controlling weapons grade plutonium worldwide. Accordingly, where an international agreement focuses on the global problem of black market plutonium and the probable bad environmental and human health consequences from failure to manage the plutonium on a global basis, it is highly appropriate for the Environmental Impact Statement to give communications primacy to this fundamental reality. Specifically, it is legally, morally, and politically correct to outline in the plainest terms the environmental consequences of not solving the problem on a global playing field. In particular it is correct to portray the international black market in weapons grade plutonium, the sellers, the entrepreneurs, the buyers, and the ultimate users. Furthermore, it is highly appropriate and prudent to present in some detail the environmental and health effects likely to be produced by plutonium explosive devices in the 1 to 100 kiloton range if detonated in Washington DC, New York, Chicago, Dallas, San Francisco, Boston and Los Angeles. To permit ancient NEPA regulatory provisions designed to prescribe the minimum content of EIS documents several decades ago to be a limit and a maximum content for an EIS on today's MOX Program is to disenable the DOE from successfully marketing this vital program through its most prominent and most widely read communications device. If it is not an actual Federal crime to present DOE's strongest arguments and reasons in support of the MOX program in the EIS then it seems to me it is a moral, logical, and policy imperative to do so. 1

3. Persons from Greenpeace or other environmental organizations who have no responsibility of any kind except to salve their own sense of *moral* righteousness must be presented in the clearest terms with the fact that MOX is a program for world peace, and that peace is good for the environment and that nuclear detonations in the atmosphere are bad for the environment. Blowing up New York City would be a bad thing for the entire ecological web in the United States and other places. Owls, whales, and snail darters would be killed. The false and artificial distinction between what happens in the USA and what happens on planet Earth is one that environmentalists should not make for two reasons. First, it contradicts their own ethics,

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MD286–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on the rationale for the surplus plutonium disposition program and the value of a global focus in related communications. Section 1.2 discusses the purpose of and need for the proposed action, including some of the international aspects of surplus plutonium disposition. It is not the purpose of this SPD EIS to market DOE's program for the disposition of surplus plutonium. The NEPA process does provide an important mechanism for obtaining public input prior to disposition decisions. In compliance with NEPA and the rules that implement that act, DOE prepared this EIS by obtaining comparable data on all of the alternatives, analyzing the data in a consistent manner using established procedures, and presenting the results in a full and open manner.

very plainly stated since the days of Rachel Carson and Silent Spring. We have been talking for years about the use of pesticides like DDT in South America. South America is not part of the USA. And what about the rain forests in Brazil? Has Greenpeace taken the position that it's only what happens to rainforests in the USA that they are concerned about -- they don't care what happens in Brazil, or have they taken some other position? The record is clear. Second, the environmentalists are demonstrating the "ethics of intention" rather than the "ethics of responsibility" when they try to distinguish between plutonium in the USA and plutonium in Russia. They think that if their intentions can be construed as *good* from some perspective, then there is no responsibility that attaches to the policy implications and consequences of what they say. This is a sort of mystical approach to the management a pressing global life and death problem. It is the sort of approach taken by persons who do not expect to be listened to, and should not be. 1

4. After January of 1999, when the new Congress takes their seats, there will be very few people on Capitol Hill who will pay the slightest attention to Greenpeace or any environmentalists. Therefore DOE should not worry about trying to convert them to a pro-MOX position. MOX is a program for peace. Peace is good for the environment. Those messages need to be taken directly to reasonable people and they can be, but only by becoming much more creative with the EIS communications opportunity. The environmentalists need to be put to their proofs. They should have to show that the risks of the MOX program (if done entirely in the USA, as I suggest) are greater risks to human health and environmental integrity than the risks inherent in an uncontrollable international black market in weapons grade plutonium (Pu that is 96% free of Pu-240, Pu-241, and Pu-242). We know that terrorists have planted bombs at the World Trade Center and at the Murrah Federal Building. We know that the Lincoln Tunnel was also on their target list. What would the environmental consequences be if one of those bombs were say a 10 kiloton device? That information has a right to be in the EIS for the MOX program. Why? Because it is your best and strongest argument for the program. It tells the real story of why you want to do the program. Readers of the EIS have a right to get the real story of why you want to do the program. Decisionmakers have a right to get your first line argument, your varsity presentation, your alpha team rationale, not some watered down, desultory, detail driven, infodump created by blind, uncreative, and rigid adherence to what are imagined (by lawyers) to be the technical requirements of NEPA and other statutes governed EIS document. If it's not a crime for DOE to put out and effective and success-oriented document, then it's a crime against reason not to do so in this case. The fate of the world hangs in the balance. Furthermore, I don't think you should confine yourselves to documents. I would put a major effort into a 30 - 45 minute video designed for an informed senior staffer on the Hill (who has no time or attention to give to a 5000 page EIS). I would make the video a formal part of the EIS. I would allocate 5 or 10 2

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MD286–2 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on the environmental rationale for the surplus plutonium disposition program and the need for effective public education in that connection. Chapter 4 of Volume I presents the potential environmental impacts of each alternative for accomplishing the proposed action.

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minutes in the video to all the stuff that's in the existing EIS documents (ineffective in terms of advocacy). The balance of the time would focus on the important information concerning your real and best reason for wanting the MOX program. What does Bin Ladden look like? What sort of ideas are in his head. What about Saddam Hussein, and Muhammar Quadaffi? That sort of context is required in order to appreciate the significance of an international black market in weapons grade Pu-239. Once the predicament has been presented, the MOX program becomes evident as the most feasible and most reasonable way to prevent the predicament from becoming a case of mass casualties. You should show pictures of what mass casualties look like -- maybe some of the ABCC black and whites taken after Hiroshima and Nakasaki. Now you show that although the MOX program contains its own risks and costs, those risks and costs are far smaller than the risks and costs of not going ahead with it. This sets up the metes and bounds of any rational discourse about MOX. People who want to oppose you must show that they have a better and more viable and less risky idea -- something more cost effective --- something more ethical. If they can't do that, they have no traction in opposing MOX. Senators will not be attracted to mystical arguments based on feelgood rationales if they can compare such arguments to your best argument. Congressmen want to live. Policymakers, as a rule, want what's best for the USA. Their more intelligent senior staffsers are the same way. Anybody living in Washington DC is bound to have some visceral connection to your best argument, if only you put it forward, as you did with me. 2

DOE must advocate effectively for this worthy program. It must disenthrall itself from the advice of lawyers whose only priorities are narrow bureaucratic compliance with outdated regulations unrelated to this unique program and its vital global goals. You need Mr. Ken Burns not Mr. Can't Do Bureaucrat. You need to communicate, not merely comply. EIS is your opportunity to do that. The foundation that has been laid so far is not wasted. You've gotten the narrow compliance part out of the way. Now it's time to put your real point across. If you could do it with me in 90 minutes, you can do it with any rational person, no matter how pro-environment or anti-nuclear they start out.

I recognize how intelligent you and Andre are, and how moral. I earnestly trust you will take to heart the things I say. Take them up, will you please, with Mr. Howard Canter. Given the opportunity, I would do more than talk about these things, I would make them happen.

Signed,

Robert Gary, Esquire

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ieer

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Comments of the Institute for Energy and Environmental Research (IEER) on:

The Department of Energy's

Surplus Plutonium Disposition Draft Environmental Impact Statement

July 1998

DOE/EIS-0283-D

Anita Seth, Global Outreach Coordinator
Hisham Zerriffi, Project Scientist
September 1998

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Institute for Energy and Environmental Research, Takoma Park, MD

Background/Introduction

At the end of the Cold War, the United States and Russia face an unprecedented and unexpected problem: surpluses of plutonium and highly enriched uranium (HEU), the two key materials used to make nuclear weapons.

The more difficult of the two is the surplus plutonium and the question of converting it into forms not usable for making nuclear weapons. The two most technically advanced options to meet the spent fuel standard are to immobilize the plutonium in a ceramic or glass form with high level radioactive waste to form a radiation barrier to theft or to create nuclear reactor fuel with it and use it in a commercial reactor (MOX). It should be noted that the MOX option does not "burn" the plutonium destroy it. While some of the plutonium will be fissioned in the reactor, plutonium is also created through neutron irradiation of the uranium which forms the bulk of the reactor fuel (this occurs in reactors fueled with low-enriched uranium as well). In fact, in some cases the plutonium left in the spent fuel is greater than the amount put into the reactor.[1]

The commonly-used yardstick to measure the resistance to theft and diversion of the final form of plutonium after disposition is the so-called "spent fuel standard." This criterion was identified by the National Academy of Sciences in their 1994 report, and means that the plutonium should be as inaccessible to theft, diversion, and re-extraction as plutonium in stored commercial low-enriched spent fuel. Both immobilization and the MOX program were considered by the NAS to have met this standard. However, the "spent fuel standard" inherently assumes that the plutonium will remain in spent fuel (or whatever form it has been placed into)--that is, that it be slated for geologic disposal. Taking into account the desire of Russia to reprocess its spent fuel and the risk of creating a plutonium economy in both countries, it is clear that immobilization is a better option for meeting the standard.

Minatom has stated very clearly on numerous occasions that it intends to reprocess spent MOX fuel, rendering the "spent fuel standard" effectively meaningless over the long-term. The U.S. appears to ready to allow Minatom to reprocess spent MOX fuel from the plutonium disposition program. The joint report notes that ". . .Russia will ultimately recycle any plutonium left in the [MOX] fuel. The U.S. objective of plutonium disposition is satisfied when the isotopic composition of the weapons-grade plutonium have been altered by irradiation, the fuel attains a significant radiation barrier, and the fuel is stored for several decades before reprocessing."[2] 1

DOE's Proposed Action

The Department of Energy analyzes 23 different alternatives in its *Surplus Plutonium Disposition Draft Environmental Impact Statement* to meet the spent fuel standard. The DEIS analyzes the disposition of a nominal 50 metric tons of plutonium (33 tons is contained in plutonium pits from weapons or in a metal form relatively free of

[1] See Table 6-1 of National Academy of Sciences, *Plutonium Disposition: Reactor-Related Options*. (Washington DC: National Academy Press, 1995).
[2] Joint study, p. WR-36-37.

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MD237–1 **Alternatives**

DOE acknowledges the commentors' support for the immobilization-only approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in weapons again.

It is true that Russia plans to reprocess the spent fuel resulting from the irradiation of MOX fuel from its surplus weapons-usable plutonium. However, the U.S. position in negotiations with the Russian government has been that Russia should not reprocess the MOX spent fuel until all of their surplus plutonium meets the Spent Fuel Standard. In addition, the future agreement between the United States and Russia would require that any Russian MOX spent fuel reprocessing program be conducted under the oversight of IAEA which is charged with verifying compliance with international nonproliferation policies.

impurities while the rest is in various other forms). The various alternatives analyzed fall into two basic categories: Immobilization and Hybrid Approaches.[3]

The Immobilization approaches would encase the plutonium (after initial processing to render it into a suitable form – plutonium dioxide) in ceramic discs which would be placed in steel cans. These cans would then be vitrified (encased in glass) along with highly radioactive waste currently being vitrified as part of DOE clean-up operations. Placing the plutonium in a ceramic mixture and then encasing it in glass makes it difficult to extract (in fact, there is less experience with extracting plutonium from a glass or ceramic matrix than from spent fuel). Encasing it in glass which contains highly radioactive waste makes it resistant to theft as the radiation dose near the glass logs would be very high. It has already been determined that this method of immobilization would meet the spent fuel standard.

The hybrid approach would use the immobilization process for a portion of the plutonium surplus and would manufacture the rest into nuclear power reactor fuel for use in a commercial nuclear reactor. Ordinary reactor fuel used in U.S. light water reactors contains uranium oxide slightly enriched in the isotope Uranium-235 (usually about 3-5% with the rest of the Uranium oxide being mainly U-238).[4] The DOE proposes to produce fuel which would replace the 3-5% U-235 with approximately the same percentage of plutonium oxide. Since the fuel would now be a mixture of plutonium oxide and uranium oxide it is called MOX (Mixed OXide). 1

The DOE's preferred alternative is a so-called hybrid approach. Approximately 33 metric tons of plutonium would be manufactured into MOX fuel. These 33 tons are currently in the form of weapon pits or metals mainly free of impurities and DOE believes these materials would meet the high purity standards required of MOX fuel. There are, however, some impurities in both the pits and clean metals which would need to be removed (namely gallium). The other 17 metric tons of material is in a variety of other forms. While they contain weapons-usable plutonium, these materials would require significantly more processing to meet the MOX requirements according to the DOE. Therefore, this 17 tons would be immobilized.

The preferred alternative would involve construction of a Pit Disassembly and Conversion Facility (PDCF) at either Pantex or the Savannah River Site. This facility would take apart the weapons pits, remove tritium if necessary, convert the plutonium to an oxide form and process it to remove gallium and other impurities. The PDCF would also convert the "clean" metal. The plutonium dioxide would then be transferred to a MOX fuel fabrication facility to be constructed at SRS (transportation would be either inter-site or intra-site depending on whether the PDCF is built at Pantex or SRS). Immobilization of the other 17t of plutonium in ceramic would occur at a new facility at SRS and the Defense Waste Processing Facility at SRS would be used for vitrification in high-level waste.

[3] The reason for the large number of alternatives is differences in siting and whether new facilities would be constructed for some parts of the mission or whether existing facilities can or would be utilized.
[4] Natural uranium contains about 0.711% U-235, 0.005% U-234 and the rest (99.284%) U-238. The enrichment of the U-235 is necessary in order for light water reactors to sustain a chain reaction.

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According to the DOE:

> Pursuing the hybrid approach provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Pursuing the hybrid approach also sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus weapons-usable plutonium, as quickly as possible, in an irreversible manner. The construction of new facilities for the disposition of surplus U.S. plutonium would not take place unless there is significant progress on plans for plutonium disposition in Russia. (p. 1-9)

It is, therefore, apparently the Russian view of plutonium as a "national" treasure and their desire to use it in reactors which is driving the United States to use the MOX option. This rationale will be examined further below. 1

The decision by the DOE to pursue a hybrid approach ignores the clear advantages offered by immobilization and the serious consequences of initiating a MOX program in the United States. The DEIS also has clear deficiencies which need to be addressed including the lack of information on crucial components of the program. These will be outlined below after an overview of the relative costs and benefits of Immobilization versus MOX and a critique of Russia's role in the decision is presented.

MOX versus Immobilization

There are a number of technical difficulties associated with MOX that DOE has not adequately addressed. First, is the issue of Russian reactors, which is discussed in more detail below. Second, US MOX plans envision the large-scale use of weapons grade plutonium in light water reactors for the first time. While MOX proponents claim that European MOX programs provide ample experience for the US program, that experience is only using reactor-grade plutonium. Furthermore, full MOX cores, which are assumed in DOE's analysis, have never been used on a large scale. 2

The Record of Decision for this Environmental Impact Statement will establish whether the United States pursues an Immobilization only approach or a hybrid approach mixing both immobilization and MOX. There are a number of factors which DOE must consider in making a decision, including environmental consequences, cost, schedule for disposition, and proliferation consequences. Each of these major factors will be discussed below. It should be noted, however, that one of the original purposes for pursuing a hybrid approach was to have a back-up technology in case there were problems implementing either immobilization or MOX. However, MOX cannot handle the full spectrum of plutonium requiring disposition. Therefore, this rationale is severely undercut by the fact that immobilization is the only option capable of processing 17 of the 50 metric tons. Given the indispensability of the immobilization option, it would appear more prudent to concentrate energy and resources into this alternative. Back-up should be pursued by developing more than one immobilization option. 3

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MD237–2 **MOX Approach**

The operational experience for electricity generation from MOX fuel in Europe is relevant to the proposed use of surplus weapons-usable plutonium in U.S. domestic, commercial reactors. While plutonium from warheads may never have been used in MOX fuel, its behavior in fuel is essentially the same as that of non-weapons-origin plutonium. Plutonium from the different origins is chemically indistinguishable. The difference is isotopic: there is less plutonium 239 in non-weapons-origin plutonium. MOX fuel, regardless of the origin of the plutonium, has a higher flux than LEU fuel, and thus can cause more wear on the reactor than LEU fuel. However, this is taken into account when developing fuel management strategy.

The proposed action assumes that MOX assemblies would be used for a partial, not full, core. Several U.S. commercial reactors are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core. Core load and safety analyses would be performed, and an NRC license amendment approved, before MOX fuel was introduced into any reactor. Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents.

MD237–3 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach of using both immobilization and MOX fuel fabrication. DOE has been studying, evaluating, and testing immobilization technologies for some time, and does not believe that it is necessary to develop more than one immobilization technology. DOE is confident that current development resources will lead to timely implementation of the can-in-canister immobilization technology.

The reasons DOE is pursuing the hybrid approach are addressed in response MD237–1.

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Proliferation/Disarmament

DOE's choice of disposition technologies does not take place in a vacuum, and has a great effect on the debate about the worth of commercial plutonium technology around the world. By relying on MOX for a large part of its disposition program, DOE strengthens the arguments of the plutonium lobby world-wide.

The DOE's emphasis on MOX brings it into partnership with European commercial plutonium concerns like BNFL, Cogema, Siemens, and Belgonucleaire, whose interest is in promoting continued use and production of plutonium, not in plutonium disposition. By supporting these companies with contracts at a time when they are coming under increasing scrutiny and criticism at home, DOE prolongs their survival and severely undermines the long-standing US position against commercial use of plutonium. 4

The most serious proliferation consequence of a MOX disposition is the acquiescence and even aiding of Minatom in its pursuit of a long-term plutonium economy. A MOX disposition program would provide Minatom with a MOX fuel fabrication facility, the currently missing link in its plutonium infrastructure.

As DOE is well aware, prior to U.S. encouragement Minatom had not supported a program of loading MOX in existing light water reactors. Minatom has instead been a proponent of storage of plutonium with a view to its eventual use in "advanced" reactors and breeder reactors. DOE has argued that moving Minatom from a position of developing breeder reactors to one of using plutonium in light water reactors represents progress in non-proliferation. This is ironic on two fronts. First, it relies on a differentiation between "weapons-" and "reactor-grade" that the US has implicitly rejected with its policy against commercial plutonium development. Second, it takes Minatom from a policy with very little likelihood of success, given the consistent failure of breeder technologies around the world, to a position much more likely to lead to increased use, transportation, and perhaps even production of plutonium in the short term. 5

In the name of disposition, the US seems not only to be relinquishing its decades-old policy of not using plutonium in commercial reactors, but aiding and abetting Russian plans to build a plutonium economy. The US will not oppose Russian reprocessing of the MOX fuel fabricated from surplus weapons plutonium, provided that it occurs only after several decades, when the disposition program is complete. DOE has argued that a several-decade moratorium on the re-separation of plutonium from spent MOX fuel is a sufficient safeguard against proliferation. But it won't matter whether MOX spent fuel is reprocessed now or in a few decades. So long as the infrastructure for MOX fuel production and reprocessing is created and maintained, there will be plenty of other spent fuel to reprocess and plenty of surplus plutonium to occupy MOX fuel fabrication plants in the meantime.

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MD237–4 **DOE Policy**

The use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process.

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing. Furthermore, selection criteria for the reactors stipulates that they have sufficient operating life to complete the mission.

MD237–5 **Nonproliferation**

The reprocessing of MOX spent fuel in Russia is the subject of sensitive negotiations between the United States and Russia and is beyond the scope of this SPD EIS. The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. The principles include the acceptance of technology for transparency measures, including

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Thus, the net result of the plutonium disposition program will have been for the United States to subsidize the very thing that it should be against: an infrastructure for a plutonium economy in Russia. A similar infrastructure would be created in the United States since a MOX plant would be built and since the U.S. appears increasingly reluctant to shut down its decades-old military reprocessing plants at the Savannah River Site in South Carolina. 5

Environmental

The DOE itself has already recognized that immobilization alone is preferable to the hybrid approach from an environmental standpoint. In the Record of Decision for the Storage and Disposition of Weapons-Usable Fissile Materials final Programmatic Environmental Impact Statement the DOE states:

> For normal operations, analyses show that immobilization would be somewhat preferable to the existing LWR and preferred alternatives, although these alternatives, *with the exception of waste generated*, would be essentially environmentally comparable.
> Severe facility accident considerations indicate that immobilization options would be environmentally preferable to the existing reactor and preferred alternatives, although the likelihood of occurrence of severe accidents and the risk to the public are expected to be fairly low. (p. 10, emphasis added)

The hybrid approaches would require at least one extra facility and possibly even two. Under the hybrid option the three facilities would be a Pit Disassembly and Conversion facility, the MOX Fuel Fabrication Facility, and the Immobilization Facility. Under Immobilization only alternatives, the MOX FFF would be eliminated. Furthermore, it appears technically feasible to design a single facility which could undertake both pit disassembly/conversion and immobilization (see below) and should have been one of the options analyzed. The environmental advantages of a reduction in facilities and operations have not been fully analyzed since a single facility alternative is not included in the DEIS. Furthermore, if the DOE decides to use the Defense Waste Processing Facility at SRS for vitrifying the cans in high level waste, the incremental environmental impacts of immobilization may be reduced further. There are no existing facilities which could be taken advantage of for MOX fuel fabrication. 6

Due to the high purity requirements of MOX fuel the conversion of plutonium pits and clean metal for MOX require additional processing steps which would be unnecessary for immobilization. At the moment the DOE plans to construct a conversion facility which would remove gallium (a major concern in MOX fuel) using a dry process.[5] If the dry process, which is still at the laboratory and pilot stage, does not meet the impurity removal specifications, the DOE proposes using an aqueous process it calls plutonium polishing. The analysis in the DEIS assumes these processes would occur even if the immobilization alternative is chosen, despite the fact they would be unnecessary. Therefore, the DEIS does not allow one to fully compare the environmental impacts of the MOX and immobilization options. A more detailed discussion of plutonium polishing and the DOE analysis of this process is presented below. 7

[5] See *Science for Democratic Action*, Vol. 5, No. 4 for more on the gallium problem.

appropriate international verification measures and stringent standards of physical protection, control, and accounting for the management of plutonium. The United States would not subsidize reprocessing capabilities or facilities in Russia.

The policy of discouraging the civilian use of MOX fuel has not changed as addressed in response MD237–4.

MD237–6 **Alternatives**

DOE acknowledges the commentor's concern over the greater cost, economically and environmentally, of the hybrid approach than the immobilization-only approach to surplus plutonium disposition. DOE believes its preference for the hybrid approach has a sound basis.

Section 2.3.1 of the SPD Draft EIS explained that a range of 23 reasonable alternatives remained after evaluating over 64 options against three screening criteria: worker and public exposure to radiation, proliferation concerns due to transportation of materials, and infrastructure cost. These 23 reasonable alternatives were evaluated in the SPD Draft EIS. Two separate facilities were combined in this SPD EIS to form the immobilization facility from those evaluated in the *Storage and Disposition PEIS*. No other combination of facilities was considered reasonable. After the SPD Draft EIS was issued, DOE eliminated as unreasonable the 8 alternatives that would involve use of portions of Building 221–F with a new annex at SRS for plutonium conversion and immobilization, thereby reducing the number of reasonable alternatives to the 15 that are analyzed in the SPD Final EIS. This SPD EIS analyzes the potential environmental impacts associated with implementing the proposed surplus plutonium disposition activities at the candidate sites including alternatives that would take advantage of DWPF at SRS. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, demonstrate that under either the hybrid or the full immobilization approach, the activities would likely have minor impacts at any of the candidate sites.

The reasons DOE is pursuing the hybrid approach are addressed in response MD237–1.

MD237–7 Plutonium Polishing and Aqueous Processing

Based on public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE decided to propose plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium oxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing. No additional aqueous processing would be necessary to prepare the plutonium dioxide for immobilization.

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In addition to a larger number of operations and facilities, the MOX option also entails an extra transportation step. Under the DOE's preferred alternative, both MOX fuel fabrication and immobilization would occur at SRS. In the case of immobilization, the glass logs would be stored until shipment to a repository. However, for MOX the unirradiated fuel would have to be shipped to the reactor and then the spent fuel shipped to a repository after irradiation. 8

Cost

According to the DOE's July 1998 cost estimate report, the cost of MOX and immobilization disposition programs are approximately the same. However, this comparison fails to take into a account a number of factors.

First, the DOE assumes that a fuel off-set will be provided by the reactor companies. The idea behind the fuel off-set is that the MOX fuel would be placed in the reactor instead of the low enriched uranium fuel the reactor operators would normally need to purchase. Thus, the DOE assumes that the bidding consortia would subtract this fuel off-set from the charges for constructing and operating the MOX fuel fabrication facility. DOE estimates this fuel off-set to be approximately one billion dollars. While in principle this is possible, there is no guarantee that the reactor companies will agree to provide the fuel off-set. There is already indication that the bidding consortia of reactor operators and nuclear fuel manufacturers do not intend to undertake this task without reaping a profit. 9

In fact, one reactor official has stated very explicitly the desire of the nuclear power companies (and by extension the consortium partners which would handle MOX fuel fabrication) to make a profit. Jack Bailey, Vice-president of the Palo Verde nuclear plants stated his company's requirements for added compensation in March 1996:

> We also stressed in our letters to DOE that any initiative should address potential benefits to ratepayers and shareholders…
> The benefits must be substantial. If not, the entire proposition is a non-starter.
> What I mean specifically is that any agreement involving Palo Verde would require more than the incremental costs associated with using MOX fuel instead of uranium. That kind of payment would be insufficient.[6]

Furthermore, the DEIS assumes that MOX fuel would be left in the reactor only long enough to meet the spent fuel standard, not for the maximum length of time a fuel rod would normally be in a reactor (p. 2-99). It is not clear what assumptions were made in the cost estimate as to the residence time of the fuel in the reactor. However, a shorter time in the reactor would mean less of the uranium fuel would be replaced over the timeframe of the disposition mission and would therefore reduce the fuel off-set. 10

Second, the cost estimate explicitly excludes a number of factors which could increase the cost of the MOX hybrid options. 11

[6] Jack Bailey, remarks made at the 3rd International Policy Forum: "Deploying the reactor/MOX Option for Plutonium Disposition within the Current System of U.S. and Canadian Nuclear Reactors – Regulatory, Policy Impediments," Landsdowne, VA., March 21, 1996.

MD237–8 **Transportation**

Additional transportation would be required for the shipment of unirradiated fuel from the MOX facility to the reactor. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS.

MD237–9 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MD237–10 **MOX Approach**

As discussed in Chapter 2 of Volume I, MOX fuel would be left in the reactor for a full cycle. Under the current reactor options, there are no plans to leave it there only long enough to meet the Spent Fuel Standard.

MD237–11 **Cost Report**

Cost-related comments are addressed in response MD237–9.

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Costs that would remain the same, independent of where the facility is sited, are not included. Examples of costs that are not included in this report are research and development, environmental analyses, operation of the Defense Waste Processing Facility (DWPF), and nuclear reactor modifications and irradiation services. Total costs shown are, consequently, not full life-cycle costs.[7]

The only cost specific to the immobilization option is operation of DWPF. However, DWPF will operate whether or not plutonium disposition occurs. The costs specific to the MOX portion of the hybrid options are reactor modifications and irradiation services. As there has been no final decision taken about specific reactors to be used for the disposition program, it is not possible to determine how much it will cost to modify the reactors to handle MOX fuel (or if modifications will need to be made). As for irradiation services, it seems unlikely that irradiation service fees will not be part of any bid from the nuclear consortia. As stated above, there is every indication that those companies intend to make a profit from their involvement with this program. 11

Therefore, while DOE indicates that the MOX hybrid and immobilization options would be comparable in cost, it is painting a misleading picture by excluding significant costs of the MOX program. The one billion dollar fuel off-set may not be realized. This would raise the hybrid option costs by approximately 50%. Furthermore, the hybrid option costs can be expected to rise even higher due to reactor modifications and irradiation service fees.

Reactor Related Issues

The vast majority of LWRs were not designed to use plutonium as a fuel. While both plutonium-239 and uranium-235 are fissile materials that generate similar amounts of energy per unit weight, there are a number of differences between them as reactor fuels that affect reactor safety. The basic set of concerns relates to control of the reactor. The chain reaction in a reactor must be maintained with a great deal of precision. This control is achieved using control rods usually made of boron and (in pressurized water reactors) by adding boron to the water. Control rods allow for increases and decreases in the levels of reactor power and for orderly reactor shut-down. They prevent runaway nuclear reactions that would result in catastrophic accidents. 12

It should be noted that while all commercial LWRs have some amount of plutonium in them which is made during the course of reactor operation from uranium-238 in the fuel, the total amount of plutonium is about one percent or less when low enriched uranium fuel is used. When MOX fuel is used, the total amount of plutonium would at all times be considerably higher. It is this difference that creates most reactor control issues.

[7] DOE, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition*, (DOE/MD-0009 Rev. 0) July 22, 1998. p. 3-1

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MD237–12 **MOX Approach**

DOE acknowledges the commentor's concern regarding the use of MOX fuel. Although no domestic, commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core. The fabrication of MOX fuel and its use in commercial reactors have been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium. The environmental, safety, and health consequences of the MOX approach, as well as the production and disposal of any waste, are addressed in this SPD EIS (see revised Section 4.28 and other appropriate sections in Chapter 4 of Volume I). In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and the commercial reactors selected to use MOX fuel to ensure adequate margins of safety.

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Changing the fuel can affect the ability of the control rods to provide the needed amount of reactor control and modifications to the reactor may be required before the new fuel can be used.

Several differences between the use of MOX fuel and uranium fuel affect safety:

- The rate of fission of plutonium tends to increase with temperature. This can adversely affect reactor control and require compensating measures. This problem is greater with MOX made with weapons-grade plutonium than that made with reactor-grade plutonium.
- Reactor control depends on the small fraction of neutrons (called delayed neutrons) emitted seconds to minutes after fission of uranium or plutonium. Uranium-235 fission yields about 0.65 percent delayed neutrons, but plutonium yields only about 0.2 percent delayed neutrons. This means that provisions must be made for increased control if plutonium fuel is used, if present control levels and speeds are deemed inadequate.
- Neutrons in reactors using plutonium fuel have a higher average energy than those in reactors using uranium fuel. This increases radiation damage to reactor parts.
- Plutonium captures neutrons with a higher probability than uranium. As a result, a greater amount of neutron absorbers are required to control the reactor. 12
- The higher proportion of plutonium in the fuel would increase the release of plutonium and other transuranic elements to the environment in case of a severe accident.
- Irradiated MOX fuel is thermally hotter than uranium fuel because larger quantities of transuranic elements are produced during reactor operation when MOX fuel is used.

Overall, the issues related to reactor control, both during normal operation and emergencies, are the most crucial. Most independent authorities have suggested that only about one third of the fuel in an LWR can be MOX, unless the reactor is specifically designed to use MOX fuel. However, there are some operational problems associated with using partial-MOX cores since MOX fuel is interspersed with uranium fuel. Their differing characteristics regarding control, radiation and thermal energy mean that there are non-uniform conditions in the reactor that can render operation and control more complicated. Some reactor operators claim they can use 100 percent MOX cores without needing to make physical changes to the reactor or control rods. The safety implications of such claims need to be independently verified.

Russia only has eight reactors under consideration for loading of MOX fuel. There has been little publicly-available analysis about the safety of loading VVER-1000s with MOX fuel. Many of these reactors are old, and will be nearing the end of their 30-year license at the time MOX loading would begin. Current plans seem to envision potential operation of Russian reactors well beyond this 30-year period. Certainly, this 13

MD237–13 **Nonproliferation**

DOE acknowledges the commentor's concern regarding reactor safety and nuclear material safeguards in Russia. Close cooperation between the United States and Russia is essential in achieving the objective of nonproliferation and arms reduction, and to ensure secure management of nuclear weapons materials. To that end, in late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. Accordingly, the U.S. Congress appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. Two of the seven principles that were agreed upon relate to financing arrangements and acceptable methods and technology for transparency measures, including appropriate international verification measures and stringent standards of physical protection, control, and accounting for the management of the plutonium.

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raises safety concerns to an even greater level. Similar problems surround plans to load the BN-600, located at Beloyarsk, with MOX fuel. By Minatom's own reckoning, there have been at least 30 sodium leaks at the reactor since its start of operation in 1980.[8] Numerous other incidents have also been documented.[9] Given the current political weakness and underfunding of regulatory forces in Russia, notably Gosatomnadzor, it is unlikely that they can guarantee proper regulation of Russian reactors. What would the US responsibility be in event of an accident at a reactor which occurred in the context of a program promoted by the US government over the wishes of the Russian nuclear establishment? If MOX fuel use in VVERs turns out to be unsafe and an accident occurs as a result, what would US liabilities be? What would be the responsibility of the US government to the Russian people who have already suffered so much from nuclear accidents in the past? Will the US be willing to assume responsibility for an accident due to this change in fuel? Would the US be willing to provide insurance against the increased risk of accidents due to the change in fuel? Furthermore, is the US prepared for the social upheaval that would accompany such an accident? The 1986 Chernobyl accident is widely acknowledged as a precipitating cause of the break-up of the Soviet Union (when combined with other factors). Given the social tensions caused by the current economic troubles, it is not hard to imagine that an accident would have a very serious impact on the stability of Russia, not to mention on the security of nuclear materials there. 13

Russia

The Russian public has been an important moderating force on Minatom's plans for a plutonium economy, consistently opposing large new plutonium projects. In this, DOE's non-proliferation interests coincide with the Russian public's desire to protect their health and environment. Given this important conjunction of interests, DOE ought to be promoting the Russian public's voice in disposition decisions. Instead, it seems inclined to ignore Minatom's violation of access to information, environmental, and public participation laws. 14

Finally, it is clear that Russia is unable to finance a disposition program without substantial outside help. As we have shown above, DOE's assertions that MOX and immobilization are approximately equal in cost are grossly misleading. MOX is by far the more expensive option, particularly when the potential costs of modifying reactors is added. The lack of money raises serious questions about the potential for large-scale Congressional appropriations, and he possibility of private investment. The latter is particularly troubling, however, because it implies potential commercial use of the MOX fuel fabrication facility and perhaps other plutonium facilities after the end of the disposition program. 15

[8] Joint United States- Russian Plutonium Disposition Study, September 1996, p. Sum-17.
[9] Leonid Piskunov, Yadernyi Ob'ekt za Okalitsei Uralskoi Stolitsy, Ektaerinburg: 1997.

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MD237–14 **Nonproliferation**

DOE will continue to maintain a close working relationship with Russia to develop technical solutions that take into consideration public health and the environment for surplus plutonium disposition.

MD237–15 **Nonproliferation**

Financing the Russian MOX fuel program, costs of the MOX fuel option, and reuse of the MOX facility are addressed in responses MD237–4, MD237–9, and MD237–13.

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DEIS deficiencies

The DEIS contains a number of deficiencies which need to be addressed. These include:

Representative/Generic Analysis

The DEIS does not include an analysis of impacts for specific reactors to be used for the MOX option. Instead, it appears to rely on a generic analysis conducted as part of the *Storage and Disposition PEIS* (e.g. summary of accident effects on pp. 2-101 and 2-102). Specific reactor analysis will supposedly be included in the Final EIS based upon the response to DOE's *Request for Proposals for MOX Fuel Fabrication and reactor Irradiation Services*. However, there are two problems with this approach. First, the use of the "216" process, in which DOE provides summary information on environmental impacts in order to protect proprietary information, does not allow the public and outside experts to adequately judge the information presented. Second, there will be no opportunity for comment by the public concerning reactor-specific issues during the NEPA process. This will exclude the populations surrounding the reactors from publicly participating in the decision-making process at this stage. 16

The DEIS uses a representative site analysis for the source of depleted uranium hexafluoride and for the conversion of the depleted uranium hexafluoride to uranium dioxide. The Portsmouth Gaseous Diffusion Plant is used as the representative site for the source of uranium hexafluoride because it is the only one of the three storage sites with the equipment to transfer the material from its storage containers to the containers used in the conversion process. Of five possible sites for conversion to uranium dioxide, the DOE chose the General Electric Company's Nuclear Energy Production Facility in Wilmington, North Carolina as a representative site (p. 1-8).

While a rationale is given for choosing the Portsmouth facility, there is no reason given for choosing the GE site. In addition to the lack of a clear reason to choose this facility for a representative analysis of the environmental impacts of this process, there is no demonstration of why this particular facility is representative of all facilities. The burden of proof is upon the DOE to demonstrate not only that representative analysis is acceptable technically, but also that the site chosen is representative of the potential impacts. This should also not act as a replacement for a complete environmental impact assessment once a candidate site has been chosen. 17

In the final EIS the DOE must clearly show that representative analysis is valid and that the sites chosen are truly representative of the processes and impacts described. The DOE should also state what process will be used for assessing environmental impacts once a site is chosen. The lack of public involvement in this area needs to be addressed as soon as possible.

Comparison of Results

The DEIS does not allow the reader to make a comparison between the alternatives. Section 2.18 is titled "Summary of Impacts of Construction and Operation 18

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MD237–16 General SPD EIS and NEPA Process

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

MD237–17 General SPD EIS and NEPA Process

General Electric Company's Nuclear Energy Production Facility in Wilmington, North Carolina, was selected because its operations are typical of those of the candidate sites for the conversion of uranium hexafluoride to uranium dioxide. The analysis presented in Chapter 4 of Volume I indicates that no significant environmental impacts would result from the use of the Nuclear Energy Production Facility, and that there is no physical basis for an expectation of significant impacts at any other candidate facility or along transportation routes to and from facilities.

The methods used to obtain the results are described in Chapter 4 and the relevant appendixes. Regardless of the facility selected, DOE would comply with NEPA and all other applicable laws and regulations.

The comment process for the SPD EIS was open to all interested parties. No individual or organization was excluded from that process.

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of Surplus Plutonium Disposition Facilities." However, it fails in its task of clearly summarizing the impacts in a manner conducive to comparison. This section (as well as parts of Chapter 4) details the integrated impacts of the MOX option (including irradiation in a reactor and transport). It also provides a comparison of the different types of immobilization options (ceramic vs. glass and homogenous vs. can-in-canister). However, there is no summary of the integrated impacts of the full immobilization option, only a comparison of the impacts of the immobilization facilities. In fact, we could find no presentation of the integrated impacts of the immobilization option could be found in the document. It is not acceptable to expect the public to undertake this task. 18

Furthermore, the two sections present the impacts in different ways. The MOX integrated impacts section provide figures for doses, population doses, increased risk and Latent Cancer Fatalities due to routine operations. The section on immobilization only provides doses and population doses.

This is a complicated program with a number of alternatives. It is the DOE's responsibility to present the information in a manner more conducive to comparison and this should be done in the final EIS.

Waste Isolation Pilot Plant

The DEIS assumes the Waste Isolation Pilot Plant will be open and able to handle the transuranic waste from these processes. However, as has been stated repeatedly by IEER in other contexts, WIPP is not the solution to the transuranic waste problem. Furthermore, WIPP is severely behind schedule, faces a number of challenges to its opening, and cannot handle the volume of waste. WIPP should not be assumed to be the final repository for transuranic waste generated during disposition. A safer assumption would be on-site retrievable storage (in RCRA compliant facilities for mixed waste if necessary). 19

Decision Making Process

The DEIS fails to clearly specify the criteria that will be used in making the final decision on which disposition alternative will be followed. The environmental impact assessment of any project should not be simply an exercise to justify policy decisions. The results of the analysis must be included in the final decision-making process in a substantive manner.

Page 2-11 of the DEIS states that three factors were involved in reducing the large number of possible options to the 23 that the DOE considers "reasonable." Taken in equal measure, these factors were: worker and public exposure to radiation, proliferation concerns due to transportation of materials, infrastructure cost. This raises a number of issues. 20

First, why were non-proliferation issues unrelated to transportation ignored in the initial phase of narrowing the options? As discussed above, there are a number of non-proliferation problems with the use of MOX fuel which are not related to transportation. The creation of a plutonium economy which includes reprocessing of spent fuel to extract

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MD237–18 **General SPD EIS and NEPA Process**

Chapter 4 of Volume I describes the environmental impacts of those alternatives (Alternatives 11 and 12) under which up to 50 t (55 tons) of surplus plutonium would be immobilized. Included are impacts incurred during the construction of new facilities and during facility operation. All categories of impacts are addressed, including those attributable to normal operation, accidents, and transportation.

For each alternative except No Action, the analysis in Chapter 4 shows radiological impacts on the population residing within 80 km (50 mi) of the facilities, the MEI, and the average exposed individual. The analysis of each alternative, including those that involve immobilization only, includes estimates of the population dose, the annual dose to the maximally exposed and average exposed individual, and the LCF risk of a 10-year exposure.

Section 2.18 summarizes the environmental impact information provided in Chapter 4. For ease of comparison, identical summary information is provided for each alternative (see Table 2–4). This information includes impacts on air quality, waste management, employment, and land disturbance, as well as human health risks, the LCF risk from the most severe design basis accident, and transportation risks.

A focused comparison of the preferred alternative (Alternative 3) and the immobilization-only alternative (Alternative 12A) at SRS is provided in the table below.

MD237–19 **Repositories**

The management of TRU waste generated by the proposed surplus plutonium disposition facilities is evaluated in this SPD EIS. DOE alternatives for TRU waste management are evaluated in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). WIPP began receiving shipments of TRU waste for permanent disposal on March 26, 1999. As described in Appendix F.8.1, and the Waste Management sections

Comparison of Alternative 3 with Alternative 12A at SRS

Summary of Impacts	Alternative	
	3	12A
Air quality		
(incremental pollutant concentrations in μg/m³)[a]		
Carbon monoxide	0.37	0.246
Nitrogen dioxide	0.0634	0.0529
PM_{10}	0.00423	0.00364
Sulfur dioxide	0.124	0.0852
Waste management (m³)[b]		
TRU	1800	1500
LLW	2400	1700
Mixed LLW	50	20
Hazardous	940	910
Employment (direct)[c]		
Construction	1968	1196
Operations	1120	751
Land disturbance (ha)[d]	32	20
Human health risk (dose in person-rem)[e]		
Construction (workforce)		
Dose	4.1	2.9
LCFs	1.6×10^{-3}	1.2×10^{-3}
Operations		
Dose		
Public	1.8	1.6
Workers	456	446
LCFs		
Public	9.0×10^{-3}	8.0×10^{-3}
Workers	1.8	1.8
Facility accidents[f]		
Tritium release at pit conversion facility	5.0×10^{-2}	5.0×10^{-2}
Transportation[g]		
LCFs	8.1×10^{-2}	0.152
Traffic fatalities	5.3×10^{-2}	8.1×10^{-2}
Kilometers traveled (millions)	4.3	4.4
Additional risk of LCFs at Pantex	8.3×10^{-2}	8.3×10^{-2}

[a] Values represent the incremental criteria pollutant concentrations associated with surplus plutonium disposition operations for the annual averaging period for nitrogen dioxide, particulate matter with an aerodynamic diameter smaller than or equal to 10 microns (PM_{10}), and sulfur dioxide, and for the 8-hr averaging period for carbon monoxide.

[b] Values are based on a construction period of approximately 3 and 10 years of operation.

[c] Values are for the peak year of construction for each site and for the annual operation of all facilities for each alternative.

[d] Values represent the total land disturbance at each site from construction and operations.

[e] Values for Alternative 1 represent impacts over 50 years of operation under No Action. Those for the remaining alternatives are for the period of construction and 10 years of operation. Public dose values represent the annual radiological dose (in person-rem) to the population within 80 km (50 mi) of the facility for the year 2030 under Alternative 1, or for 2010 under Alternatives 2 through 12. Worker dose values represent the total radiological dose to involved workers at the facility (in person-rem/year). Public LCFs represent the 50-year LCFs estimated to occur in the population within 80 km (50 mi) for the year 2030 under Alternative 1, or the 10-year LCFs estimated to occur for the year 2010 under Alternatives 2 through 12. Worker LCFs represent the associated 50- or 10-year LCFs estimated to occur in the involved workforce.

[f] The most severe design basis accidents (based on 95 percent meteorological conditions) is used to obtain the population LCF.

[g] For alternatives that involve more than one site, the transportation impacts for the entire alternative are shown in the first site listed in the alternative. LCFs are from the radiological exposure associated with incident-free operation, radiological accidents, and fatalities expected as a result of vehicle emissions. Traffic fatalities are from nonradiological vehicle accidents. LCFs at Pantex are associated with repackaging requirements if the pit conversion facility is located elsewhere.

Key: LCF, latent cancer fatality; LLW, low-level waste; TRU, transuranic.

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plutonium will be harder to counter internationally if the United States is using MOX fuel. The desire of the Russian government in particular to eventually extract the plutonium from the spent fuel raises serious non-proliferation concerns.

Second, the choice of a dual-track strategy as the preferred alternative indicates that these criteria were not considered the most important. As discussed above, immobilization provides advantages from an environmental and human health perspective as well as cost savings and the capability of a faster completion of the mission. This does not even take into account the much greater proliferation and policy consequences of a MOX program which should have been included as a criteria. 20

Third, if these criteria were suitable for an initial screening of options, are they used as the basis for a final decision? What further factors will be used in the final decision?

The final EIS should answer these questions and lay out the criteria for a decision in this program.

Single Facility Analysis

The DEIS fails to analyze an alternative which is "reasonable." It is technically feasible to convert and immobilize all 50 tons of plutonium in a single facility, including pit disassembly and conversion. The pit disassembly and conversion facility transforms the plutonium into an oxide form which is necessary for the ceramification process. However, it also includes processes only necessary for the MOX option, the main one being gallium removal. Under the current planning the facility would be constructed and operated with gallium removal even if the decision is made to immobilize all the plutonium.

However, the immobilization facility also includes the capability to convert plutonium to an oxide form (which is necessary for the 17 tons of non-pit material which is slated for immobilization). It would be possible to expand this capability in the immobilization facility and dispense with the separate Pit Disassembly and Conversion Facility entirely. We do not know what effect this would have on the environmental impacts. However, such a facility would not include the gallium removal process or the plutonium polishing process which is being kept as an option if certain impurities cannot be removed. It would therefore require less overall processing and handling than the current plans. 21

The DOE has stated that a single immobilization facility should be technically feasible but that the obstacle would be keeping the facility open to IAEA inspection.[16] Under current plans the immobilization facility will be open to inspection by the IAEA. At issue is the fact that the plutonium pits are classified until they are converted into an oxide. However, this argument is disingenuous. It would not be difficult to design the facility in such a way that IAEA inspectors would not have access to the processing

[16] Notes of Hisham Zerriffi taken at the Aug. 20 Idaho Falls hearing on the Surplus Plutonium Disposition Draft Environmental Statement.

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in Chapter 4 of Volume I, it is conservatively assumed that TRU waste would be stored at the candidate sites until 2016, at which time it would be shipped to WIPP in accordance with DOE's plans. Expected TRU waste generated by the proposed facilities is included in the *WIPP Disposal Phase Final Supplemental EIS* cumulative impacts estimates, as well as in the *National TRU Waste Management Plan* (DOE/NTP-96-1204, December 1997).

MD237–20 **Alternatives**

The decision to pursue a hybrid approach to surplus plutonium disposition is reflected in the *Storage and Disposition PEIS* ROD. The three screening criteria described in Section 2.3.1 were used to establish the siting alternatives for the hybrid and immobilization-only approaches, not the alternative technologies. After their application in selecting the reasonable range of alternatives, these criteria were no longer useful as discriminators for the selection of preferred alternatives.

DOE does not agree with the commentor's assertion that the MOX fuel approach does not provide the degree of proliferation resistance that immobilization does. As explained in the *Storage and Disposition PEIS*, DOE's Office of Arms Control and Nonproliferation, with MD support, prepared a report, *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN–0007, January 1997), to assist in development of the ROD. This report, which concerns the nonproliferation and arms reduction implications of alternatives for the storage of plutonium and HEU and the disposition of excess plutonium, makes it clear that in regard to nonproliferation issues unrelated to transportation, none of the disposition technologies evaluated is clearly superior to another.

Russia's plans for MOX fuel are addressed in response MD237–1.

MD237–21 **Alternatives**

It would be technically possible to perform pit disassembly and conversion in the same facility as plutonium conversion and immobilization. However, given the different composition of pit and nonpit plutonium, and the different security issues, it is not clear that there would be any cost or other advantage

sections which contain classified pits, but would have access to the rest of the facility. Indeed, DOE is already designing such a facility. The Pit Disassembly and Conversion Facility layout presented in the DEIS clearly shows a Classified section where pits are received and a non-classified section after they have been processed. There are even IAEA offices clearly labeled in the non-classified section. There is no reason this could not be done in a single pit disassembly, conversion, and immobilization facility. In fact, on p. 2-20 the DEIS discusses the possibility of collocating the pit disassembly and immobilization functions in an existing facility. If this can be done in an existing facility, it surely can be done in a new facility which is specifically designed to allow for both classified and unclassified sections. 21

The failure of this DEIS to analyze a reasonable alternative which would appear to meet their screening criteria is a fundamental flaw. The needs to be addressed before an informed decision can be made as to the relative costs and benefits of the various alternatives.

Worker Risks in Accidents

The DEIS explicitly excludes analyzing the radiological effects of accidents on involved workers (those workers actually involved in a process when an accident occurs). The analysis is limited to non-involved workers 1000 meters away, the maximally exposed individual and the general public within 80 kilometers. The rationale for excluding workers actually involved in an accident is provided in K.1.4.1 which states:

> Consequences to workers directly involved in the processes under consideration are addressed generically, without attempt at an scenario-specific quantification of consequences. This approach to in-facility consequences was selected for two reasons. First, the uncertainties involved in quantifying accident consequences become overwhelming for most radiological accidents due to the high sensitivity of dose values to assumptions about the details of the release and the location and behavior of the impacted worker. Also, the dominant accident risks to the worker of facility operations are from standard industrial accidents as opposed to bounding radiological accidents. (p. K-7)

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This rationale is not sufficient to exclude those workers likely to bear the brunt of an accident during processing of plutonium. While it may be true that the models employed have problems below 1000 meters, this does not excuse this omission. Models have been developed for use in such circumstances. Alternatively, an attempt to modify the model could have been made or the uncertainty in the model results expanded to reflect the greater uncertainty in modeling workers close to the accident. Assumptions could be made about worker patterns (similar to the way assumptions are made concerning the general population).

The problem is exacerbated greatly by the presentation of the data on the noninvolved worker. The table which summarizes accident impacts for each alternative does not provide an estimate for the number of Latent Cancer Fatalities for non-involved workers despite providing this information for the general public. It should not be difficult for this estimate to be made as DOE presents numbers on how many badged workers are on-site. This omission is repeated in the summary of impacts presented on

in doing so, even if all 50 t (55 tons) of the surplus plutonium were to be dispositioned through immobilization. Pit and nonpit plutonium would have to be converted to an oxide in separate, totally segregated processes. The pits would be classified, and access to the plutonium and process byproducts would have to be strictly limited. Moreover, the plutonium from the pits would be much purer; most of the nonpit plutonium would be contaminated with a variety of other materials, and the conversion processes would have to be tailored to address that. Services such as access control, shipping, and receiving (including truck bays) could conceivably be shared to some extent. However, because of the classification of almost all pit conversion activities, pit conversion and immobilization processes and spaces would have to be maintained and serviced largely independently of one another. The overall impacts, therefore, would not likely be substantially different from those of two separate but collocated facilities, a condition bounded by the analyses reflected in this SPD EIS.

MD237–22 **Facility Accidents**

There are a number of factors behind the decision to report worker consequences in the manner presented in this SPD EIS. First, as the commentor has stated, is the inability to calculate radiological doses to the involved worker in a meaningful way given the enormous dependency of calculated dose results on the values of highly uncertain parameters, such as those associated with the particular release mechanisms (e.g., the precise puff distribution of powder for a spill, explosion, or other accident, which depends on drop height, explosion phenomenology, the spatial and temporal failure profile of the can, glove, glovebox), and the assumptions defining the involved worker (e.g., inhaling versus exhaling, location, response to accident). The second factor is that for most accidents with a significant radiological consequence to the involved worker, this consequence is overwhelmed by nonradiological phenomena. This is because it takes a physical insult of some kind to breach radiological confinement. Such phenomena as fires, explosions, and building collapse that result in radiological release (among other things) present more significant nonradiological consequences to the involved worker. As a result, each alternative in Chapter 4 of Volume I includes an estimate of the expected

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pages 2-69 to 2-104. Accident impacts are quantified and discussed for the general population and a one paragraph description of consequences for involved workers is included. However, There is no discussion of impacts to noninvolved workers due to accidents. Table 2.4 which is supposed to be a summary of impacts by Alternative and Site only lists the accident Latent Cancer Fatalities for the general public.

The exclusion of involved workers in the accident analysis and the lack of complete results on the effects of accidents on non-involved workers raises serious questions as to DOE's commitments to worker safety and health. It is a reasonable assumption that the effect of an accident on workers would be greater than on the general public. The probability of Cancer Facility is often ten times higher for the non-involved worker compared to the general public. The probability for the involved worker can be expected to be even higher. By only presenting full results for the public the consequences of accidents appear to be lower than what can reasonably be expected. 22

The final environmental impact statement should include a full and complete analysis of worker risks.

Plutonium Polishing

Appendix N of the DEIS describes "a polishing process by which impurities, particularly gallium, could be removed from the plutonium feed for mixed oxide (MOX) fuel fabrication." (p. N-1) It is included as an appendix because DOE considers it a contingency in case the dry processes DOE is developing for gallium removal fail to achieve the necessary purification level for MOX fuel fabrication. The plutonium polishing process would be an aqueous (wet) process. In previous analyses, DOE had rejected an aqueous process because of its higher environmental costs. Aqueous processes generate greater waste volumes and the waste is in a liquid form which is more difficult to handle.

It is difficult to determine, from the information given in the DEIS, exactly what the incremental effects of using plutonium polishing would be in all cases. This is because waste generation figures within each alternative are given for all three facilities. The added waste information presented in Appendix N is very confusing, and makes it very difficult to assess the environmental impact of the addition of plutonium polishing on the PDCF. This comparison would be the most suitable in judging the impacts of plutonium polishing. 7

Appendix N provides the potential impacts of plutonium polishing at the four sites (Tables N-10 to N-13). For the Hanford and SRS sites the DEIS uses alternatives 2 and 3 which would locate all three facilities at the site in question. Plutonium polishing at these sites would approximately 12% more transuranic waste. However, for INEEL and Pantex which would only have two facilities the incremental production of transuranic waste would be approximately 30%. The same holds true generally for low-level waste, mixed low-level waste, hazardous waste, and non-hazardous waste. In fact, for LLW the increases at Hanford and SRS are 27% and 16% respectively, while the increases at INEEL and Pantex are 33% and 64% respectively. This disparity in the cases being

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cases of nonradiological injuries or illnesses and fatalities. These are the dominant risks to involved workers. The reason that risks to the public can be stated in terms of radiological releases is that other facility-related dangers are of only localized concern and do not travel the distance required to represent a public hazard (one notable exception being seismic events, which could cause significant damage to local buildings). With respect to the noninvolved worker, the calculation of population doses, from which cancer statistics can be calculated, is somewhat intractable. The largest individual doses would likely occur immediately outside the facility, particularly for ground-level releases. Doses from stack releases are more stable, but are also highly uncertain at small distances. Therefore, the potentially largest contribution to doses to noninvolved workers are in a regime that is uncertain, for calculations are of questionable value. This problem does not exist for the public, where each member is at a distance where estimates are meaningful. It would be possible, for example, to define the noninvolved worker as a worker beyond some distance like 200 m (656 ft), but the population dose calculated for that population would exclude a potentially large fraction of the total worker dose. Consequently, it was decided to provide the metric of individual dose (and probability of LCF) to the maximally exposed member of the public 1,000 m (3,281 ft) away or at the site boundary if less than 1,000 m (3,281 ft) distant. This was the protocol used in the *Storage and Disposition PEIS*, and it was considered proper for use in this SPD EIS as well; it also provides a valid basis for understanding environmental impacts of and comparing alternatives considered in this EIS.

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compared is very confusing and underplays the impact of plutonium polishing on waste generation. The incremental impacts on the single facility which would actually house the plutonium polishing module would be even greater.

Furthermore, the DOE has not stated how it would make a decision to use plutonium polishing and what role the potential future use of plutonium polishing will have on its more immediate decisions. If DOE decides to proceed with the hybrid approach and it is discovered in the future that plutonium polishing is necessary, resource commitments already made at that point will likely render it difficult to switch to an immobilization only alternative. 7

Unanswered Questions

While the DEIS does provide a substantial amount of information on both the MOX and immobilization options there are serious gaps.

- What are the DOE's plans to account for the failure of the In-Tank Precipitation (ITP) process at the Savannah River Site? DOE has ruled out the only alternative that it was previously considering, the use of cesium-137 from Hanford. (p. S-15) How will ITP failure affect the immobilization program's technical options and timescale? 23
- What assumptions were made about the number and siting of reactors in assessing the cumulative impacts of the MOX option (Section 2.18.3)? Reference is made in this section to 4.3.5.2 of the *Storage and Disposition PEIS* for a generic analysis of light water reactors using 100% MOX cores. That analysis is for a single reactor at a site and clearly states that for multiple reactors at a site the impacts "would be approximately doubled for two rectors or tripled for three reactors." On p. S-11 of the *Surplus Plutonium Disposition DEIS* it states that irradiation would occur at 3-8 reactors but does not state any assumptions about the number of sites or how many were assumed for the analysis. 24
- Why is the DOE reserving the option to use CANDU reactors and moving forward with testing if throughout the DEIS the assumption is that MOX will be used in US LWRs? If the DOE is still considering CANDU reactors, what effect will Ontario Hydro's recent shutdown of a number of CANDU reactors have on the program? What provisions will be made to ensure that both Canadian and U.S. citizens will have the opportunity for input? 25
- Who is responsible for unirradiated fuel? What will occur if MOX fuel fabrication commences but either the license to use MOX is rejected by the NRC or the reactor operators decide to cancel the project? 26
- How long will unirradiated fuel be stored and at what sites? If storage is at the reactor site, what additional security measures will be undertaken? 27
- What are the implications of siting facilities in the F-Canyon? How will this affect reprocessing policy? How will it affect clean-up of the site? Is there any relation between a decision to use the F-Canyon for the disposition program and the use of the 28

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MD237–23 **Immobilization**

DOE's offices are coordinating efforts so that potential impacts of the SRS HLW program's decisions on immobilization are understood. This would allow any necessary changes to the can-in-canister or other immobilization approach to be made in a timely manner. DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared.

In addition, results of an in-progress NAS study will help determine to what extent the can-in-canister configuration meeting the Spent Fuel Standard depends on the presence of an intense radiation barrier. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. Necessary analyses would be conducted at that time should this decision identify the need to reconsider using cesium 137 from the capsules currently stored at Hanford. It should be noted that DOE has not made final decisions on disposition of the Hanford cesium and strontium capsules.

MD237–24 **Cumulative Impacts**

Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use

the MOX fuel. The analyses reflect the information provided by the bidders in the MOX procurement process, supplemented by additional information. Section 2.18.3 was revised and Section 4.32.8 was added to include the cumulative impacts of the proposed reactor sites.

MD237–25 **Parallex EA**

In the SPD Draft EIS, DOE retained the option to use some of the surplus plutonium as MOX fuel in CANDU reactors, which would have only been undertaken in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the SPD Draft EIS was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is no longer actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. A separate environmental review, the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999), analyzes the fabrication and proposed shipment of MOX fuel rods for research and development activities involving the use of limited amounts of U.S. MOX fuel in a Canadian test reactor. A FONSI was signed on August 13, 1999. Both of these documents can be viewed on the MD Web site at http://www.doe-md.com. If a decision is made to dispose of Russian surplus plutonium in Canadian CANDU reactors in order to augment Russia's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

MD237–26 **DOE Policy**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. Because the fuel fabricator and reactor licensees work closely as a team, it is unlikely that the fabrication of MOX fuel would outpace its need. Reactor shutdowns or other operational

issues that could affect the need for fuel would be incorporated into the fuel fabrication schedules, and adjustments made as required. In the event that MOX fuel were made and then not be needed due to NRC not issuing a license amendment or other factors, DOE would be responsible for the unirradiated fuel and would reexamine its disposition options.

MD237–27 **MOX RFP**

The MOX facility would have the capability to store the MOX fuel for a minimum of 18 months prior to shipment to the reactor sites for irradiation. The MOX facility would be located at an existing secure DOE site. DOE does not anticipate the need for any additional security measures at reactor sites, other than for the additional security applied for the receipt of fresh fuel. MOX fuel would be delivered to the commercial reactors in SST/SGTs. Commercial reactors currently have armed security forces, primarily to protect against perimeter intrusion. There would be increased security for the receipt and storage of fresh MOX fuel, as compared with that for fresh LEU fuel, for additional vigilance inside the perimeter. However, the increased security surveillance would be a small increment to the plant's existing security plan. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a geologic repository built in accordance with the NWPA. The duration for storage does not depend on whether the spent fuel originated as MOX or LEU, but rather on when a storage facility is available to receive spent fuel. The storage of MOX spent fuel would not require any additional security due to the radiation barrier and difficulty associated with moving spent fuel.

MD237–28 **DOE Policy**

The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). DOE eliminated as unreasonable the eight alternatives in the SPD Draft EIS that used portions of Building 221–F with a new annex at SRS for plutonium conversion and immobilization. It was determined

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F-Canyon to deal with scrubs and alloys from Rocky Flats by reprocessing them at SRS? 28

- What are the implications of re-use of the facilities? The DEIS states:

when the missions of the plutonium disposition facilities are completed, deactivation and stabilization would be performed to reduce the risk of radiological exposure; reduce the need for, and costs associated with, long-term maintenance; and prepare the buildings for potential future use. (Chapter 4 of the SPD EIS provides a discussion on deactivation and stabilization.) At the end of the useful life of the facilities, DOE would evaluate options for D&D or reuse of the facilities. D&D of these facilities would not occur for many years. When DOE is ready to propose D&D of these facilities, an appropriate NEPA review will be conducted. (p. S-5)

Section 4.31 states that "it is *assumed* that the equipment within the building would be deactivated and the facilities stabilized to a condition suitable for reuse." (p. 4-391, emphasis added) Such a process would include removing both nuclear materials and the equipment. However, DOE does not indicate how it would ensure, either through legal or regulatory means, that the facilities would not be reused for MOX fuel production purposes. The ROD for the *Storage and Disposition of Weapons-Usable Fissile Materials Final PEIS* indicates that DOE would try to limit facility licenses in order to prevent use of the MOX FFF for commercial MOX production (as well as limiting reactor licenses). This is not discussed in the *Surplus Plutonium Disposition DEIS*. 29

- What are the effects of an accident involving a cask near water? In chapter L, the DEIS describes various tests done on casks (e.g. drop tests). However, the immersion test is done a separate cask, one which has not gone through the series of physical stress tests. How would the accident analysis change if such a test were performed? Are there plausible scenarios for a cask falling from a height *and* being immersed in water (e.g. accidents on bridges over rivers)? 30

DOE's final environmental impact statement should answer these questions.

Conclusions

The "dual-track" strategy and its emphasis on MOX rests on a number of faulty political and technical assumptions. Two of the most important are, first, the idea that the US must implement a MOX program to ensure Russian participation in a disposition program.. As we have shown above, this is false for a number of reasons. Second, is the idea that the dual-track provides technical backup in the case of problems with one of the options. This idea is faulty because immobilization is necessary to process 17 of the 50 metric tons of surplus plutonium, and so must be made to operate successfully in any case. 31

A MOX disposition program poses a number of long-term proliferation risks not adequately considered by DOE. Most significantly, such a program will finance a MOX fuel fabrication facility in Russia, providing the only missing link in Minatom's plans for 32

MD237

16

that the amount of space required for the immobilization facility would be significantly larger than originally planned. These new space requirements mean that the annex required to be built alongside Building 221–F would be very close in size and environmental impacts to the new immobilization facility alternatives at SRS. Therefore, this SPD EIS only presents the alternatives involving a completely new immobilization facility at SRS. Building 221–F remains the preferred alternative for processing the RFETS plutonium residues and scrub alloy, as described in the *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site* (DOE/EIS-0277F, August 1998). The cleanup of site facilities after completion of the surplus plutonium disposition program would be conducted in compliance with applicable environmental and safety regulations.

MD237–29 **DOE Policy**

DOE does not plan to use the proposed surplus plutonium disposition facilities for MOX fuel fabrication after completion of the surplus plutonium disposition program. D&D actions would be commensurate with facility reuse decisions.

MD237–30 **Transportation**

The Type B shipping containers that would be used for the transportation of surplus plutonium in various forms are described in Appendix L.3.1.6. The requirements for certification of a Type B container include maintaining its integrity at a depth of 15 m (50 ft). This would be a greater depth than would be involved in an accident on most bridges. A more rigorous requirement to withstand a depth of 200 m (656 ft) is required for casks that are certified to carry 1 million or more curies. These requirements are applied to an undamaged container because of the very low probability of a container breach by any realistic cause and on the basis of actual transportation experience. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

MD237–31 **DOE Policy**

The Russian government has plans to use surplus plutonium in commercial reactors. Because the Russians have expressed concern that immobilization would not destroy any plutonium, it is conceivable that the Russians would not eliminate their plutonium stockpile if the United States were to implement an immobilization-only approach. Therefore, the hybrid approach provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in weapons again.

Immobilization is the preferred approach to disposition the 17 t (19 tons) of impure plutonium. All of the surplus plutonium could be made into MOX fuel, however, DOE reviewed the chemical and isotopic composition of the surplus plutonium and determined in the *Storage and Disposition PEIS* ROD that about 8 t (9 tons) of surplus plutonium were not suitable for use in making MOX fuel. Furthermore, DOE has identified an additional 9 t (10 tons) for a total of 17 t (19 tons) that have such a variety of chemical and isotopic compositions that it is more reasonable to immobilize these materials and avert the processing complexity that would be added if these materials were assigned to be made into MOX fuel. The criteria used in this identification included the level of impurities, processing requirements, and the ability to meet the MOX fuel specifications. If at any time it were determined that any of the 33 t (36 tons) currently proposed for MOX fuel fabrication was unsuitable, that portion would be sent to the immobilization facility.

MD237–32 **Nonproliferation**

DOE acknowledges the commentor's concerns regarding the disposition of surplus Russian plutonium as MOX fuel, although programmatic and policy issues such as U.S. policies toward plutonium disposition in Russia are beyond the scope of this SPD EIS. The United States will not support any plans to build a plutonium economy.

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Institute for Energy and Environmental Research, Takoma Park, MD

a plutonium economy. It also poses severe safety and environmental dangers, particularly in its reliance on again Russian reactors. | 32

Furthermore, immobilization provides a number of other advantages over MOX. Reactor control issues would not be present under an immobilization program. The number of facilities and operations would be reduced and the overall cost of the program would be lower. | 33

The DEIS is insufficient as an environmental analysis document. The DOE has failed to include the communities living near the reactors their opportunity to participate in the process. It is insufficient to assume the NRC re-licensing process will accommodate their concerns. Furthermore, many reactor-related issues have been left out of this document. | 16

Similarly, the DOE has failed to demonstrate that the sites chosen for conversion of uranium hexafluoride to uranium dioxide are representative of the actual sites which may be used. DOE has also failed to involve the affected citizens near these sites in the NEPA process. | 17

The DEIS also has a number of deficiencies which need to be addressed. The DOE has failed to analyze a reasonable alternative which would involve a single facility undertaking the pit disassembly and conversion, as well as the immobilization process. | 21
The facility accident analysis does not adequately address the issue of worker risk and the effects of accidents on involved workers. The results for non-involved workers are not fully presented. There are numerous other deficiencies and unanswered questions which need to be resolved. | 22

Unless DOE studies the proper options and provides complete analysis the final environmental impact statement will be fundamentally flawed and incomplete.

Recommendations

The Institute for Energy and Environmental Research strongly urges the Department of Energy to:

1. Select immobilization of all 50 metric tons of plutonium. Immobilization is the best alternative for meeting the non-proliferation and disarmament goals of the program while minimizing the impacts. The MOX option should be rejected for both technical and policy reasons, because it could create many safety and proliferation problems, even while addressing the security of surplus weapons plutonium. Certainly, it is in the interest of the US to encourage plutonium disposition in Russia, and to support such a program financially. However, DOE has not adequately explored other options for reconciling Russian policy on plutonium as an economic asset with the need to put surplus plutonium in non-weapons-usable form. | 34
2. The DOE should analyze the option of conversion and immobilization of all 50 tons of surplus plutonium utilizing a single facility | 21
3. The DOE should revise its accident analysis to include involved workers. | 22

17 MD237

Close cooperation between the two countries is required to ensure that nuclear arms reductions cannot be easily reversed. Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. In fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

U.S. nonproliferation policy is addressed in response MD237–4.

MD237–33 **Alternatives**

It is correct that there would be no reactor issues involved if surplus plutonium disposition occurred through the immobilization-only approach, and the overall costs would probably be less because only two proposed surplus plutonium disposition facilities would be needed. However, the goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this.

MD237–34 **Alternatives**

Russia's plans for MOX fuel are addressed in response MD237–1.

Institute for Energy and Environmental Research, Takoma Park, MD

4. The DOE should provide integrated impacts for each alternative analyzed. A clear and concise summary of those impacts should be provided and comparisons made between the two major classes of alternatives: Hybrid and Immobilization. 35

5. The DOE should develop technical back-up options by developing alternate immobilization technologies, perhaps through pilot scale work to handle Rocky Flats materials. 36

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MD237

MD237–35 **General SPD EIS and NEPA Process**

A comparison of the impacts of the hybrid and the all immobilization alternatives is addressed in response MD237–18.

MD237–36 **DOE Policy**

Several immobilization technologies for surplus plutonium disposition were analyzed in the *Storage and Disposition PEIS*. They include vitrification (glass), ceramic immobilization, and electrometallurgical treatment. Vitrification and electrometallurgical treatment are existing technologies. This SPD EIS analyzes the can-in-canister approach for both glass and ceramic immobilization. This technology is currently under testing for ceramic immobilization. Regarding the RFETS plutonium materials, existing technologies are being used to stabilize these materials so that they can be immobilized with the technology chosen in the SPD EIS ROD.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
STEVEN BIEBER
PAGE 1 OF 1

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore Maryland 21224
(410) 631-4120

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

August 13, 1998

Mr. Harold Canter
Acting Director
Office of Fissile Materials Disposition
United States Department of Energy
P.O. Box 23786
Washington DC 20026-3786

State Application Identifier: MD980727-0797
Project Description: Draft EIS - Surplus Plutonium Disposition

Dear Mr. Canter:

Thank you for providing the Maryland Department of the Environment (MDE) with the opportunity to comment on the above-referenced project. Copies of the documents were circulated throughout MDE for review, and it has been determined that this project is consistent with MDE's plans, programs and objectives. 1

Again, thank you for giving MDE the opportunity to review this project. If you have any questions or need additional information, please feel free to call me at (410) 631-3656.

Sincerely,

Joane Mueller for

Steven Bieber
MDE Clearinghouse Coordinator
Technical and Regulatory Services Administration

cc: Bob Rosenbush, State Clearinghouse

"Together We Can Clean Up"

TDD FOR THE DEAF (410) 631-3009

Recycled Paper

MD026

MD026–1 **Other**

DOE acknowledges the commentor's input.

MASSACHUSETTS CITIZENS FOR SAFE ENERGY
MARY ELIZABETH LAMPERT
PAGE 1 OF 1

Massachusetts Citizens for Safe Energy

*29 Temple Place, Boston MA 02111 [617] 292-4821 phone * [617] 292-8057 fax*
148 Washington St., Duxbury MA 02332 [781] 934-0389 phone [781] 934-5579 fax*

July 21, 1998 JUL 27 RECD

U.S.Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786 - Washington DC 20026-5134

RE: Request for DOE Meeting Concerning DEIS Regarding MOX in Boston/Plymouth MA Area

One operating nuclear reactor remains in Massachusetts - the Pilgrim Nuclear Power Station in Plymouth, Massachusetts. We have no confidence in the safety of that reactor because, for example: it is old and experiencing age-related deterioration peculiar to boiling water reactors; it is a GE Mark I - a flawed design and the manufacturer, GE, holds the prize for making reactors with the most troubled histories in the U.S.; the N.R.C., the regulators, have a consistent history of being the lapdogs, instead of the watchdogs, of the industry; and Massachusetts has recently deregulated it's electric market with consequent efforts by the owner of Pilgrim NPS to cut corners in an attempt to compete. 1

With that as background, it is understandable why we oppose the MOX proposal which would both raise the probability of a severe reactor accident and more than double the radioactivity that could be released should an accident occur.

We request that an additional DOE meeting on the Draft Environmental Impact statement be held in the Boston/Plymouth area to provide you with an opportunity for dialogue with individuals and groups who stand to be impacted by your proposal in the future.

The meetings scheduled to date are in Richland, Washington; Amarillo, Texas; North Augusta, SC; Portland, Oregon; Idaho Falls, ID. There are none scheduled in the Northeast where many of the aged reactors which potentially may use MOX fuel are located. We are left out of the process. 2

Respectfully submitted by,

Mary Elizabeth Lampert MD001

MD001–1 **MOX RFP**

Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel, should the decision be made to proceed with the hybrid approach. In addition, the reactors selected include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. Thus, the Pilgrim reactor was not considered because it is an older reactor.

MD001–2 **General SPD EIS and NEPA Process**

DOE does not believe that an additional public hearing in the Northeast is necessary, since none of the reactors to be used are located there. All interested parties were encouraged to comment on the *Supplement to the SPD Draft EIS* issued in April 1999. This *Supplement* included the Environmental Synopsis, a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Appendix P and Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

CITY OF ALGONAC

RESOLUTION

URGING THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS-USABLE FISSILE MATERIAL THROUGH MICHIGAN AND ST. CLAIR COUNTY IN PARTICULAR

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and 1

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas.

NOW, THEREFORE, BE IT RESOLVED, by the Algonac City Council, that we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

ADOPTED 8/4/98

Rose Ann Perricone
Rose Ann Perricone
City Clerk

MD017

MD017–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

BERLIN
THOMAS R. BLOUSLH ET AL.
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BERLIN TOWNSHIP

13892 HOUGH ROAD,
BERVILLE, MI, 48002
PHONE: (810) 784-9969
FAX: (810) 784-9717

RESOLUTION 98-8
TRANSPORTATION OF NUCLEAR-GRADE MATERIALS

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, through Michigan, possibly utilizing I-69 and the Blue Water Bridge in Port Huron., and

WHEREAS, we are all aware of the many problems associated with transporting volatile and carcinogenic materials. The environmental risks are excessively high and the use of the Blue Water Bridge route would definitely jeopardize the population of Berlin Township as well as all of the other communities along this route and finally, of all places, one of the Great Lakes, and

WHEREAS, there are many other more suitable access points than the international water boundaries of Michigan. And as you must know, the western portions of the continent are more easily accessed and do not involve transportation through this densely populated area. 1

NOW, THEREFORE, BE IT RESOLVED: by the Berlin Township Board, St. Clair County, Michigan, that we sincerely urge the Department of Energy to exclude from consideration, the I-69 to Port Huron route, as a choice for transport of weapons-usable fissile material.

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

ADOPTED BY ROLL CALL VOTE ON AUGUST 10, 1998

BERLIN TOWNSHIP SUPERVISOR

BERLIN TOWNSHIP CLERK

BERLIN TOWNSHIP TREASURER

BERLIN TOWNSHIP TRUSTEE

BERLIN TOWNSHIP TRUSTEE

MD018

MD018–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

I would like to receive the Surplus Plutonium Disposition Draft Environmental Impact Statement. I did call about this about one month ago, and I have not received it yet. And the local people here would like to have a meeting. We feel that we need a public meeting here, as you would like to bring it through our Blue Water Bridge in Port Huron. You will be receiving information from our County Commissioners and our Port Huron City Councilmen. We all feel that is an important spot to have a meeting and we do not feel that we have had time to review the EIS, because we only have until September 16th and we believe that date should be pushed up. We have not been able to review it. We haven't been able to discuss it. And we would like to respond before September 16th as we feel it is our right. Thank you. Good bye. 1

PD025

PD025–1 **Parallex EA**

DOE acknowledges the commentor's concern regarding transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

DOE does not believe that a hearing in Michigan is necessary because none of the actions addressed in this SPD EIS would occur there.

BROCKWAY
CARL VERMEESCH ET AL.
PAGE 1 OF 1

BROCKWAY TOWNSHIP

A resolution to urge the United States Department of Energy to refrain from transporting weapons-usable fissile material through Michigan and St. Clair County in particular.

Whereas, The United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

Whereas, There are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and

Whereas, There are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas; now, therefore, be it 1

Resolved by the Brockway Township Board of Trustee's, That we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and it further be

Resolved, That a copy of this resolution be transported to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

CARL VERMEESCH, SUPERVISOR

ARTHUR LAUPICHLER, CLERK

RUTH KROSNICKI, TREASURER

FRED THEEL, TRUSTEE

RONALD MEHARG, TRUSTEE

MD161

MD161–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

CHARTER TOWNSHIP OF CHINA
St. Clair County, Michigan
Resolution #8-98

URGING THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS-USABLE FISSILE MATERIAL THROUGH MICHIGAN AND ST. CLAIR COUNTY IN PARTICULAR

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable , and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and 1

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan.. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas.

NOW, THEREFORE, BE IT RESOLVED, by the Charter Township of China Board of Trustees, that the United States Department of Energy be urged to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

IT IS FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

The following aye votes were recorded: Allen, Neiman, Wallace, Schweihofer, Markel, and Green
Absent: Linsday
The following nay votes were recorded: None

CHARTER TOWNSHIP OF CHINA
BOARD OF TRUSTEES

Julie Ann Wallace, Clerk

MD082

MD082–1 **Parallex EA**

The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

CHINA
JULIE ANN WALLACE
PAGE 2 OF 2

STATE OF MICHIGAN)
COUNTY OF ST. CLAIR)

I, Julie Ann Wallace, Clerk of the Charter Township of China, County of St. Clair, and State of Michigan, do hereby certify that the above Resolution #8-98 is a true and exact copy of the Resolution adopted at a regular meeting held August 17, 1998.

JULIE ANN WALLACE
Township Clerk

DATE: August 17, 1998

MD082

CITIZENS FOR A HEALTHY PLANET
KATHRYN CUMBOW
PAGE 1 OF 2

Sept. 16th 1998

Office of Fissile Materials Management
U.S. Dept. of Energy
1000 Independence Ave. SW
Washington D.C.

To the Dept. of Energy:

I am writing in behalf of Citizens For a Healthy Planet, a grassroots environmental group based in St. Clair County, Michigan. We are requesting a 60 day extension of the comment period and additional Public Hearings on the Draft Surplus Plutonium Disposition Environmental Impact Statement.

One good reason for extending the comment period is that some of the persons in our area requesting the SPDEIS documents requested the documents immediately upon notification of their existence, yet the documents did not arrive until at least 6 weeks after the start of the comment period. I personally requested documents at the same time and received mine 3 weeks after the start of the comment period. This seems blatantly unfair as 2 weeks is not enough time to read these documents, and send for related reports noted in these documents.

We are asking for additional hearings:
First, we propose at least a hearing in the Port Huron, Michigan/ Sarnia, Ontario, Canada area, since the Parallex Project (the proposed shipping of U.S MOX fuel from Los Alamos, New Mexico for testing at Chalk River Canada) was shunted to an Environmental Assessment without notifying persons on the Plutonium Disposition mailing list, and providing no chance for local or national public review of the documents (especially shutting out review and comments by residents of the proposed routes which are impacted areas.) We also ask that all persons on the Plutonium Disposition mailing list be notified immediately of the existence of the Environmental Assessment for the Parallex Project, and given a 60 day comment period and opportunity to ask for hearings. 2) that the Final Environmental Assessment for the Parallex Project to not be completed before 1) and 2) are done. We also note that the St. Clair County Commissioners, the City of Port Huron, the Mayors of Sarnia, Ontario in Canada, and Port Huron, Michigan, several townships in St. Clair County, many Michigan legislators including State Rep. Karen Willard and Federal Rep. David Bonior, Senator Spencer Abraham, as well as many Great Lakes, Canadian and Michigan environmental groups including Great Lakes United, Nuclear Awareness Project, Citizens For Alternatives to Chemical Contamination, Michigan Environmental Council et. al. are calling for hearings in the Port Huron/Sarnia area. We would also ask that the Dept. of Energy refrain from calling earlier by the Governor of states and Tribes along the route Public Review, especially as their comments are not available to the general public, in the states along the route or interested public on the Plutonium Disposition mailing list. What happened to the DOE's commitment to openness to the public?

We also support STAND of Amarillo in their request for additional hearings. 1) near reactor sites that are being considered for use of MOX fuel. 2) a hearing in Dallas, Texas as Dallas is likely to be a corridor for special nuclear shipments and radioactive waste from new operations. 3) in Denver, Colorado, in close proximity to Rocky Flats where approximately 25 % of the surplus plutonium is in storage. 4) regional hearings in Savannah, Georgia and Columbia, South Carolina. The DOE cannot justify excluding Savannah from hearings while holding one in Portland, no longer under serious consideration for the plutonium processing facilities. Impacts on the Savannah River from SRS operations and accidents are well documented and the Dept. of Energy owes these impacted citizens the right to speak out on any further plans. At a hearing in Washington D. C. where many public policy and decisions are made, and many consumer advocate groups and non-governmental organizations exist that would monitor both the Dept. of Energy and taxpayer dollars that would go to support the DOE's Plutonium Disposition projects.

Finally, we feel that since all of these projects will impact greatly on every U.S. taxpayer, we suggest that in addition to normal DOE public notification policy that the U.S. DOE break with tradition and send press releases also through the Associated Press or other national media for distribution in newspapers nationwide in the Sunday editions every time it releases documents pertaining to the Plutonium Disposition.

1

2

FD321

FD321–1 **Parallex EA**

The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com. To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites and therefore, with the most directly concerned population. This decision did not preclude relevant comment by State and local governments, individuals, and organizations in Michigan. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how or where they were received. DOE does not believe that any extension of the comment period on the SPD Draft EIS is necessary. Moreover, DOE does not believe that a hearing in Michigan is necessary because none of the actions addressed in this SPD EIS would occur there.

FD321–2 **General SPD EIS and NEPA Process**

DOE used various methods, including press releases to national and local news media—newspapers, radio stations, and television stations—to announce the availability of the SPD Draft EIS. It also mailed availability announcements to national, local, and tribal officials, as well as members of the public.

CITIZENS FOR A HEALTHY PLANET
KATHRYN CUMBOW
PAGE 2 OF 2

There is much more we would like to say, and more documents and reports we would like to read and refer to. Our group is made up of people who work and have families and we do not have the luxury to spend the time or money that is needed to speak to the mighty corporate and defense interests and monies that are pushing these huge plans forward. Plutonium is a lethal poison and has a half-life of 24,000 years. Whatever we do with it will have a lasting effect on our living conditions on everyone on this planet. Therefore, we recommend in the interest of all humankind that these decisions not be made in haste, and that at the very least that the spirit of NEPA not be violated, by lack of meaningful public involvement in the planning and decision process. 1

Signed,

Kathryn Cumbow,
Citizens For a Healthy Planet,
Box 334,
Bennett, MI 49020

FD321

CITIZENS RESISTANCE INFIRMY II
MICHAEL KEAGAN
PAGE 1 OF 1

Hello, this is Michael Keagan, and I'm calling on behalf of Citizens Resistance Infirmy II. We have formally taken a position that we are requesting an extension of the public comment period on the environmental assessment pertaining to the MOX Parallex project. We are in strong opposition to this being carried through and we are asking for our comments, an extension of time so that we can make comments on this MOX Parallex Project. My phone number is (31), I'm sorry, it is (734) 457-5979. Again that's Michael Keagan with Citizens Resistance Infirmy II. Thank you. I'm requesting a 90-day extension. 1

PD064

PD064–1 **Parallex EA**

Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action, the Parallex Project; therefore, it is beyond the scope of the proposed action analyzed in this SPD EIS. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com. As indicated in Section 1.1, while the United States is participating in the Parallex Project, it is no longer actively pursuing the CANDU option as part of its plutonium disposition program. If Russia and Canada agree to disposition Russian surplus plutonium in CANDU reactors in order to augment Russia's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

CLAY
JON E. MANOS ET AL.
PAGE 1 OF 2

TOWNSHIP OF CLAY
County of St. Clair

JON E. MANOS
Supervisor

MICHAEL P. PELLERITO
Clerk

CONNIE S. TURNER
Treasurer

4710 PTE. TREMBLE ROAD • P.O. BOX 429 CLAY TOWNSHIP, MICHIGAN 48001-0429

TELEPHONE (810) 794-9303
FAX (810) 794-1964

BUILDING-ASSESSING
(810) 794-9320

August 19, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington D.C. 20026-3786

Enclosed is a Resolution adopted by the Clay Township Board of Trustees on August 3, 1998 urging the United States Department of Energy to refrain from transporting weapons-usable fissile material through St. Clair County.

Sincerely,

Jon E. Manos
Clay Township Supervisor

JEM/vk
Enclosure

MD104

RESOLUTION

URGING THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS-USABLE FISSILE MATERIAL THROUGH MICHIGAN AND ST. CLAIR COUNTY IN PARTICULAR

Minutes of a regular meeting of the Township Board of the Township of Clay, County of St. Clair, Michigan held in the Harsens Island Lions Hall, 263 LaCroix Road, Harsens Island, Michigan on the 3rd of August, 1998, at 7:30 p.m. Eastern Standard Time.

PRESENT: Supervisor Jon Manos, Clerk Michael Pellerito, Treasurer Connie Turner, Trustee Pat Sharrow, Trustee Dr. L. Kasperowicz, Trustee Joanne Shirkey, Trustee George Webster.
ABSENT: None.

The following Preamble and Resolution were offered by Trustee George Webster and supported by Trustee Joanne Shirkey.

A resolution to urge the United States Department of Energy to refrain from transporting weapons-usable fissile material through Michigan and St. Clair County in particular.

WHEREAS, the Township of Clay supports the St. Clair County Board of Commissioner's Resolution No. 98-29, hereby, offers the following Resolution:

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and 1

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas.

NOW, THEREFORE, BE IT RESOLVED, by the Clay Township Board of Trustees that we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

ROLL CALL VOTE WAS AS FOLLOWS:
AYES: Sharrow, Dr. Kasperowicz, Turner, Manos, Pellerito, Shirkey, Webster.
NAYS: None.
ABSENT: None.

This Resolution adopted by the Clay Township Board of Trustees August 3, 1998.

Michael P. Pellerito
Clay Township Clerk

CERITIFICATION

,I, hereby, certify that the foregoing constitutes a true and complete copy of a Resolution adopted by the Township Board of the Township of Clay, County of St. Clair, Michigan, at a regular meeting held on August 3, 1998, and that said meeting was conducted and public notice of said meeting was given pursuant to and in full compliance with the Open Meetings Act, being Act 267, were kept and will be or have been made available as required by said Act.

Michael P. Pellerito
Clay Township Clerk

MD104

MD104–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

CLYDE
REBECCA YARR
PAGE 1 OF 1

RESOLUTION 98-29

URGING THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS-USABLE FISSILE MATERIAL THROUGH MICHIGAN AND ST. CLAIR COUNTY IN PARTICULAR

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas. 1

NOW, THEREFORE, BE IT RESOLVED, by the St. Clair County Board of Commissions, that we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriated federal and state elected officials.

DATED: August 18, 1998

Reviewed and Approved by:

Rebecca Yarr, Clerk
Clyde Township

ELWOOD L. BROWN
County Corporation Counsel
301 County Building
Port Huron, MI 48060

MD099

MD099–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

TOWNSHIP OF COLUMBUS

RESOLUTION 98-08

URGING THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS-USABLE FISSILE MATERIAL THROUGH MICHIGAN AND IN ST. CLAIR COUNTY IN PARTICULAR

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; 1

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas.

NOW, THEREFORE, BE IT RESOLVED, by the Columbus Township Board of Trustees, that we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

DATED: August 11, 1998

Reviewed and Approved By:

JAMES V. DUBAY
Columbus Township Attorney
68650 Main Street
Richmond, MI. 48062

COLUMBUS TOWNSHIP BOARD OF TRUSTEES

By: Patricia Iseler
Columbus Township Clerk

MD023

MD023–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

DUDUS, MAT
PAGE 1 OF 1

My name is Mat Dudus. I'm just calling to let you guys know that recently there was this article in the Detroit Free Press on Thursday, August 27th concerning a possible shipment of plutonium to Michigan to Canada. I hope you guys choose Michigan now even more so because this is, this reporting is just crazy on their part to scare up some sales of papers and scare people about plutonium. I'm happy, I'd be more than happy to allow you guys to come through Michigan. I'd escort you myself. I'm, thank you very much. Good bye. Oh by the way, if you needed my phone, home phone number, it's (313) 640-0283. 1

PD042

PD042–1 **Parallex EA**

DOE acknowledges the commentor's support of transporting material through Michigan. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action, the Parallex Project; therefore, it is beyond the scope of the proposed action analyzed in this SPD EIS. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

RESOLUTION

Charter Township of East China
County of St. Clair, Michigan

Minutes of a regular meeting of the Township Board of the Charter Township of East China, County of St. Clair, Michigan, held in the Township Hall, on the 3rd day of August, 1998, at 7:30 p.m., Eastern Daylight Savings Time.

PRESENT: Barker, Beaudua, Horn, Light, Parcell and Smith.

ABSENT: Trustee Randolph.

The following Resolution was offered by Member Light and supported by Member Horn.

RESOLUTION
URGING THE UNITED STATES DEPARTMENT OF ENERGY
TO REFRAIN FROM TRANSPORTING
WEAPONS-USABLE FISSILE MATERIAL
THROUGH MICHIGAN
AND ST. CLAIR COUNTY IN PARTICULAR

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

1

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas.

NOW, THEREFORE, BE IT RESOLVED, by the Charter Township of East China Board of Trustees, that we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

MD011

MD011–1 **Parallex EA**

The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

EAST CHINA
SANDRA A. SMITH
PAGE 2 OF 2

All resolutions and parts of resolution insofar as they conflict with the provisions of this resolution be and the same hereby are rescinded.

AYES: Barker, Beaudua, Horn, Light, Parcell and Smith.

NAYS: None.

ABSENT: Randolph.

RESOLUTION DECLARED ADOPTED

Sandra A. Smith
SANDRA A. SMITH, CLERK
CHARTER TOWNSHIP OF EAST CHINA

CERTIFICATION

I hereby certify that the foregoing is a true and correct copy of a Resolution adopted by the Township Board of the Charter Township of East China, St. Clair County, Michigan, at a regular meeting held on August 3, 1998, and that said meeting was conducted and public notice of said meeting was given pursuant to and in full compliance with the Open Meetings Act, being Act 267, Public Acts of Michigan, 1976, and that the minutes of said meeting were kept and have been or will be made available as required by said Act.

Sandra A. Smith
SANDRA A. SMITH, CLERK
CHARTER TOWNSHIP OF EAST CHINA

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MD011

RESOLUTION 98-05
EMMETT TOWNSHIP

A resolution to urge the United States Department of Energy to refrain from transporting weapons-usable fissile material through Michigan and St. Clair County in particular.

Whereas, The United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

Whereas, There are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and 1

Whereas, There are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas; now, therefore, be it

Resolved by the St. Clair County Board of Commissioners, Emmott Township That we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and it further be

Resolved, That a copy of this resolution be transported to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

OWEN KEAN, SUPERVISOR

PATRICIA E. BROZOWSKI, CLERK

ROBERT STURZA, TREASURER

JOHN COWHY, TRUSTEE

DANIEL GREENIA, TRUSTEE

MD013

MD013–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

GUNTER, KEITH
PAGE 1 OF 1

Hello, my name is Keith Gunter. I reside at 37232 Great Oaks Court, Clinton Township, Michigan 48036. I'm calling to request that the DOE do a 90 day extension on public comment on the plutonium/MOX issue. Would very much appreciate your giving us more of an opportunity to comment on this very important issue and also to take Representative David Bonior's advice for Michigan to have hearings in the Port Huron, Michigan/Canada, Ontario area. Thank you very much 1

PD056

PD056–1 **Parallex EA**

DOE acknowledges the commentor's concern regarding transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites and therefore, with the most directly concerned population. This decision did not preclude relevant comment by State and local governments, individuals, and organizations in Michigan. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how or where they were received. DOE does not believe that any extension of the comment period on the SPD Draft EIS is necessary. Moreover, DOE does not believe that a hearing in Michigan is necessary because none of the actions addressed in this SPD EIS would occur there.

IRA
JOHN F. JONES
PAGE 1 OF 2

RES 98-8-4

URGING THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS – USABLE FISSILE MATERIAL THROUGH MICHIGAN AND ST. CLAIR COUNTY IN PARTICULAR

***WHEREAS**, the United States Department of Energy is studying transportation options for moving weapons – usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and*

***WHEREAS**, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply on the Great Lakes; and* 1

***WHEREAS**, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas.*

***NOW, THEREFORE, BE IT RESOLVED**, by the Ira Township Board, that we urge the United States Department of Energy to refrain from Transporting weapons – usable fissile materials through Michigan and St. Clair County; and*

***BE IT FURTHER RESOLVED**, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.*

DATED: August 14, 1998

MD116

MD116–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

IRA
JOHN F. JONES
PAGE 2 OF 2

CERTIFICATION OF CLERK

I hereby certify that the foregoing is a true and complete copy of a Resolution duly adopted by the Township Board of Ira Township, County of St. Clair, State of Michigan, at a regular meeting held on the 17th day of August, 1998 at which the following members were present: Thomas Jeannette, John Jones, Peter Vernier, Crystal Sovey and absent was Frieda Blackstock, and that said meeting was conducted and public notice of said meeting was given pursuant to and in full compliance with the Open Meetings Act, being Act 267, Public Acts of Michigan, 1976, and that the minutes of said meeting were kept and will be or have been made available as required by said Act.

I further certify that member Crystal Sovey moved adoption of said Resolution and member Thomas Jeannette supported said motion.

I further certify that the following members voted for adoption of said Resolution: Jeannette, Jones, Vernier and Sovey and none voted against adoption of said Resolution.

I further certify that the said Resolution has been recorded in the Resolution Book of Ira Township, and that such recording has been authenticated by the signatures of the Township Supervisor and the Township Clerk.

1

John F. Jones
Supervisor

Frieda M. Blackstock
Clerk
Deputy Clerk

Dated: August 17, 1998

MD116

City of Marine City
County of Saint Clair, Michigan

Resolution 98-27

Resolved by the City Commission of the City of Marine City, County of Saint Clair, Michigan, at their regular meeting held in the Guy Center, 303 S. Water Street, Marine City, Michigan, on August 6, 1998, at 7:00 P.M., a resolution urging the United States Department of Energy to refrain from transporting weapons-usable fissile material through Michigan and Saint Clair County in particular.

PRESENT: Beattie, Dunn, Fisher, Nasto, Negro, Petitpren and Roehrig
ABSENT: None

The following preamble and resolution were offered by Commissioner Roehrig, and supported by Commissioner Dunn .

WHEREAS, The United States Department of Energy is studying transportation options for moving weapons-usable fissile material, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, There are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and

WHEREAS, There are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas; now

THEREFORE, BE IT RESOLVED, by the Marine City City Commission, That we urge the United States Department of Energy to refrain from transporting weapons-fissile materials through Michigan and Saint Clair County and from utilizing the Blue Water Ferry between the City of Marine City and Sombra, Canada; and

FURTHER BE IT RESOLVED, That a copy of this resolution be transported to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate Federal and State elected officials.

1

Yeas: Beattie, Dunn, Fisher, Nasto, Negro, Petitpren and Roehrig
Nays: None

ATTEST:

Robert F. Beattie, Mayor

Sherry McAnally, City Clerk

MD020

MD020–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

MARINE CITY
DAVID RICHARDS
PAGE 1 OF 1

CITY OF
MARINE CITY
300 Broadway
MARINE CITY, MICHIGAN 48039
(810) 765-8846 • Fax (810) 765-4010

August 7, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

Re: Michigan Public Hearing

Dear Sir:

It has come to our attention the Department of Energy is scheduling meetings in many states to take public comment on the disposition of fissile materials. The officials and residents of the City of Marine City are interested in this issue, as are many small towns and local governments, especially since one disposal route utilizes Michigan thoroughfares.

Please consider this a formal request to schedule public meetings in Michigan. It only makes sense to consider public comment elicited from government officials and residents of communities along a proposed disposal transportation route. To not do so would seem to imply disinterest or indifference to those local attitudes and opinions. 1

It is our collective opinion the Department of Energy is neither disinterested nor indifferent to local opinions concerning this matter. We hope the Department will demonstrate an interest by conducting public meetings here in Michigan. I hope to receive a timely response to this request that can be conveyed to the Marine City Commission and the City's residents. Please contact me at your earliest convenience in this regard.

Sincerely,

David Richards, City Manager

"In The Heart of Blue Water District"

MD105

MD105–1 **Parallex EA**

DOE acknowledges the commentor's concern regarding transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites and therefore, with the most directly concerned population. This decision did not preclude relevant comment by State and local governments, individuals, and organizations in Michigan. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how or where they were received. DOE does not believe that any extension of the comment period on the SPD Draft EIS is necessary. Moreover, DOE does not believe that a hearing in Michigan is necessary because none of the actions addressed in this SPD EIS would occur there.

#21-98

RESOLUTION

A RESOLUTION TO URGE THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS-USABLE FISSILE MATERIAL THROUGH MICHIGAN AND ST. CLAIR COUNTY IN PARTICULAR.

Moved by Councilman Maples supported by Councilman Orr to adopt the following Resolution:

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and

WHEREAS, there are many suitable access points other than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas; 1

NOW, THEREFORE, BE IT RESOLVED that the Marysville City Council requests that the United States Department of Energy host a public meeting in the local affected area to explain the project and to receive public comment; and

BE IT FURTHER RESOLVED that the sixty (60) day public comment period for this project, which is due to expire September 16, 1998, be extended to allow for a local public meeting; and

BE IT FURTHER RESOLVED that the Marysville City Council urges the United States Department of Energy to refrain from considering transporting weapons-usable fissile materials through Michigan and St. Clair County until said meeting can be held and public comment considered; and

BE IT FURTHER RESOLVED that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

ADOPTED:

I hereby certify that the above is a true and correct copy of a resolution adopted at a regular meeting of the Marysville City Council on Monday, August 24, 1998.

Sharon L. Schess
City Clerk CMC

MD127

MD127–1 **Parallex EA**

DOE acknowledges the commentors' concern regarding transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

MEMPHIS
MARY I. BRUSCA
PAGE 1 OF 1

City of Memphis
" A pleasant place to live "

35095 Potter Street
P.O. Box 86
Memphis, Michigan 48041
810-392-2385
Fax: 810-392-3625

RESOLUTION

URGING THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS-USABLE FISSILE MATERIAL THROUGH MICHIGAN AND ST. CLAIR COUNTY IN PARTICULAR

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas. 1

NOW, THEREFORE, BE IT RESOLVED, by the Memphis City Council, that we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

* *

At a regular meeting of the City Council of the City of Memphis on the 4th day of August 1998, the following Councilmembers were present:

Garber, Horton, Hulett, Moran, Mayor Tatton, Walleman

and the following Councilmembers were absent:

Zukas

The within Resolution was moved by Councilmember Garber supported by Councilmember Moran and adopted by a vote of 5 to 1.

Mary I. Brusca

Mary I. Brusca, City Clerk

MD012

MD012–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

MICHIGAN HOUSE OF REPRESENTATIVES
HONORABLE KAREN WILLARD
PAGE 1 OF 2

HOUSE OF REPRESENTATIVES
LANSING, MICHIGAN

92ND DISTRICT
STATE REPRESENTATIVE
KAREN WILLARD
STATE CAPITOL
LANSING, MICHIGAN 48913
(517) 373-1600
1-800-423-8282

HOUSE MAJORITY WHIP
COMMITTEES
CHAIR: SENIOR CITIZENS AND VETERANS AFFAIRS
AGRICULTURE
JUDICIARY
TOURISM

August 14, 1998

Mr. Howard Canter
U. S. Department of Energy
Office of Fissile Material Disposition
P. O. Box 23786
Washington, D.C. 20026-3786

Dear Mr. Canter:

I am writing to communicate my concerns regarding the safety of transporting weapons-grade plutonium fuel over the International Blue Water Bridge in Port Huron, Michigan. I am asking for a sixty day extension on the comment period, which will close on September 16, 1998. I am also requesting a public hearing to be held in the city of Port Huron. It is necessary that the Department of Energy give local residents a chance to seriously analyze the situation and be able to comment.

Michigan is considered one of the alternative routes of transportation of plutonium-based nuclear fuel to Canadian power plants. The route will go directly through my district, which includes Lapeer and St. Clair counties. There is a strong desire of many residents of my district, as well as other affected citizens in Michigan, to attend one of the public meetings to comment and simply gather more information. However, the closest public meeting was scheduled to take place in North Augusta, South Carolina on August 13, 1998. There are no workshops scheduled in the state of Michigan. It is not possible for the vast majority of those expressing concern in my district to attend a meeting so far from their homes and work places. 1

Also, I ask you to consider alternative routes of travel from the Western U. S. where there are many access points to Canada that do not involve international waterways and high population areas. This waterway is also a major connecting channel in the Great Lakes. The environmental and security risk factors involved in transporting this highly volatile nuclear fuel more than 2,000 miles over ground through some of the most densely populated areas of the U. S. and the state of Michigan are deeply concerning.

Again, I am requesting a public hearing on the issue in Michigan. Port Huron would be an excellent meeting place that would allow those affected to be a true part of the process. This is an issue that could have a dramatic effect on the lives of many residents in Michigan. I strongly urge you to allow for adequate comment and education on the issue before you make your final recommendations.

MD025

MD025–1 **Parallex EA**

The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites and therefore, with the most directly concerned population. This decision did not preclude relevant comment by State and local governments, individuals, and organizations in Michigan. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how or where they were received. DOE does not believe that any extension of the comment period on the SPD Draft EIS is necessary. Moreover, DOE does not believe that a hearing in Michigan is necessary because none of the actions addressed in this SPD EIS would occur there.

MICHIGAN HOUSE OF REPRESENTATIVES
HONORABLE KAREN WILLARD
PAGE 2 OF 2

Thank you for the opportunity to express my views on this important issue. I hope that you will seriously consider my input.

Sincerely,

Karen Willard

Karen Willard
State Representative
82nd District

MD025

PORT HURON
HONORABLE GERALD "AJAX" ACKERMAN
PAGE 1 OF 2

OFFICE OF THE MAYOR

CITY OF PORT HURON
100 MCMORRAN BOULEVARD, PORT HURON, MICHIGAN 48060
PHONE. 810-984-9740; FAX: 810-982-0282

August 17, 1998

U. S. Department of Energy
Office of Fissile Materials
P.O. Box 23786
Washington, DC 20026-3786

Dear Energy Officials:

It has come to our attention that the U. S. Department of Energy is studying transportation options for moving nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge in Port Huron.

At the Port Huron City Council's last meeting, the enclosed resolution was unanimously adopted. The Council and residents of our community and surrounding area are interested in hearing an explanation of the project and to be able to provide public comment on this matter. 1

We would appreciate your cooperation in arranging such a meeting. Please give me a call if you have any questions or concerns.

Sincerely,

Gerald "Ajax" Ackerman
Mayor

GA/smc

Enclosure

MD053

MD053–1 **Parallex EA**

The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites and therefore, with the most directly concerned population. This decision did not preclude relevant comment by State and local governments, individuals, and organizations in Michigan. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how or where they were received. DOE does not believe that any extension of the comment period on the SPD Draft EIS is necessary. Moreover, DOE does not believe that a hearing in Michigan is necessary because none of the actions addressed in this SPD EIS would occur there.

PORT HURON
HONORABLE GERALD "AJAX" ACKERMAN
PAGE 2 OF 2

Resolution # 27
August 10, 1998

Councilmember Miller offered and moved the adoption of the following resolution:

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and

WHEREAS, there are many suitable access points other than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas;

NOW, THEREFORE, BE IT RESOLVED that the Port Huron City Council requests that the United States Department of Energy host a public meeting in the local affected area to explain the project and to receive public comment; and 1

BE IT FURTHER RESOLVED that the sixty (60) day public comment period for this project, which is due to expire September 16, 1998, be extended to allow for a local public meeting; and

BE IT FURTHER RESOLVED that the Port Huron City Council urges the United States Department of Energy to refrain from considering transporting weapons-usable fissile materials through Michigan and St. Clair County until said meeting can be held and public comment considered; and

BE IT FURTHER RESOLVED that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

ADOPTED/~~REJECTED~~ *UNANIMOUSLY*

I hereby certify that the above is a true and correct copy of a resolution adopted at a regular meeting of the Port Huron City Council on Monday, August 10, 1998.

Pauline M. Repp, CMC
City Clerk

MD053

SISTERS, SERVANT OF THE IMMACULANT HEART OF MARY
MARTHA RABAUT
PAGE 1 OF 1

Sisters, Servant of the Immaculate Heart of Mary
610 West Elm Ave.
Monroe, MI 48162

To: The Department of Energy
Regarding: Mixed Oxide Fuel

We are very concerned about the proposed plans to test and possibly allow the use of mixed oxide fuel. Please grant a 90 day extension for comments on this issue. The gravity of the issue warrants further time for public education and comment. 1

We are very grateful for your consideration of this matter.

Sincerely,

Martha Rabaut, I.H.M.

Martha Rabaut, I.H.M.
Eco Justice Office of the Sisters,
Servant of the Immaculate Heart of Mary

FD309

FD309–1 **General SPD EIS and NEPA Process**

The comment period for the SPD Draft EIS extended from July 17 through September 16, 1998. During that time, DOE convened five public hearings comprising afternoon and evening workshops to obtain oral and written comments from the public. It also accepted comments submitted by various other means: mail, a toll-free telephone and fax line, and the MD Web site. In view of the ample opportunities to comment and the urgency of the surplus plutonium disposition program, the comment period was not extended.

St. Clair
Honorable Bernard E. Kuhn
Page 1 of 2

RESOLUTION NO. 98-19

CITY OF ST. CLAIR
ST. CLAIR COUNTY, MICHIGAN

URGING THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS-USABLE FISSILE MATERIAL THROUGH MICHIGAN, AND ST. CLAIR COUNTY IN PARTICULAR

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and 1

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas.

NOW, THEREFORE, BE IT RESOLVED by the St. Clair City Council, that we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

RESOLUTION DECLARED ADOPTED

Bernard E. Kuhn

BERNARD E. KUHN, MAYOR
CITY OF ST. CLAIR, MICHIGAN

MD084

MD084–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

CERTIFICATION

The foregoing is a true and complete copy of a Resolution adopted by the City Council of the City of St. Clair, County of St. Clair, State of Michigan, at a regular meeting of the City Council held on the 3rd day of August 1998, and public notice of said Meeting was given pursuant to and in accordance with the requirements of Act No. 267 of the Public Acts of 1976, as amended, the same being the Open Meetings Act, and the Minutes of said meeting have been or will be made available as required by said Act.

Members Present: Mayor Kuhn, Members Ellery, Ferlito, LaPorte, Stablein, Stockhausen

Members Absent: Cedar

It was moved by Member Ellery and supported by Member LaPorte to adopt the resolution.

Members Voting Yes: Stablein, Stockhausen, Ellery, Ferlito, Kuhn, LaPorte

Members Voting No: None

The Resolution was declared adopted by the Mayor and has been duly recorded in the Resolution Book of the City of St. Clair.

JANICE B. WINN, CITY CLERK
CITY OF ST. CLAIR, MICHIGAN

MD084

ST. CLAIR COUNTY
LEE MASTERS ET AL.
PAGE 1 OF 1

AUG 3 RECD

RESOLUTION 98-29

URGING THE UNITED STATES DEPARTMENT OF ENERGY TO REFRAIN FROM TRANSPORTING WEAPONS-USABLE FISSILE MATERIAL THROUGH MICHIGAN AND ST. CLAIR COUNTY IN PARTICULAR

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium, for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of the Great Lakes; and 1

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas.

NOW, THEREFORE, BE IT RESOLVED, by the St. Clair County Board of Commissioners, that we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

DATED: July 22, 1998

Reviewed and Approved by:

ELWOOD L. BROWN
County Corporation Counsel
301 County Building
Port Huron, MI 48060

MD004

MD004–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

ST. CLAIR TOWNSHIP
1539 S. Bartlett Rd., St. Clair, MI 48079
Phone (810) 329-9042 Fax (810) 329-1198

ST. CLAIR TOWNSHIP
RESOLUTION

WHEREAS, the United States Department of Energy is studying transportation options for moving weapons-usable fissile materials, including plutonium for disposition. One of the three options under consideration is transporting the nuclear materials and fuel to Canada through Michigan utilizing the Blue Water Bridge at Port Huron; and

WHEREAS, there are many problems with transporting volatile and carcinogenic materials. The security and environmental risks are considerable and utilizing the Blue Water Bridge route would jeopardize the population of St. Clair County and the water supply of Great Lakes; and

WHEREAS, there are many other suitable access points than the international water boundaries of Michigan. The western portions of the continent offer access that is much easier to secure and does not involve transportation through as many densely populated areas. 1

NOW, THEREFORE, BE IT RESOLVED, by the St. Clair Township Board, that we urge the United States Department of Energy to refrain from transporting weapons-usable fissile materials through Michigan and St. Clair County; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

Dated: August 3, 1998

Reviewed and Approved by:

Joyce A. Skonieczny
Clerk

MD015

MD015–1 **Parallex EA**

DOE acknowledges the commentors' concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

STATEWIDE PUBLIC ADVISORY COUNCIL
KATHY EVANS
PAGE 1 OF 1

MICHIGAN AREAS OF CONCERN

STATEWIDE PUBLIC ADVISORY COUNCIL

September 24, 1998

Mr. Howard R. Canter
Acting Director
Office of Fissile Materials Disposition
Department of Energy
P.O. Box 23786
Washington, D.C. 20026-3786

RE: Public Review of *Surplus Plutonium Disposition Draft Environmental Impact Statement*

Dear Mr. Canter:

I am writing on behalf of the Statewide Public Advisory Council for Michigan's Areas of Concern Program to express support for the recent request from the St. Clair River Binational Public Advisory Council (BPAC) for an additional 60 days for public review and comment on the plan to ship surplus plutonium across the Bluewater Bridge linking the United States and Canada. The BPAC has also requested that a public meeting be held in the local area to provide information and respond to questions on the proposal.

The Statewide Public Advisory Council (SPAC) includes representatives from the 14 Areas of Concern (AOC) in the State of Michigan designated pursuant to the U.S.-Canada Great Lakes Water Quality Agreement. The SPAC provides advice and input to the State of Michigan regarding the statewide AOC Program, coordinates the exchange of information among the state's 14 AOCs, and works to support the efforts of the local public advisory councils to restore environmental quality in the AOCs. 1

At its September 12, 1998 meeting the SPAC was briefed on the St. Clair River BPACs' concerns about the plan to ship surplus plutonium across the Bluewater Bridge and their request for an extension of the public comment period and for a public meeting on the issue. The SPAC approved a motion supporting the BPAC's request and the purpose of this letter is to formally convey this position to your office. By extending the public comment period and holding a public meeting in the local area, the U.S. and Canadian federal governments will be able to share information with and receive input on the proposed shipment from the many American and Canadian citizens working to restore environmental quality in the St. Clair River.

The SPAC appreciates your attention to this request and looks forward to your response. I ca
773-0008; please respond to the address provided below.

Sincerely,

Kathy Evans

Kathy Evans
Vice Chair
Statewide Public Advisory Council

cc: Fred Kemp, United States Chair, St. Clair River BPAC
Bob Lalonde, Canadian Chair, St. Clair River BPAC
Members, Statewide Public Advisory Council
Richard Hobrla, Chief, Remedial Action Unit, Michigan Department of Environmental Quality

c/o Great Lakes Commission • The Argus II Building • 400 Fourth St. • Ann Arbor, MI 48103-4816
Phone: (313) 665-9135 • Fax: (313) 665-4370 • Email: SPAC@glc.org

Printed on recycled paper.

MD324

MD324–1 **Parallex EA**

DOE acknowledges the commentor's concern with transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

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Good morning, my name is Greg Zolae, I'm a voter in Comstock, MI. Just recently received some information about MOX fuel transportation and I would like to get some more information, if I could. I would also like to strongly suggest that there is an extension for public comment on the transportation of MOX fuel so that folks that are going to be affected by it can find out more about it and can voice their opinions. My temporary mailing address is Greg Zolae, 3 Fairlake Lane, Gross Point Shores, Michigan 48236. Again, I would like to request a 90 day extension on the public comment on the transportation of MOX fuel. It would be really good for us to have a little bit more time to learn from you what it's about and to tell you what we think. Thank you very much. 1

PD055

PD055–1 **Parallex EA**

DOE acknowledges the commentor's concern regarding transportation of material through Michigan. The transportation of weapons-usable fissile materials through Michigan and St. Clair County is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites and therefore, with the most directly concerned population. This decision did not preclude relevant comment by State and local governments, individuals, and organizations in Michigan. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how or where they were received. DOE does not believe that any extension of the comment period on the SPD Draft EIS is necessary.

IF NOT NOW...

140 ARBORWAY, STE. 6, BOSTON, MA 02130-3522 USA
(617) 524-1342 • fax (617) 524-1347 • contact@ifnotnow.com

To: DOE, Fax 18008205156
From: If Not Now: A Citizens Lobbying Tool, EMail rep-info@ifnotnow.com
Date: Sep 10, 1998 13:44 GMT
Subject: Plutonium Disposal By Burning In Nuclear Reactors

If Not Now is a web-based citizen's lobbying tool. We are forwarding to you a letter from some of your constituents. At the end of this message there is a description of how our service works and how you can respond to your constituents.

Signatures as of Sep 10, 1998:
There were 2 new signers. Total signers to date: 2.

TOPIC: Plutonium Disposal By Burning In Nuclear Reactors

Dear DOE (Fissile Materials Program),

I am writing to oppose the current Department of Energy plan for plutonium disposition, which is based on mixed-oxide (MOX) fuel. MOX fuel is a bad idea. It is unproven technology as far as commercial reactors in the U.S. are concerned. MOX techniques for plutonium disposal are also slower and more expensive than immobilization techniques. In addition, the treatment of plutonium as an energy source sets a dangerous precedent for nuclear proliferation and the development of plutonium fuel economies. It is essential that the DOE do everything possible to discourage this proliferation. 1

New signers and comments:

Scott Bonner, Boise, ID 83702
Amy Hobbs, Springfield, MO 65806

DESCRIPTION OF IF NOT NOW SERVICE

Subscribers use If Not Now (www.ifnotnow.com) to get information about political and social issues of concern to them. The service also enables them to sign letters about these topics, which we then forward in consolidated form to officials such as yourself. It is important to emphasize that our subscriber list is authenticated through credit card verification, and only those signers who belong to your specific constituency are included in the signature list that you receive.

FD300

FD300–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. While it is true MOX fuel has not been produced commercially in the United States, it has been produced in Western Europe. MOX fuel fabrication is not a new technology. This experience would be used for disposition of the U.S. surplus plutonium. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Any difference between the cost of the hybrid approach and that of the immobilization-only approach would be marginal. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyses the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

HOBBS, AMY
PAGE 2 OF 2

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To respond to an action letter: fill out the form at http://www.ifnotnow.com/respond.html -- you will need to use your special key: PeeTJlwV. This key is valid for one-time use only. Please send questions or comments via email to: rep-info@ifnotnow.com.

FD300

BUSH, MICHELE
PAGE 1 OF 2

☑	**YES!**	**Keep Texas Panhandle water, air, and soil safe from radioactive pollutants**	1
☑	**NO!**	**To any plutonium processing in the Texas Panhandle** or anywhere else!	2
☑	**YES!**	**To minimal handling and processing of plutonium and other nuclear materials**	3
☑	**NO!**	**To converting military plutonium for use in mixed oxide (MOX) fuel**	4

How DARE you MAKE US PAY FOR THIS
STOP producing this deadly
Signed: poison – Michele Bush
Silver City NV

CD1358

CD1358–1 **Alternatives**

Sections 4.17 and 4.26.3 describe the potential effects of the maximum impact alternative on air quality, water resources, and soil. These analyses indicate that the impacts of construction and normal operation of the pit conversion and MOX facilities on air, water, and soil at Pantex would likely be minor.

CD1358–2 **Alternatives**

DOE acknowledges the commentor's opposition to the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

CD1358–3 **DOE Policy**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. DOE is committed to public and worker safety during the construction, operation, and deactivation of the proposed surplus plutonium disposition facilities, and would implement appropriate controls and procedures to ensure compliance with all applicable Federal, State, and local laws, rules, regulations, and requirements.

CD1358–4 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in weapons again.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

Hi. I'm calling Donna Menace and I want to thank her very much for calling me back. The way, my address is PO Box 2598 and its Pahrump, NV 89041. I'm interested in whatever it is she want to send me because I do want to make commentary. I'm very concerned about the MOX and if it can't be used in the light water reactors, so whatever you do is right. And I look forward to hearing from you. I've been out of town and that's why I didn't return your call sooner. Thank you again. My number is (702) 727-6853 if you want to call. And the best time I will be home in the morning. Thank you. Bye 1

PD032

PD032–1 **MOX Approach**

DOE acknowledges the commentor's concern regarding the MOX approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

170 Villanova Drive
Paramus, NJ 07652
July 31, 1998

Executive Director
U.S. Department of Energy
Washington, DC

Dear Director:

I am vehemently opposed to the use of MOX fuel in civilian nuclear power plants.

There are already serious problems of unaccounted for sensitive materials without putting weapons grade plutonium in mass circulation.

Every step in the direction of putting us on a plutonium economy risks unconscionable environmental, economic, and weapons proliferation problems. 1

The nuclear industry has failed miserably in its responsibility to the general welfare.

The last thing we need now is another arrogant, corrupt blunder.

Very truly yours,

Sidney J. Goodman, P.E.

Sidney J. Goodman, P.E.
Professional Engineer

FD173

FD173–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the commercial use of weapons-usable plutonium. The proposed use of MOX fuel is consistent with the nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
LAWRENCE SCHMIDT
PAGE 1 OF 1

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

Office of Program Coordination
PO Box 418
Trenton, NJ 08625-0418
Phone 609-292-2662
Fax 609-777-0942

August 25, 1998

Mr. G. Bert Stevenson
NEPA Compliance Officer
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, D.C. 20026-3786

RE: **COMMENTS**
Surplus Plutonium Disposition Draft EIS
DOE/EIS-0283-D

Dear Mr. Stevenson:

The Office of Program Coordination of the New Jersey Department of Environmental Protection (NJDEP) has completed its review of the Draft Environmental Impact Statement (EIS) for Surplus Plutonium Disposition. None of the three proposed sites are in the Northeast, consequently our Department's Radiation Protection Programs foresees no environmental impact to New Jersey, at this time, from the siting, construction or operation of any of the facilities. In addition, they foresee no increase in transportation of radioactive materials in New Jersey as result of this action. 1

However, one alternative facility would produce Mixed Oxide Fuel (MOX). This fuel would be manufactured as fuel for a commercial nuclear power plant. As stated in the Draft EIS, specific reactor sites where this fuel will be used have not been identified. The Final EIS will include an environmental impact analysis related to specific reactors selected. Thus, there is no indication, at this time, if any nuclear power plants in New Jersey will utilize MOX fuel. 2

Please send the Office of Program Coordination two copies of the Final EIS, when it becomes available, so that we can review potential environmental impacts associated with the use of MOX fuel in New Jersey.

Sincerely,

Lawrence Schmidt
Director
Office of Program Coordination

C: Jill Lipoti, NJDEP

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MD115

MD115–1 **Alternatives**

DOE acknowledges the commentor's conclusions that the surplus plutonium disposition program would not impact the State of New Jersey.

MD115–2 **MOX Approach**

Section 4.28 was revised to discuss the potential environmental impacts of using MOX fuel in the six reactors proposed for the MOX approach. None of the proposed reactors are in New Jersey, they are: Catawba Nuclear Station Units 1 and 2 in South Carolina, McGuire Nuclear Station Units 1 and 2 in North Carolina, and North Anna Power Station Units 1 and 2 in Virginia.

I would like to submit the following comments for ~~the scoping on~~ the Surplus Plutonium Disposition Environmental Impact Statement:

1) The mixed-oxide (MOX) nuclear fuel option has a negative economic value, will result in unnecessary subsidies to nuclear power utilities, and is experiencing grave technical challenges. A range of immobilization options need to be addressed as more viable for disposition. 1

2) Plutonium processing has never occurred at Pantex and for this reason it is a relatively clean site. I believe it is unwise to locate plutonium processing at a site with no processing and minimal nuclear waste treatment experience, especially one located over a major aquifer and in the middle of rich agricultural producing land. 2

3) Environmental, safety, and health impacts must be fully identified and analyzed, including quantity and composition of waste streams, potential accident scenarios, and consequences of accidents. 3

4) The impact on the area agricultural economy needs to be addressed at length in this document. 4

Signed Kathryn Albrecht, NM

CD1700

CD1700–1 **Alternatives**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

The fabrication of MOX fuel and its use in commercial reactors has been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium.

The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

CD1700–2 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. The analyses presented in

Section 4.26.3.2.2 indicate that there would be no discernible impacts on the quality of water in the Ogallala aquifer from normal operation of these facilities. Other sections show, moreover, that the normal operation of these facilities would likely have minor impacts on human health, agriculture, and livestock: Sections 4.17.1.4 and 4.17.2.4 address the potential radiological and hazardous chemical effects of the maximum-impact alternative on workers and the public at Pantex; Appendix J.3, the potential contamination of agricultural products and livestock, and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex.

CD1700–3 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). DOE has analyzed the potential environmental impacts of waste management, human health risks, and facility accidents associated with the proposed surplus plutonium disposition facilities as discussed in Appendixes H, J, and K, respectively.

CD1700–4 **General SPD EIS and NEPA Process**

This comment is addressed in responses CD1700–2 and CD1700–3.

NO! To plutonium processing in the Texas Panhandle. 1

NO! To bringing plutonium to Pantex from other sites.

NO! To long-term storage of plutonium over the Ogallala Aquifer. 2

NO! To facilities that handle nuclear waste or to processes that generate it. 1

I support jobs and development in the Panhandle that don't endanger workers, my family, our natural resources, or the reputation of Texas agricultural products. 3

Signature: Kathryn Albrecht

Name: O

CD1701

CD1701–1 **Alternatives**

DOE acknowledges the commentor's opposition to the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

CD1701–2 **DOE Policy**

DOE acknowledges the commentor's concern regarding the safe storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. Evaluation of repackaging Pantex pits into a more robust container is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

CD1701–3 **Alternatives**

DOE acknowledges the commentor's support of new missions at Pantex that don't endanger people or the environment. The analyses presented in Section 4.26.3.2.2 indicate that there would be no discernible impacts on the quality of water in the Ogallala aquifer from normal operation of the proposed surplus plutonium disposition facilities. Other sections show, moreover, that the normal operation of these facilities would likely have minor impacts on human health, agriculture, and livestock; Sections 4.17.1.4 and 4.17.2.4 address the potential radiological and hazardous chemical effects of the maximum-impact alternative on workers and the public at Pantex; Appendix J.3, the potential contamination of agricultural products and livestock, and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex.

NEW MEXICO ENVIRONMENT DEPARTMENT
GEDI CIBAS
PAGE 1 OF 2

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502-6110
Telephone (505) 827-2855
Fax (505) 827-2836

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
Secretary

September 23, 1998

Howard R. Canter
Acting Director
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, D.C. 20026-3786

Dear Mr. Canter:

RE: **SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT; OFFICE OF FISSILE MATERIALS DISPOSITION, U.S. DEPARTMENT OF ENERGY; JULY 1998**

This transmits New Mexico Environment Department (NMED) staff comments regarding the above-referenced Draft Environmental Impact Statement (DEIS).

(1) Volume I. Part A. Page 1-5 **Issues that Need to Be or Are Already Addressed Elsewhere**. The Nuclear Regulatory Commission should be involved, and their regulations be complied with, in all aspects of the Mixed Oxide (MOX) fabrication process, including the lead fuel assembly fabrication. 1

(2) Volume 2. L.3.3 **Ground Transportation Route Selection Process**. Shipments of radioactive materials to LANL should use the Santa Fe Relief Route (Route 599) to reduce the potential of a vehicular accident (and subsequent human health risk) while shipping components though the Santa Fe area. 2

(3) The main activities of pit disassembly, conversion, and immobilization, and MOX fuel fabrication were analyzed for sites outside the State of New Mexico. The only activity that might be located at Los Alamos National Laboratory is the fabrication of lead assemblies. An existing building would need to be modified to contain this activity, so welding would be done only inside buildings, limiting emissions. Operational emissions would result from vehicular traffic and emergency diesel generators. The Los Alamos National Laboratory is in an area that is currently in attainment for all National Ambient Air Quality Standards (NAAQS). Based upon the information provided, we would not anticipate any ambient air quality problems as a result of this project. 3

We appreciate the opportunity to comment on this DEIS. Please let us know if you have any questions.

Sincerely,

Gedi Cibas, Ph.D.
Environmental Impact Review Coordinator

NMED File No. 1191ER

MD325

MD325–1 **NRC Licensing**

Under the National Defense Authorization Act (fiscal year 1999), Congress directed that any facility under contract with and for the account of DOE that is used for the purpose of fabricating mixed plutonium-uranium oxide nuclear fuel for use in a commercial nuclear reactor obtain a license from NRC. In this act, Congress also exempted facilities that are used for research, development, demonstration, testing, or other analysis purposes from the licensing requirement.

Early in the preparation of the *Storage and Disposition PEIS* and this SPD EIS, DOE invited NRC to be a cooperating agency for the surplus weapons-usable fissile materials program. NRC declined the offer in favor of being a commenting agency. DOE is conducting regular meetings with NRC on the MOX approach, including fuel design and qualification.

As directed by Congress, NRC will be the regulatory authority for the MOX facility and will continue to be responsible for licensing the reactors, and as such would have to approve the use of MOX fuel through the license amendment process. The lead assemblies would be fabricated at DOE facilities that are not licensed by NRC, but the lead assemblies would meet licensing requirements for irradiation in selected reactors.

MD325–2 **Transportation**

DOE acknowledges the commentor's concerns about the transportation route selection process. The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, November 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified

information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD325–3 **Air Quality and Noise**

DOE acknowledges the commentor's input. Air quality impacts from construction and normal operation of facilities at LANL for lead assembly fabrication would likely be minor as discussed in Section 4.27.4.1.

NEW MEXICO URANIUM WORKERS
PAUL HICKS
PAGE 1 OF 1

Honorable Donna Shalala
Sec. of Health & Human Services
200 Independence ave. SW
Wash. D.C. 20201

Dear madam Secretary:
We the Uranium workers of the 4 corners states have a serious problem. We are fighting tooth & nail for our very lives, and there are few of us left alive now. See my testimony before the judiciary committee in June.
The Presidents advisory committee on human radiation experiments in 1995 said that R.E.C.A. (Radiation Exposure compensation act) of 1990 was an unfair, unjust & inadequate bill, & should be amended. 1
We now have rep. Redmonds bill (which is really our bill) in the house & rep. Bingaman has a similar bill in the senate but they are going no where.
Could you please help us in some way, or tell us what we can do to get things moving.

505-287-3165 Paul Hicks
President New Mexico Uranium Workers
FAX: 505-287-4877 604 B Adam, Grants, NM. 87020

08/24/1998-0042

MD331

MD331–1 **Other**

DOE acknowledges the commentor's concerns. However, the impact of radiation on uranium miners is beyond the scope of this SPD EIS. If MOX fuel is used in domestic, commercial reactors as proposed in this EIS there would be less uranium needed to fuel these reactors and therefore less uranium mined. This comment was forwarded to the Department of Health and Human Services to whom it was originally addressed.

IF NOT NOW...

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(617) 524-1342 • fax (617) 524-1347 • contact@ifnotnow.com

To: DOE, Fax 18008205156
From: If Not Now: A Citizens Lobbying Tool, EMail rep-info@ifnotnow
Date: Sep 16, 1998 7:04 GMT
Subject: Plutonium Disposal By Burning In Nuclear Reactors

If Not Now is a web-based citizen's lobbying tool. We are forwarding to you a letter from some of your constituents. At the end of this message there is a description of how our service works and how you can respond to your constituents.

Signatures as of Sep 16, 1998:
There were 2 new signers. Total signers to date: 4.

TOPIC: Plutonium Disposal By Burning In Nuclear Reactors

Dear DOE (Fissile Materials Program),

I am writing to oppose the current Department of Energy plan for plutonium disposition, which is based on mixed-oxide (MOX) fuel. MOX fuel is a bad idea. It is unproven technology as far as commercial reactors in the U.S. are concerned. MOX techniques for plutonium disposal are also slower and more expensive than immobilization techniques. In addition, the treatment of plutonium as an energy source sets a dangerous precedent for nuclear proliferation and the development of plutonium fuel economies. It is essential that the DOE do everything possible to discourage this proliferation. 1

New signers and comments:

Krista Bradford, New York, NY 10033
Danielle Benzinger, Arlington, TX 76006

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FD312

FD312–1 **MOX Approach**

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BRADFORD, KRISTA
PAGE 2 OF 2

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To respond to an action letter: fill out the form at http://www.ifnotnow.com/respond.html -- you will need to use your special key: PeeTJIwV. This key is valid for one-time use only. Please send questions or comments via email to: rep-info@ifnotnow.com.

FD312

BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE

PO Box 88 ~ Glendale Springs, North Carolina 28629 Phone 336-982-2691 ~ Fax 336-982-2954 ~ Email bredl@skybest.com

August 10, 1998

via facsimile # 800-820-5156

Office of Fissile Materials Management
U.S. Department of Energy
PO Box 23786
Washington, D.C. 20026-3786

Dear Sir or Madam:

We, the undersigned, write to request both a sixty-day extension of the public comment period and additional public hearings in North Carolina on the Draft Surplus Plutonium Disposition Environmental Impact Statement. We write also to support requests by other citizens' groups and individuals for additional public hearings in affected communities. The SPDEIS is the latest National Environmental Policy Act document that will help shape decisions on how to dispose of up to fifty metric tons of weapons usable plutonium that has been declared surplus to national security needs. Full public debate must occur now.

Extend the Public Comment Period for Sixty Days

The Department of Energy is allowing for a sixty day comment period for people to review and provide comments on a large, complex document that references twenty-eight other related NEPA documents, an economic report that not released until July 28, 1998, and numerous Data Reports. The Data Reports are unavailable to people who are not near a Department of Energy Reading Room, yet contain crucial information. For example, on page J-4 of the Draft SPDEIS, DOE wrote that, "source term data for radiological releases, stack heights, and release locations are provided in the Data Reports for the pit conversion, immobilization, and MOX facilities." In other words, the Draft SPDEIS does not contain any data on something as basic as expected quantities of radioactive air pollutants. 1

Provide for Additional Public Hearings

The Department of Energy is planning only five public hearings, four in the communities closest to DOE sites being considered for new plutonium processing plants, and one regional meeting in a downstream community (Portland). This public hearings schedule will likely dilute the diversity of public comments; inhibit the involvement of downwind and downstream communities that generally bear liabilities without benefits; and skew the public opinion curve in favor of DOE proposals. 2

DOE should add the following hearings to its list:

1. Regional Hearings in Savannah, Georgia and Columbia, South Carolina. The Savannah River Site is the preferred candidate site for all three new plutonium processing facilities. Real impacts on the Savannah River from SRS operations and accidents are well documented, with the most notable being the December, 1991 tritium leak that quickly reached Savannah, Georgia. DOE

If a creditor stands before a man's house all day long, demanding payment of his bill, the man must either remove the creditor or pay the bill. ~ Alice Paul

SCD30

SCD30–1 General SPD EIS and NEPA Process

DOE believes that the comment period, longer than required by CEQ's NEPA regulations, allowed sufficient time for public review of the SPD Draft EIS. Although it did not extend the comment period, DOE did consider all comments received after the close of that period. All comments were given equal consideration and responded to.

Appendix J was revised to include expected radiological release quantities from each of the proposed surplus plutonium disposition facilities. DOE's descriptions of the affected environment and the potential environmental impacts in this SPD EIS are in accordance with 40 CFR 1502.15 and 40 CFR 1502.16. These descriptions are no longer than necessary for an understanding of the effects of the alternatives, and the analyses and data are commensurate with the significance of the impact, the less-important information being consolidated, summarized, or referenced. Resources such as the data reports are available in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

SCD30–2 General SPD EIS and NEPA Process

It was not possible to hold hearings in all areas of the country; therefore, the hearings were restricted to locations where the greatest impacts of the proposed surplus plutonium disposition facilities could be expected. DOE did, however, provide various other means for public comment on this SPD EIS: mail, a toll-free telephone and fax line, and the MD Web site. During preparation of the *Storage and Disposition PEIS*, regional hearings were held in locations such as Boston, Chicago, San Francisco, and Denver. Denver was included because the PEIS dealt with the removal of materials from RFETS. DOE made, and is honoring, a commitment to get all plutonium out of RFETS. Additional hearings in Denver were not held because the proposed surplus plutonium disposition facilities would not be sited in the area. Shipment of MOX fuel to Canada for testing is under consideration as part of a separate EA, and is beyond the scope of this EIS. The *Environmental Assessment for the Parallex Project Fuel*

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10 August 1998
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cannot justify a lack of public hearings in Savannah or Columbia, which will bear the greatest liability from its proposals. 2

2. Regional hearings in communities near nuclear reactor sites that are being proposed for irradiation of Mixed Oxide (MOX) fuel. Consortiums of utilities and nuclear fuel fabricators are scheduled to submit Proposals for MOX Fuel Fabrication and Irradiation Services August 1998. We request that a public hearing be held in Raleigh and Charlotte, North Carolina, where reactor communities and the affected public are located.

DOE has stated that "environmental impact analysis relating to specific reactors will be included in the SPD Final EIS," although these analyses are scheduled to be made by Consortiums in their Proposals. During the 1997 Scoping for the SPDEIS, DOE was repeatedly asked to involve nuclear reactor communities in the NEPA process, yet ignored these comments while moving forward on a process to select reactor sites that excludes community input. DOE cannot justify soliciting public comment for the site selection process for plutonium processing facilities, while excluding public involvement in selecting plutonium irradiation facilities. 3

3. A regional hearing in Denver, Colorado. Denver is in proximity to Rocky Flats where approximately 25% of the surplus plutonium is in storage, so the area has a stake in the decisions being made. Furthermore, DOE has never held hearings to discuss plutonium immobilization of Rocky Flats plutonium as a reasonable alternative, and is proposing to weaken the requirements for shipping plutonium from Rocky Flats to Savannah River Site.

4. A regional hearing in Dallas, Texas. Dallas is likely to be in the transportation corridor for shipments of special nuclear materials and radioactive waste from new operations. The Department of Energy cannot legitimately claim that state-wide support exists in Texas for Pantex becoming a new DOE plutonium processing site without seeking input from outside the Amarillo area. 2

5. A hearing in Washington D.C., where decisions are made, policy is formulated, and a substantial community of non-governmental organizations exists to monitor the Department of Energy, and where a larger community of organizations exists to monitor how taxpayer dollars are spent.

6. Port Huron, Michigan (or other location), the location of the border crossing for plutonium fuel shipments to Chalk River, Ontario to test in CANDU reactors. DOE is still considering the option of burning MOX fuel in CANDU reactors, yet has effectively excluded Canadian citizens from the process. The hearing could be a cooperative public event held with the Atomic Energy of Canada, Ltd.

The abundant uncertainties and recent changes in direction in the Department of Energy's hazardous plutonium disposition program indicates a continued need to subject Federal proposals to the highest and most rigorous levels of public debate possible. DOE has already failed to 4

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SCD30

Manufacture and Shipment (DOE/EA-1216, January 1999) and FONSI (August 1999) can be viewed on the MD Web site at http://www.doe-md.com.

DOE actively sought public comments on the SPD Draft EIS and distributed approximately 1,700 copies of the document to all interested parties. All comments, regardless of how they were submitted, were given equal consideration and responded to.

SCD30–3 General SPD EIS and NEPA Process

Regional public hearings on the nuclear reactor sites proposed for the irradiation of MOX fuel could not be conducted during the public comment period for the SPD Draft EIS, as no sites had been designated by that time. The SPD Final EIS was not issued until specific reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999.

SCD30–4 General SPD EIS and NEPA Process

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. Additionally, various means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public

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implement the easiest part of its plutonium storage and disposition program. At Pantex it has abandoned its new "safer" container and a proposed facility upgrade for plutonium pit storage. 5
For Rocky Flats plutonium, it is already amending the "Record of Decision" for the "Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement" to "address the environmental impact of utilizing the K-Reactor facility for plutonium storage, the possibility that plutonium stabilization would be done at SRS instead of at RFETS, the shipment of plutonium to SRS before the APSF storage vault is operational, the shipment of some materials from RFETS that are less than 50% plutonium, and the need to utilize direct metal casting in FB-Line to de-classify some of the RFETS." (Defense Nuclear Facilities Safety Board Weekly Report for Savannah River Site, June 26, 1998). 6

The National Environmental Policy Act requires Federal Agencies to insure that high quality "environmental information is available to public officials and citizens before decisions are made and before actions are taken", and that substantial and meaningful public involvement in the planning and decision process. By restricting public hearings to a few communities, DOE would be violating the spirit of NEPA. 1

Signed,

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SPD-EIShearings4aug98

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SCD30

dialogue. It is DOE policy to encourage public input into these matters of national and international importance.

SCD30–5 Storage and Disposition PEIS and ROD

DOE acknowledges the commentors' concern regarding the safe storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

SCD30–6 Storage and Disposition PEIS and ROD

DOE conducted a supplement analysis for the early movement to and storage of the RFETS surplus plutonium in Building 105–K after modifications to enable safe, secure plutonium storage. Based on this analysis, DOE issued the amended ROD, referenced by the commentor, in the Federal Register (63 FR 43392) on August 13, 1998, in fulfillment of the letter and spirit of NEPA (40 CFR 1506.6(b)). The decision is contingent on a decision under this SPD EIS to locate an immobilization facility at SRS. A copy of the amended ROD and the supplement analysis is available in the DOE reading rooms and on the MD Web site at http://www.doe-md.com.

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BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE

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Comments of Lou Zeller to the Office of Fissile Materials Disposition regarding the Surplus Plutonium Disposition Draft EIS August 13, 1998, North Augusta, South Carolina.

My name is Louis Zeller and I am on the staff of the Blue Ridge Environmental Defense League. Our organization was founded in 1984 in response to the Department of Energy's Crystalline Repository Project which planned to bury high level nuclear waste in a deep hole in the ground. Together with thousands of activists, we organized to halt that ill-conceived project.

Today I address the draft EIS for surplus plutonium disposition which would take fissle materials from Hanford, Washington and Rocky Flats, Colorado and move it to the Savannah River Site in preparation for reprocessing. I have studied available documents including the DOE's 6450-01-P on amending the Record Of Decision on the Storage and Disposition of Weapons-Usable Fissile Materials. Although the Amended Record of Decision would increase the transport and storage of plutonium from 10 MT to 11.6 MT, it would also open the door to reprocessing of plutonium into commercial nuclear reactor fuel. 1

We oppose the planned "***burning***" of surplus weapons-usable plutonium as mixed oxide fuel in existing commercial light water reactors outlined in the SPDEIS. It is simply not possible to burn plutonium. 2 The continued use of Orwell-like terms to describe DOE actions does nothing to increase public confidence in the DOE's programs. Another example: To "***declassify***" in DOE newspeak means to ***reprocess*** plutonium metal for storage at SRS. 3

Furthermore, the use of plutonium oxide fuel, or POX, in commercial power reactors will not significantly reduce the amount of plutonium. Nuclear reactors produce plutonium where none existed before. A typical commercial reactor produces 500 pounds of plutonium a year. Government contractors have estimated that using POX in commercial reactors would reduce the total plutonium by only 1%. To this must be added the dangers of reactor component embrittlement caused by the POX fuel's higher neutron flux. This will shorten the expected lifespan of utility reactors and increase the risk and the severity of accidents. Utility ratepayers and the taxpayers will pay for all this, and our children and grandchildren will bear the negative health effects and genetic abnormalities. 4

Even without an accident, people who live, work, and go to school near the transport routes will be dosed with radiation. The transport casks have never been subjected to real-world tests. In the name of reducing the nuclear threat, the U.S. government will give terrorists thousands of miles of opportunities to seize or sabotage radioactive materials. 5

In 1994 and 1995, the Foreign Research Reactor Spent Nuclear Fuel program provided the Blue Ridge Environmental Defense League and our allies with an opportunity to expose the myth of nuclear non-proliferation. The firestorm of publicity ignited by the Don't Nuke North/South Carolina Campaign made it impossible for elected officials charged with protection of public health to avoid the issue. Our methods were straitforward, our goal simple: get the word 6

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SCD29

SCD29–1 **Storage and Disposition PEIS and ROD**

DOE acknowledges the commentor's concern about the movement of fissile materials from Hanford and RFETS to SRS. In order to support the early closure of RFETS and the early deactivation of plutonium storage facilities at Hanford, DOE has modified, contingent upon certain conditions, some of the decisions made in its *Storage and Disposition PEIS* ROD. Hanford and RFETS surplus plutonium would not be of a quality suitable for use as MOX fuel in a domestic, commercial reactor.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

SCD29–2 **MOX Approach**

DOE acknowledges the commentor's opposition to the use of MOX fuel in commercial reactors. Commentor is correct that using MOX fuel does not destroy all the plutonium. However, the MOX approach does meet the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

SCD29–3 **General SPD EIS and NEPA Process**

The declassification at SRS of plutonium residues from RFETS is the subject of the *Supplement Analysis for Storing Plutonium in the Actinide Packaging and Storage Facility and Building 105–K at the Savannah River Site* (July 1998) and amended ROD for the *Storage and Disposition*

PEIS. It is important that this limited amount of material be changed from its current form into a form that does not allow for proliferation of the knowledge or means of nuclear weapons fabrication to terrorists or rogue states. The plutonium resulting from the declassification action could be either immobilized or used to fabricate MOX fuel.

SCD29–4 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Although no U.S. commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core. While it is true that not all the plutonium would be consumed during irradiation in a nuclear reactor, the resulting spent fuel would have a radiation barrier equivalent to LEU spent fuel, and recovery of this plutonium would be extremely dangerous, time consuming, and costly.

The higher flux associated with MOX fuel can accelerate reactor component aging. However, this would be taken into account when developing fuel management strategy, including fuel assembly placement in the reactor core. The proposed action anticipates partial, not full, MOX cores in the selected reactors. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution*

Document (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

SCD29–5 **Transportation**

DOE acknowledges the commentor's concern regarding the safety of nuclear materials transportation. DOE is committed to safety and safeguards for its facilities and the transport of materials.

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

Table L–6 summarizes the possibility of a LCF associated with the radiation doses from shipping radioactive material. Type B packages have been used for years to ship radioactive materials in the United States and around the world. To date, no Type B package has ever been punctured or released any of its contents, even in actual highway accidents. No Type B package has seen real-world conditions that approach the severity level of the tests. As described in Appendix L.3.1.6, the Type B package is extremely robust and provides a high degree of confidence that even in extremely severe accidents, the integrity of the package would be maintained with essentially no loss of the radioactive contents or serious impairment of the shielding capability.

out. Our traveling roadshow traced the nuclear transport route from Sunny Point to Wilmington to Pembroke and into South Carolina. The Governor of North Carolina responded with scores of Highway Patrolmen, the State Bureau of Investigation, and a helicopter to accompany the nuclear waste trains. The elaborate preparations for accidents underscores the real danger represented by international commerce of nuclear waste.

Exposing these strategically valuable materials to shipment on the nations highways and byways presents thousands of miles of opportunities for would-be saboteurs, thieves, and terrorists. We demonstrated by our all-night vigil at Sunny Point that anyone so inclined can easily track these shipments. "This just goes to show that any terrorist who can afford a pair of binoculars and a plane ticket could know their every move,"said Janet M. Zeller, BREDL's Executive Director. A spokesman for the DOE labeled our actions a "needless breach of security."4 But the publicity generated by our campaigns does not make sabotage more likely. On the contrary, the increased surveillance and precautions taken by state officials was a direct result of the high media profile.

The Environmental Assessment for the foreign wastes prepared by DOE in 1994 states that the Savannah River Site's receiving basin for the foreign wastes "show no visible signs of corrosion." But in July 1995 a report by the Defense Nuclear Facilities Safety Board inspection team noted that,"significant corrosion of the spent fuel was contaminating the facility, generating significant waste, and contributing to personnel exposure."

6

The exposure of people living close to the rail lines and highways to ionizing radiation is easily overlooked. Cancers, leukemias, and immune suppression may be delayed for years or decades. Dr. Carl Rupert, BREDL Board of Directors member, estimates the population dose from the expected total of 837 trans-ocean shipments to be 7,885 person-rem, which could result in twenty cancer fatalities from ocean transport of FRR waste alone.

During our Don't Nuke North/South Carolina Campaign we met mostly Native American residents living a stone's throw from the tracks watching the activity at the rail junction. Small homes and housing projects are close to the tracks here. Many people are unable to afford automobiles and telephones. Evacuation would be difficult or impossible. The people of Pembroke believed that the nuclear waste train endangered their community. They did not believe DOE spokesmen who claim, on the one hand, that these materials are too dangerous to be left in storage but that, on the other hand, there is no cause for concern for residents of North and South Carolina.

Our rights in a free society are threatened by the laws deemed necessary to protect these shipments. This nation cannot protect the nuclear fuel cycle from terrorism without becoming a police state. A private citizen standing on public property may view a train or truck and spread the word without jeopardy. However, if that cargo carries nuclear weapons-grade materials the citizen becomes an outlaw. The Blue Ridge Environmental Defense League plans to continue our campaign for as long as it takes to bring an end to this deadly commerce.

If a creditor stands before a man's house all day long, demanding payment of his bill, the man must either remove the creditor or pay the bill. ~ Alice Paul

SCD29

SCD29–6 **Transportation**

DOE's SST/SGT system uses couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications and additional couriers. The evaluation of human health risks from transportation are addressed in the Transportation sections in Chapter 4 of Volume I and in greater detail in Appendix L. Human health impacts of the proposed facilities are discussed in the Human Health Risk sections of Chapter 4 and in greater detail in Appendix J. Nonproliferation is only one factor in the decisionmaking process for surplus plutonium disposition. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

DUKE COGEMA STONE & WEBSTER
ROBERT H. IHDE
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DUKE COGEMA
STONE & WEBSTER

September 10, 1998

Mr. Bert Stevenson
NEPA Compliance Officer
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

Subject: **Surplus Plutonium Environmental Impact Statement**

Dear Mr. Stevenson:

Thank you for the opportunity to comment on the draft Surplus Plutonium Disposition Environmental Impact Statement, as published in July 1998.

The attached comments are submitted on the behalf of DUKE COGEMA STONE & WEBSTER. DUKE COGEMA STONE & WEBSTER is leading a consortium of companies which has responded to a Department of Energy request for bids to design, construct and operate a mixed oxide plant. Other members of the team are Framatome COGEMA Fuels, Nuclear Fuel Services, Duke Power and Virginia Power.

Our specific comments on the draft Surplus Plutonium Disposition Environmental Impact Statement are provided in the attachment to this letter. If you have any questions pertaining to these comments, please contact Ms. Mary Birch at (704) 382-2140.

Sincerely,

Robert H. Ihde
President and CEO
DUKE COGEMA STONE & WEBSTER

Enc/ Comments on Draft EIS

MD177

DUKE COGEMA STONE & WEBSTER
ROBERT H. IHDE
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ATTACHMENT

DUKE COGEMA STONE & WEBSTER Comments on the Department of Energy's (DOE's) Draft Surplus Plutonium Disposition (SPD) Environmental Impact Statement (EIS)

No.	Location	Comment
1	Executive Summary, p. S-8	**Specification of "can-in-canister" immobilization as a preferred alternative.** DOE is proposing "can-in-canister" immobilization as its preferred alternative for immobilization. However, the DOE's own reports [1,2] indicate that "can-in-canister' immobilization does not currently meet the Spent Fuel Standard for long-term nonproliferation resistance. The United States must deploy an effective, accepted plutonium disposition technology or technologies if it wants to encourage international support for plutonium disposition. DUKE COGEMA STONE & WEBSTER expects that concurrent action on the part of Russia to dispose of its surplus plutonium will be predicated on the disposition of United States material in a manner that provides high confidence in its resistance to theft, diversion, or re-use. 1 *Recommendations:* 1. DOE should consider only those alternatives that meet the Spent Fuel Standard [i.e., mixed oxide (MOX) fuel and homogeneous immobilization] as preferred alternatives. 2. If the DOE pursues deployment of "can-in-canister" immobilization, the DOE should explain how it will demonstrate, in an open, objective, and peer-reviewed process, that the "can-in-canister" plutonium disposition approach will meet this fundamental program requirement - the Spent Fuel Standard.

[1] Sandia National Laboratories, SAND97-8203- Proliferation Vulnerability Red Team Report, October 1996
[2] U.S. Department of Energy, DOE/NN-0007- Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives, January 1997

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MD177

MD177–1 **DOE Policy**

DOE acknowledges the commentor's concern regarding the ability of the immobilization approach to meet the Spent Fuel Standard. In the *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), DOE identified two potential liabilities of the immobilization alternatives relative to the Spent Fuel Standard. These liabilities involve ensuring sufficient radiation levels and providing removal-resistant can-in-canister designs. Since that time, DOE has modified the can support structure inside the canisters and has focused its research on the ceramic form of immobilization. As part of the form evaluation process, an independent panel of experts determined (*Letter Report of the Immobilization Technology Peer Review Panel*, from Matthew Bunn to Stephen Cochran, LLNL, August 21, 1997) that the can-in-canister design would meet the Spent Fuel Standard. In addition, NAS is currently conducting studies to confirm the ability of the ceramic can-in-canister immobilization approach to meet the Spent Fuel Standard. DOE is confident that immobilization remains a viable alternative for meeting the nonproliferation goals of the surplus plutonium disposition program.

DUKE COGEMA STONE & WEBSTER
ROBERT H. IHDE
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No.	Location	Comment
2	Executive Summary, p.S-14	**Quantities of plutonium considered in the EIS for disposal using the two approaches.** The draft EIS states, "Since the ROD was issued, however, DOE has determined that an additional 9 tonnes of low plutonium content materials would require additional processing and would, therefore, be unsuitable for MOX fuel fabrication". DOE alternatives include disposing of a maximum of 33 tonnes of plutonium as MOX fuel, while the alternatives include immobilizing 50 tonnes of surplus plutonium. DOE has never provided justification that any surplus plutonium is not suitable for MOX use. The DOE has not explained what form this "unsuitable" plutonium is in. The technology descriptions in the draft EIS make it clear that various kinds of processing will be used in the Conversion and Immobilization Facility. Also, a wet processing step has been allowed in the DOE's MOX RFP. It would appear to be possible that some of this processing would render material that is suitable for fabrication into MOX fuel. Finally, the DOE has specified no requirements that the plutonium destined for either MOX fuel or immobilization must satisfy. Therefore, it seems very unlikely that there is any technical basis for any decision about quantities of plutonium that are suitable for either option. *Recommendation:* Given the lack of justification for any decision about quantities of material for the two options, DOE should include the evaluation of a 100% (50 tonnes) MOX fuel alternative in the SPD EIS. This is the only way to preserve all appropriate options until the time that the DOE can make a technically defensible evaluation and decision on the allocation of material to the two plutonium disposition approaches.

2

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MD177

MD177–2 **Feedstock**

DOE reviewed the chemical and isotopic composition of the surplus plutonium and determined in the *Storage and Disposition PEIS* ROD that about 8 t (9 tons) of surplus plutonium were not suitable for use in making MOX fuel. Furthermore, DOE has identified an additional 9 t (10 tons) for a total of 17 t (19 tons) that have such a variety of chemical and isotopic compositions that it is more reasonable to immobilize these materials and avert the processing complexity that would be added if these materials were made into MOX fuel. The criteria used in this identification included the level of impurities, processing requirements, and the ability to meet the MOX fuel specifications. Section 2.2 includes a description of the forms of plutonium that would be used for MOX feed and immobilization feed and the levels of impurities present in those materials. As discussed in this section, the plutonium destined for immobilization is mainly in the form of impure oxides, impure metals, plutonium alloys, uranium/plutonium oxide, and some alloyed reactor fuel. Impurities present include neptunium, thorium, and beryllium. None of the material planned for immobilization is in the form of spent fuel, and all of it is considered weapons usable. A further description of the types and amounts of plutonium currently planned for disposition can be found in *Feed Materials Planning Basis for Surplus Weapons-Usable Plutonium Disposition* (MD-0013, April 1997), which is available on the MD Web site at http://www.doe-md.com.

DUKE COGEMA STONE & WEBSTER
ROBERT H. IHDE
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No.	Location	Comment	
3	Executive Summary, p. S-8. Appendix D.	**Fast Flux Test Facility (FFTF).** It is not clear that using the FFTF to destroy nuclear weapons material (plutonium) would be acceptable to the international community if, at the same time, the facility was producing another kind of nuclear weapons material (tritium). *Recommendation:* In discussing the use of the FFTF for a combined plutonium disposition and tritium production mission, DOE should acknowledge that there is a significant nonproliferation issue associated with such a course of action.	3
4	Appendix D, p.D-2.	**Fast Flux Test Facility (FFTF).** The appendix states "If it were determined that MOX fuel (rather than uranium-only fuel) were needed for the FFTF operations, the MOX fuel fabrication alternatives may be eliminated, depending on the amount of surplus plutonium that would be required for tritium production." however, it is our understanding that the capability to fabricate significant quantities of MOX fuel for the FFTF does not currently exist within DOE complex. *Recommendation:* DOE should acknowledge that the use of the FFTF with plutonium fuel in this manner would require the design and construction of a MOX fuel fabrication facility for the FFTF. It is the light water reactor irradiation of MOX fuel that might be eliminated by such a course of action.	4

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MD177–3 **DOE Policy**

As discussed in Appendix D of the SPD Draft EIS, DOE did consider FFTF in the *Storage and Disposition PEIS*, but it was eliminated from further study because it was in a standby status and it could not satisfy the criterion of completing the disposition mission within 25 years using the historic FFTF plutonium enrichment specifications. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

MD177–4 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source.

DUKE COGEMA STONE & WEBSTER
ROBERT H. IHDE
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No.	Location	Comment	
5	Sections 2.17 and 2.18.	**Hot cell examinations of irradiated lead assembly fuel.**	
	Section 4.27.6	The environmental impacts in the draft EIS do not appear to include those impacts associated with hot cell examinations. In particular, there is no acknowledgement that the hot cell facilities would be responsible for the disposal of the spent nuclear fuel that results from destructive hot cell examinations. *Recommendation:* DOE should revise the EIS to include these impacts, or note that such impacts are already included in other environmental evaluations.	5
6	Section 5.1, 5.2 and 5.4.	**Preferred Alternatives.** **MOX Fuel Fabrication Alternatives.** **Lead Assembly Fabrication.** Numerous times the number of lead assemblies referred to is 10. Based on scope and schedule for a lead assembly program it would be very unlikely that this number of full MOX lead assemblies could be fabricated. *Recommendation:* If this is a bounding number of lead assemblies used for EIS basis, then it should be stated as such. It is misleading to indicate that 10 lead assemblies could be successfully fabricated based on our knowledge (or is there some information that we are not aware that established this number).	6

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MD177–5 **Lead Assemblies**

The two DOE sites, ANL–W and ORNL, proposed for postirradiation examination conduct these types of activities on an ongoing basis. Impacts for activities associated with the postirradiation examination of lead assemblies are within the scope of existing NEPA documentation at these sites and are discussed, for limited resource areas, in Section 4.27.6. Spent fuel after postirradiation examination would be the responsibility of the DOE spent nuclear fuel program. As stated in the ROD for the *DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final EIS* (DOE/EIS-0203-F, April 1995), interim storage for this type of spent fuel would take place at INEEL before eventual disposal in a geologic repository. As described in the revised Section 1.6, the preferred alternative for postirradiation examination is ORNL.

MD177–6 **Lead Assemblies**

The SPD Draft EIS assumed up to 10 lead assemblies as a bounding analysis based on DOE's extensive discussions with representatives from the commercial fuel industry. This SPD EIS was revised to evaluate two lead assemblies based on information from DCS, the team that was selected to provide MOX fuel fabrication and irradiation services, although it is possible that more than two would be required.

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ROBERT H. IHDE
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No.	Location	Comment	
7	Section 5.1	**Preferred Alternatives.** DOE does not, at this time, have a preference for the location where lead assemblies for MOX fuel qualification would be fabricated. *Recommendation:* The decision should be left up to the contractor where lead assembly fabrication will take place based on their technical evaluation at the preferred locations cited by DOE.	7
8	Section 5.2	**MOX Fuel Fabrication Alternatives.** Environmental critique that will be prepared, will it be available to Contractor for review prior to the issuance and basis for environmental synopsis? *Recommendation:* Contractor should be able to review for accuracy and completeness prior to issuance.	8
9	General Appendix B	**SPD EIS Contractor** The SPD EIS includes a Appendix B - Contractor Nondisclosure Statement. In this appendix there is a signed statement that the contractor has no financial interest in the outcome of the project. Given the nature of the statement, it would more appropriately be called a disclosure (vs. nondisclosure) statement. Also, the identity of the SPD EIS support contractor does not appear to be provided anywhere in the SPD EIS, including Appendix B. *Recommendations:* 1. Rename Appendix B "Contractor Disclosure Statement." 2. Identify the support contractor in Appendix B and in the cover section of the SPD EIS.	9

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MD177–7 **Lead Assemblies**

As discussed in the revised Section 1.6, based on consideration of capabilities of the candidate sites and input from DCS on the MOX approach, DOE prefers LANL for lead assembly fabrication. LANL is preferred because it already has fuel fabrication facilities that would not require major modifications, and takes advantage of existing infrastructure and staff expertise. Additionally, the surplus plutonium dioxide that would be used to fabricate the lead assemblies would already be in inventory at the site. Section 2.17.2 describes the lead assembly fabrication siting alternatives, and Section 4.27 discusses the potential impacts of lead assembly activities. Decisions on lead assembly fabrication will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

MD177–8 **MOX RFP**

The Environmental Synopsis is a nonproprietary, publicly available summary of the Environmental Critique, which is an internal DOE procurement document subject to confidentiality requirements. Procurement analyses are not subject to review and approval by offerors.

MD177–9 **General SPD EIS and NEPA Process**

Per the commentor's recommendation, the title of Appendix B is now "Contractor Disclosure Statement," and the name of the contractor, Science Applications International Corporation, appears on the revised form.

DUKE POWER COMPANY
K. S. CANADY
PAGE 1 OF 6

Duke Power
A Duke Energy Company

Duke Power Company
A Duke Energy Company
Energy Center
P.O. Box 1006
Charlotte, NC 28201-1006

September 8, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

Subject: Surplus Plutonium Disposition Environmental Impact Statement

Dear Sir or Madam:

Thank you for the opportunity to comment on the draft Surplus Plutonium Disposition Environmental Impact Statement, as published in July 1998.

The attached comments are submitted on the behalf of Duke Power, a division of Duke Energy Corporation. Duke Power has proposed to provide four mission reactors for the disposition of surplus weapons plutonium as part of the DUKE COGEMA STONE & WEBSTER Team. The team members are Duke Engineering & Services; COGEMA; Stone & Webster; Framatome Cogema Fuels; Nuclear Fuel Services; and Virginia Power.

Duke Power's specific comments on the draft Surplus Plutonium Disposition Environmental Impact Statement are provided in the attachment to this letter. If you have any questions pertaining to these comments, please contact Mr. Steven Nesbit at (704) 382-2197.

Sincerely,

K. S. Canady, Manager
Nuclear Engineering - NGD
Duke Power Company

Attachment

SPN

MD165

ATTACHMENT

Duke Power Comments on the Department of Energy's (DOE's) Draft
Surplus Plutonium Disposition (SPD) Environmental Impact Statement (EIS)

No.	Location	Comment
1	Executive Summary, p. S-8	**Specification of "can-in-canister" immobilization as a preferred alternative.** DOE is proposing "can-in-canister" immobilization as its preferred alternative for immobilization. However, the DOE's own reports[1,2] indicate that "can-in-canister" immobilization does not currently meet the Spent Fuel Standard for long-term nonproliferation resistance. The United States must deploy an effective, accepted plutonium disposition technology or technologies if it wants to encourage international support for plutonium disposition. Duke expects that concurrent action on the part of Russia to dispose of its surplus plutonium will be predicated on the disposition of United States material in a manner that provides high confidence in its resistance to theft, diversion, or re-use. *Recommendations:* 1. DOE should consider only those alternatives that meet the Spent Fuel Standard [i.e., mixed oxide (MOX) fuel and homogeneous immobilization] as preferred alternatives. 2. If DOE pursues deployment of "can-in-canister" immobilization, DOE should explain how it will demonstrate, in an open, objective, and peer-reviewed process, that the "can-in-canister" plutonium disposition approach will meet this fundamental program requirement - the Spent Fuel Standard.	1

[1] Sandia National Laboratories, SAND97-8203 - Proliferation Vulnerability Red Team Report, October 1996.

[2] U. S. Department of Energy, DOE/NN-0007 - Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives, January 1997.

MD165

MD165–1 **DOE Policy**

DOE acknowledges the commentor's concern regarding the ability of the immobilization approach to meet the Spent Fuel Standard. In the *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), DOE identified two potential liabilities of the immobilization alternatives relative to the Spent Fuel Standard. These liabilities involve ensuring sufficient radiation levels and providing removal-resistant can-in-canister designs. Since that time, DOE has modified the can support structure inside the canisters and has focused its research on the ceramic form of immobilization. As part of the form evaluation process, an independent panel of experts determined (*Letter Report of the Immobilization Technology Peer Review Panel*, from Matthew Bunn to Stephen Cochran, LLNL, August 21, 1997) that the can-in-canister design would meet the Spent Fuel Standard. In addition, NAS is currently conducting studies to confirm the ability of the ceramic can-in-canister immobilization approach to meet the Spent Fuel Standard. DOE is confident that immobilization remains a viable alternative for meeting the nonproliferation goals of the surplus plutonium disposition program.

DUKE POWER COMPANY
K. S. CANADY
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No.	Location	Comment
2	Executive Summary p. S-14.	**Quantities of plutonium considered in the EIS for disposal using the two approaches.** The draft EIS states, "Since the ROD was issued, however, DOE has determined that an additional 9 tonnes of low plutonium content materials would require additional processing and would, therefore, be unsuitable for MOX fuel fabrication." DOE alternatives include disposing of a maximum of 33 tonnes of plutonium as MOX fuel, while the alternatives include immobilizing 50 tonnes of surplus plutonium. DOE has never provided justification that any surplus plutonium is not suitable for MOX use. The DOE has not explained what form this "unsuitable" plutonium is in. The technology descriptions in the draft EIS make it clear that various kinds of processing will be used in the Conversion and Immobilization Facility. It would appear to be possible that some of this processing would render material that is suitable for fabrication into MOX fuel. In addition, if a plutonium polishing step is included in the MOX fuel program, such a step may make more of the formerly "unsuitable" plutonium amenable for fabrication into MOX fuel. Finally, the DOE has specified no requirements that the plutonium destined for either MOX fuel or immobilization must satisfy. Therefore, it seems very unlikely that there is any technical basis for any decision about quantities of plutonium that are suitable or unsuitable for either option. *Recommendation:* Given the lack of justification for any decision about quantities of material for the two options, DOE should include the evaluation of a 100% (50 tonne) MOX fuel alternative in the SPD EIS. This is the only way to preserve all appropriate options until the time that the DOE can make a technically defensible evaluation and decision on the allocation of material to the two plutonium disposition approaches.	2

2

MD165

MD165–2 **Feedstock**

DOE reviewed the chemical and isotopic composition of the surplus plutonium and determined in the *Storage and Disposition PEIS* ROD that about 8 t (9 tons) of surplus plutonium were not suitable for use in making MOX fuel. Furthermore, DOE has identified an additional 9 t (10 tons) for a total of 17 t (19 tons) that have such a variety of chemical and isotopic compositions that it is more reasonable to immobilize these materials and avert the processing complexity that would be added if these materials were made into MOX fuel. The criteria used in this identification included the level of impurities, processing requirements, and the ability to meet the MOX fuel specifications. Section 2.2 includes a description of the forms of plutonium that would be used for MOX feed and immobilization feed, and the levels of impurities present in those materials. As discussed in this section, the plutonium destined for immobilization is mainly in the form of impure oxides, impure metals, plutonium alloys, uranium/plutonium oxide, and some alloyed reactor fuel. Impurities present include neptunium, thorium, and beryllium. None of the material planned for immobilization is in the form of spent fuel, and all of it is considered weapons usable. A further description of the types and amounts of plutonium currently planned for disposition can be found in *Feed Materials Planning Basis for Surplus Weapons-Usable Plutonium Disposition* (MD-0013, April 1997), which is available on the MD Web site at http://www.doe–md.com.

DUKE POWER COMPANY
K. S. CANADY
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No.	Location	Comment	
3	Executive Summary, p. S-8. Appendix D.	**Fast Flux Test Facility (FFTF).** It is not clear that using the FFTF to destroy nuclear weapons material (plutonium) would be acceptable to the international community if, at the same time, the facility was producing another kind of nuclear weapons material (tritium). *Recommendation:* In discussing the use of the FFTF for a combined plutonium disposition and tritium production mission, DOE should acknowledge that there is a significant nonproliferation issue associated with such a course of action.	3
4	Appendix D, p. D-2.	**Fast Flux Test Facility (FFTF).** The appendix states "If it were determined that MOX fuel (rather than uranium-only fuel) were needed for the FFTF operations, the MOX fuel fabrication alternatives may be eliminated, depending on the amount of surplus plutonium that would be required for tritium production." However, it is our understanding that the capability to fabricate significant quantities of MOX fuel for the FFTF does not currently exist within the DOE complex. *Recommendation:* DOE should acknowledge that use of the FFTF with plutonium fuel in this manner would require the design and construction of a MOX fuel fabrication facility for the FFTF fuel. It is the light water reactor irradiation of MOX fuel, not MOX fuel fabrication, that might be eliminated by such a course of action.	4

3

MD165

MD165–3 **DOE Policy**

As discussed in Appendix D of the SPD Draft EIS, DOE did consider FFTF in the *Storage and Disposition PEIS*, but it was eliminated from further study because it was in a standby status and it could not satisfy the criterion of completing the disposition mission within 25 years using the historic FFTF plutonium enrichment specifications. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

MD165–4 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source.

DUKE POWER COMPANY
K. S. CANADY
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No.	Location	Comment	
5	Sections 2.17 and 2.18. Section 4.27.6.	**Hot cell examinations of irradiated lead assembly fuel.** The environmental impacts in the draft EIS do not appear to include those impacts associated with hot cell examinations. In particular, there is no acknowledgment that the hot cell facilities would be responsible for the disposal of the spent nuclear fuel that results from destructive hot cell examinations. *Recommendation:* DOE should revise the EIS to include these impacts, or note that such impacts are already included in other environmental evaluations.	5
6	Executive Summary, p. S-27. Section 4.28.	**Spent Nuclear Fuel.** The *Storage and Disposition EIS* and the draft SPD EIS overstate the impact of MOX fuel with respect to generating additional quantities of spent nuclear fuel. The assumption of minimum burnup (20,000 MWd/MThm) on MOX fuel is uneconomical and therefore inconsistent with the MOX fuel program that DOE has outlined through its Request for Proposal for MOX Fuel Fabrication and Irradiation Services. Additional quantities of spent fuel generated as a result of MOX fuel use should be very small. *Recommendation:* DOE should revise the EIS to more accurately reflect these MOX fuel impacts.	6

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MD165

MD165–5 **Lead Assemblies**

The two DOE sites, ANL–W and ORNL, proposed for postirradiation examination conduct these types of activities on an ongoing basis. Impacts for activities associated with the postirradiation examination of lead assemblies are within the scope of existing NEPA documentation at these sites and are discussed, for limited resource areas, in Section 4.27.6. Spent fuel after postirradiation examination would be the responsibility of the DOE spent nuclear fuel program. As stated in the ROD for the *DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final EIS* (DOE/EIS-0203-F, April 1995), interim storage for this type of spent fuel would take place at INEEL before eventual disposal in a geologic repository. As described in the revised Section 1.6, the preferred alternative for postirradiation examination is ORNL.

MD165–6 **MOX Approach**

DOE evaluated technical and environmental information provided during the procurement process to acquire MOX fuel fabrication and irradiation services and revised Section 4.28 accordingly.

No.	Location	Comment
7	General	**SPD EIS Contractor.**
	Appendix B	The SPD EIS includes a Appendix B - Contractor Nondisclosure Statement. In this appendix there is a signed statement that the contractor has no financial interest in the outcome of the project. Given the nature of the statement, it would more appropriately be called a disclosure (vs. nondisclosure) statement. Also, the identity of the SPD EIS support contractor does not appear to be provided anywhere in the SPD EIS, including Appendix B. 7
		Recommendations: 1. Rename Appendix B "Contractor Disclosure Statement." 2. Identify the support contractor in Appendix B and in the cover section of the SPD EIS.

5

MD165

MD165–7 **General SPD EIS and NEPA Process**

Per the commentor's recommendation, the title of Appendix B is now "Contractor Disclosure Statement," and the name of the contractor, Science Applications International Corporation, appears on the revised form.

HAMILL, LISA
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Lisa Hamill
Box 392
Carrboro, NC 27510

Re: a sixty day extension of comment period

August 11, 1998
via facsimile # 800-820-5156
Office of Fissile Materials Management
U.S. Department of Energy
PO Box 23786
Washington, D.C. 20026-3786

Dear Sir or Madam:

I write to request both a sixty-day extension of the public comment period and additional public hearings in North Carolina on the Draft Surplus Plutonium Disposition Environmental Impact Statement. I write also to support requests by other citizens' groups and individuals for additional public hearings in affected communities. The SPDEIS is the latest National Environmental Policy Act document that will help shape decisions on how to dispose of up to fifty metric tons of weapons usable plutonium that has been declared surplus to national security needs. Full public debate must occur now.

Extend the Public Comment Period for Sixty Days

The Department of Energy is allowing for a sixty-day comment period for people to review and provide comments on a large, complex document that references twenty-eight other related NEPA documents, an economic report that not released until July 28,1998, and numerous Data Reports. The Data Reports are unavailable to people who are not near a Department of Energy Reading Room, yet contain crucial information. For example, on page J-4 of the Draft SPDEIS, DOE wrote that, "source term data for radiological releases, stack heights, and release locations are provided in the Data Reports for the pit conversion, immobilization, and MOX facilities." In other words, the Draft SPDEIS does not contain any data on something as basic as expected quantities of radioactive air pollutants. 1

Provide for Additional Public Hearings

The Department of Energy is planning only five public hearings, four in the communities closest to DOE sites being considered for new plutonium processing plants, and one regional meeting in a downstream community (Portland). This public hearings schedule will likely dilute the diversity of public comments; inhibit the involvement of downwind and downstream communities that generally bear liabilities without benefits; and skew the public opinion curve in favor of DOE proposals. 2

DOE should add the following hearings to its list:

1. Regional Hearings in Savannah, Georgia and Columbia, South Carolina. The Savannah River Site is the preferred candidate site for all three new plutonium processing facilities. Real impacts on the Savannah River from SRS operations and accidents are well documented, with the most notable being the December, 1991 tritium leak that quickly reached Savannah, Georgia. DOE cannot justify a lack of public hearings in Savannah or Columbia, which will bear the greatest

FD224

FD224–1 **General SPD EIS and NEPA Process**

DOE believes that the comment period allowed sufficient time for public review of the SPD Draft EIS. Although it did not extend the comment period, DOE did consider all comments received after the close of that period. All comments were given equal consideration and responded to.

DOE's descriptions of the affected environment and the potential environmental impacts in this SPD EIS are in accordance with 40 CFR 1502.15 and 40 CFR 1502.16. These descriptions are no longer than necessary for an understanding of the effects of the alternatives, and the analyses and data are commensurate with the significance of the impact, the less-important information being consolidated, summarized, or referenced. Resources such as the data reports are available in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

FD224–2 **General SPD EIS and NEPA Process**

It was not possible to hold hearings in all areas of the country; therefore, the hearings were restricted to locations where the greatest impacts of the proposed surplus plutonium disposition facilities could be expected. DOE did, however, provide various other means for public comment on this SPD EIS: mail, a toll-free telephone and fax line, and the MD Web site. During preparation of the *Storage and Disposition PEIS*, regional hearings were held in locations such as Boston, Chicago, San Francisco, and Denver. Denver was included because the PEIS dealt with the removal of materials from RFETS. DOE made, and is honoring, a commitment to get all plutonium out of RFETS. Additional hearings in Denver were not held because the proposed surplus plutonium disposition facilities would not be sited in the area. Shipment of MOX fuel to Canada for testing is under consideration as part of a separate EA, and is beyond the scope of this EIS. The *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI (August 1999) can be viewed on the MD Web site at http://www.doe-md.com.

liability from its proposals. 2

2. Regional hearings in communities near nuclear reactor sites that are being proposed for irradiation of Mixed Oxide (MOX) fuel. Consortiums of utilities and nuclear fuel fabricators are scheduled to submit Proposals for MOX Fuel Fabrication and Irradiation Services August 1998. We request that a public hearing be held in Raleigh and Charlotte, North Carolina, where reactor communities and the affected public are located.

DOE has stated that "environmental impact analysis relating to specific reactors will be included in the SPD Final EIS," although these analyses are scheduled to be made by Consortiums in their Proposals. During the 1997 Scoping for the SPDEIS, DOE was repeatedly asked to involve nuclear reactor communities in the NEPA process, yet ignored these comments while moving forward on a process to select reactor sites that excludes community input. DOE cannot justify soliciting public comment for the site selection process for plutonium processing facilities, while excluding public involvement in selecting plutonium irradiation facilities. 3

3. A regional hearing in Denver, Colorado. Denver is in proximity to Rocky Flats where approximately 25% of the surplus plutonium is in storage, so the area has a stake in the decisions being made. Furthermore, DOE has never held hearings to discuss plutonium immobilization of Rocky Flats plutonium as a reasonable alternative, and is proposing to weaken the requirements for shipping plutonium from Rocky Flats to Savannah River Site.

4. A regional hearing in Dallas, Texas. Dallas is likely to be in the transportation corridor for shipments of special nuclear materials and radioactive waste from new operations. The Department of Energy cannot legitimately claim that state-wide support exists in Texas for Pantex becoming a new DOE plutonium processing site without seeking input from outside the Amarillo area. 2

5. A hearing in Washington D.C., where decisions are made, policy is formulated, and a substantial community of non-governmental organizations exists to monitor the Department of Energy, and where a larger community of organizations exists to monitor how taxpayer dollars are spent.

6. Port Huron, Michigan (or other location), the location of the border crossing for plutonium fuel shipments to Chalk River, Ontario to test in CANDU reactors. DOE is still considering the option of burning MOX fuel in CANDU reactors, yet has effectively excluded Canadian citizens from the process. The hearing could be a cooperative public event held with the Atomic Energy of Canada, Ltd.

The abundant uncertainties and recent changes in direction in the Department of Energy's hazardous plutonium disposition program indicates a continued need to subject Federal proposals to the highest and most rigorous levels of public debate possible. DOE has already failed to implement the easiest part of its plutonium storage and disposition program. At Pantex it has abandoned its new "safer" container and a proposed facility upgrade for plutonium pit storage. For Rocky Flats plutonium, it is already amending the "Record of Decision" for the "Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement" to "address the environmental impact of utilizing the K-Reactor facility for plutonium storage, the possibility that plutonium stabilization would be done at SRS instead of at RFETS, the shipment of plutonium to SRS before the APSF storage vault is operational, the shipment of some materials from RFETS that are less than 50% plutonium, and the need to utilize direct metal casting in FB-Line to de-classify some of the RFETS." (Defense Nuclear Facilities Safety 4 5 6

FD224

DOE actively sought public comments on the SPD Draft EIS and distributed approximately 1,700 copies of the document to all interested parties. All comments, regardless of how they were submitted, were given equal consideration and responded to.

FD224–3 General SPD EIS and NEPA Process

Regional public hearings on the nuclear reactor sites proposed for the irradiation of MOX fuel could not be conducted during the public comment period for the SPD Draft EIS, as no sites had been designated by that time. The SPD Final EIS was not issued until specific reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999.

FD224–4 General SPD EIS and NEPA Process

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. Additionally, various means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue. It is DOE policy to encourage public input into these matters of national and international importance.

HAMILL, LISA
PAGE 3 OF 3

Board Weekly Report for Savannah River Site, June 26, 1998). | 6

The National Environmental Policy Act requires Federal Agencies to insure that high quality "environmental information is available to public officials and citizens before decisions are made and before actions are taken", and that substantial and meaningful public involvement in the planning and decision process. By restricting public hearings to a few communities, DOE would be violating the spirit of NEPA. | 1

Signed,

Lisa Hamill

Lisa Hamill

FD224

FD224–5 **Storage and Disposition PEIS and ROD**

DOE acknowledges the commentor's concern regarding the safe storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

FD224–6 **Storage and Disposition PEIS and ROD**

DOE conducted a supplement analysis for the early movement to and storage of the RFETS surplus plutonium in Building 105–K after modifications to enable safe, secure plutonium storage. Based on this analysis, DOE issued the amended ROD, referenced by the commentor, in the Federal Register (63 FR 43392) on August 13, 1998, in fulfillment of the letter and spirit of NEPA (40 CFR 1506.6(b)). The decision is contingent on a decision under this SPD EIS to locate an immobilization facility at SRS. A copy of the amended ROD and the supplement analysis is available in the DOE reading rooms and on the MD Web site at http://www.doe-md.com.

CAHALL, DIANA I.
PAGE 1 OF 3

Howard R. Canter, Acting Director
U.S. Department of Energy
Office of Fissile Materials
P.O. Box 23786
Washington, D.C. 20026-3786

September 16, 1998

Re: SUPPLEMENT TO COMMENTS SUBMITTED DURING PUBLIC COMMENT PERIOD.
SURPLUS PLUTONIUM DRAFT ENVIRONMENTAL IMPACT STATEMENT, SPD EIS

Dear Director Canter:

Please include the following correspondence, submitted by facsimile transmission, as part of the official record of proceedings in the above referenced public comment period. The information discussed herein was not available to me as of 9/15/98, and therefore, could not be included in comments of 9/15/98.

United States Enrichment Corporation was created under congressional mandate of Energy Policy Act of 1992. In February of 1994 DOE published notice to the public in the Federal Register, USING A FINDING OF NO SIGNIFICANT IMPACT (FONSI), that The Nuclear Regulatory Commission (NCR) would assume watch dog status of both the Portsmouth Gaseous Diffusion Plant and the Paducah Gaseous Diffusion Plant due to transfer from public ownership (under DOE) to private/commercial operations (under NRC). I submitted comments objecting to agency intent which included objection to the agency's use of a FONSI: finding of fact of no significant impact! The rational, I was later informed, was that environmental, health and safety impacts, and risks to the general public would be the same conditions as previously existed under DOE oversight and management.

As stated in correspondence of 9/15/98 to the agency, DOE is prolific in production of documents, holding public information meetings, and making documents, upon request, available to interested members of the public. DOE maintains an information center in close proximity to the Portsmouth Gaseous Diffusion Plant. NRC has no such public involvement and public information process. NRC, in fact, refused to accept comments from me, personally, which pertained to the Portsmouth Gaseous Diffusion Plant BECAUSE I HAD NO STATUS, ACCORDING TO NRC DETERMINATION, AS A DIRECTLY AFFECTED PARTY!! It is noteworthy herein that NRC has since "modified" its public comment periods on nuclear power plants TO ALLOW COMMENTS FROM ONLY DIRECTLY AFFECTED PARTIES which NRC interprets to be groups and/or individuals who live in proximity of the individual nuclear power plants and who can demonstrate their status as directly affected parties in NRC proceedings. Contrary to Administrative Procedure Act (which states, among other things, that any citizen, taxpayer, and/or interested party MAY SUBMIT COMMENT AND PARTICIPATE in proceedings,) to the best of my knowledge, NRC has continued to preclude parties from proceedings if NRC determines these parties to lack status as defined by NRC. 1

NRC APPARENTLY ALSO DETERMINES WHAT IS AND, OF EQUAL IMPORTANCE, WHAT IS NOT DISCUSSED/REVEALED TO THE PUBLIC AT SEMI-ANNUAL PUBLIC INFORMATION SESSIONS HELD TO DISCUSS TROUBLED NUCLEAR PLANTS!!! NRC failed to include

MD280

MD280–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's remarks concerning policies of NRC. However, DOE has no authority in matters pertaining to policies and practices of NRC.

DOE acknowledges the commentor's remarks concerning operations at Portsmouth and Paducah. As described in Section 1.5, DOE may elect to use depleted uranium hexafluoride stored at these gaseous diffusion plants to produce the uranium dioxide that would serve as feed material during fabrication of MOX fuel and for the ceramic immobilization process. Approximately 0.04 percent (145 t [160 tons]) of DOE's current inventory of depleted uranium hexafluoride would be used annually for this purpose. Environmental analyses supporting this SPD EIS used Portsmouth as a representative source for depleted uranium hexafluoride. As discussed in Chapter 4 of Volume I, no major environmental effects would result from the use of depleted uranium hexafluoride in the production of uranium dioxide.

USEC was created by Congressional mandate under Title IX of the Energy Policy Act of 1992. As described in Section 1202, USEC was created for several purposes, one of which is to maximize the long-term value of USEC to the Treasury of the United States. There is no conspiracy involving DOE to misuse public funds in the matter of USEC or any other matter.

DOE acknowledges the commentor's remarks concerning the requirement for environmental impact statements at Portsmouth and Paducah. As discussed in Section 1.8.1, environmental conditions at Portsmouth and Paducah are described in the *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* (DOE/EIS-0269 April 1999).

CAHALL, DIANA I.
PAGE 2 OF 3

discussion of safety concerns at both the Portsmouth and Paducah Plants "to avoid embarrassment on the day after the plants were sold to the public." ATTACHMENT I.

To clarify: both plants were public property (government ownership) until they were transferred to USEC beginning in 1994 (privatization), and then, in 1998 USEC offered stock in both the plants for sale to private investors in public offering!! The "transfer" of government/public property to USEC was estimated to be $1.4 BILLION DOLLARS in property and technology. It is most interesting that NRC FAILED TO INCLUDE WHAT THE COMMISSION KNEW TO BE "PROBLEMS" at the Ports and Paducah Plants in semi-annual "information" session held by NRC the day after public stock offering. It is also most interesting that private investors bought what the American taxpayers already owned and had paid for resulting from the "privatization" process!! The term 'complicity' as referenced in comments of 9/15/98 certainly seems to apply to this wheeling and dealing with public funds by DOE/USEC/NRC.

In further 'complicity,' DOE failed to require an Environmental Impact Statement which fully addressed environmental problems PRIOR TO TRANSFER TO USEC at the Portsmouth and Paducah Gaseous Diffusion Plants during the "privatization process." Likewise, NRC has failed to reveal/disclose known problems to both the public, and the private investors who purchased stock in the plants only one day prior to NRC's semi-annual "information" session! 1
See ATTACHMENT II, paragraph 7. Note that safety concerns not disclosed by NRC included potential risks/damage from earthquake at one plant and potential risk of "unintended" nuclear chain reaction from storage of too much uranium in one place!

An interested party, citizen, and/or taxpayer might well ask what agency, if any, is protecting the public health, safety, and property in the process being practiced at these uranium plants?!? From personal experience, kill-the-messenger is descriptive of the response to my questions regarding the operational safety, environmental legacy, risks to the public and workers, and 'wisdom' of 1.4 Billion dollar taxpayer gifts to private interests from multiple agencies! The goals of 'SHOOT-AT-THE-CORPSE'- 1) silencing others on the scene from revealing the real perpetrators- and 2) making guilt dispensable- appear to be pertinent issues for comment.

In conclusion, I would respectfully remind the agency that DOE is mandated by various federal laws, other than Energy Policy Act of 1992, which require the agency to represent the best long term interests of the public and the nation.

Respectfully submitted,
Diana I. Cahall
Diana I. Cahall (Note: formerly known as Diana Salisbury)
7019 Ashridge Arnheim Road
Sardinia, Ohio 45171 (937) 446-2763

Attachment
(via telecopier transmission to 1-800-820-5156, on 9/16/98, and by, The U.S. Postal Service, regular mail, postage prepaid on 9/16/98.

2

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THE CINCINNATI ENQUIRER

9/10/98 p1 A-7

Attachment I

Secrecy by NRC on plants faulted

BY MATTHEW L. WALD
The New York Times

WASHINGTON — The Nuclear Regulatory Commission (NRC) has kept quiet about its safety concerns over two uranium fuel processing plants in order to avoid embarrassment on the day after the plants were sold to the public, a nuclear watchdog group said Tuesday.

Documents obtained by the group, the Union of Concerned Scientists (UCS), show that the NRC, which oversees civilian nuclear operations and some Energy Department plants, had many safety concerns, including how well one plant would withstand an earthquake and whether operators took adequate precautions to prevent the storage of too much uranium in one place, which could cause an unintended nuclear chain reaction — essentially a small explosion.

The plants, in Portsmouth, Ohio, and Paducah, Ky., which were built by the federal government to process uranium for weapons, naval propulsion reactors and civilian power plants, were sold in an initial public offering this summer, when the Energy Department spun them off as the U.S. Enrichment Corp.

The management team that ran the two plants before the spinoff now runs the corporation.

The NRC held one of its twice-a-year public sessions to discuss troubled nuclear plants the day after the sale was completed but did not discuss the two plants.

"Investors are supposed to make their own decisions, what risk they're comfortable with," said David Lochbaum, a nuclear engineer with the UCS. "But they can only do that when they have a clear idea of the risks."

NRC spokesman William Beecher said the commissioners were familiar with the plants' problems from previous reports.

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PAGE 1 OF 4

Howard R. Canter, Acting Director
U.S. Department of Energy
Office of Fissile Materials
P.O. Box 23786
Washington, D.C. 20026-3786

September 15, 1998

Re: PUBLIC COMMENT, SURPLUS PLUTONIUM ENVIRONMENTAL IMPACT STATEMENT (SPD EIS)

Dear Director Canter:

Please include this correspondence as part of the agency's official record of proceedings in the above referenced matter.

Due to considerable demands upon both my time and energy from other matters, I am submitting what I consider to be comments that address the crucial issues in the agency's SPD EIS generally rather than specifically.

The agency obviously must take responsibility for doing something, i.e., inaction is not a reasonable alternative in the "solution" to plutonium disposition. DOE has produced prolific information for public comment on the agency's proposed actions. This comment is NOT intended as criticism of the agency's SPD EIS. Rather, DOE is providing information necessary for "informed" public participation and, for that, deserves to be commended. 1

SPD Draft EIS makes numerous references to technology in the development or yet-to-be-developed/available stages. The public cannot make comment on the "wisdom" or appropriateness of technology not known to the public. Although, DOE appears to have knowledge of technology that is so-to-speak coming down the road. Likewise, DOE makes multiple references in Draft SPD EIS to commercial facilities, especially commercial facilities for Hazardous Waste treatment, storage, and disposal. The agency appears to be strongly leaning toward incinerator/reduction to ash as one such commercial facility/"solution". 2

DOE does, in fact, acknowledge that agency actions in plutonium disposition will result in multiple other actions which will occur directly and indirectly as consequences of DOE decision-making. DOE is, in fact and law, required to fully addresses these impacts/consequences in draft EIS. Transfer of materials to commercial facilities does not relieve DOE of NEPA mandate and/or agency responsibility to the public, numerous affected and to-be-affected communities, the environment, and the nation's safety and security. DOE has, in fact, co-operated with multiple federal, state, and local agencies, and proposed in draft EIS to continue this considerable "co-operation." Translated into simple terms members of the public can comprehend, DOE has historically SHARED THE PUBLIC'S FUNDS WITH OTHER AGENCIES IN PLANNING, CONSTRUCTING, AND OPERATING FACILITIES (implementing "solutions") such as the ones described in draft EIS. 3

-1-

MD192

MD192–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's support for DOE's public outreach and providing information necessary for informed public participation. In Sections 2.5 and 4.2, the No Action Alternative and its environmental impacts is described as required by 40 CFR 1502.14. This description makes clear to the public and decisionmakers the environmental impacts of taking no action rather than implementing the proposed action.

MD192–2 **General SPD EIS and NEPA Process**

The methods DOE proposes to use for surplus plutonium disposition are based on proven and well-understood technologies. Technological work cited in this SPD EIS is work required to adapt those technologies to the disposition of surplus plutonium and the engineering studies required to design the disposition facilities to meet specific program needs. Basic science or proof of principal scientific work is required to implement the surplus plutonium disposition program.

Hazardous waste management is discussed in Hazardous Waste sections in Chapter 4 of Volume I and Section 1.8.2. DOE plans to handle hazardous waste generated as a result of the surplus plutonium disposition program in accordance with the decisions made on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997). The decision on hazardous waste, excluding wastewater, was to continue to use off-site facilities for treatment at all sites except ORR and SRS, where a combination of off-site and existing on-site facilities may be used.

MD192–3 **General SPD EIS and NEPA Process**

The term "cooperating agency" in this EIS has a narrower sense than that used by the commentor. DOE's use of the term is in accordance with the definition stipulated in 40 CFR 1501.5: another Federal agency that has jurisdiction by law and/or has special expertise with respect to any environmental issue.

Co-operating local, state, and federal agencies are too numerous to mention in brief comments. However, implementation requires considerable funding to and distrubed by Departments of Transportation (local, state, and federal) for highway infrastructure projects, HUD requires funding (for distribution) to build housing required during facility construction phase, etc. Furthermore, numerous state and local agencies have "re-aligned" and "re-organized" in the process of implementing 'solutions'. Recycling and waste reduction funding appears to be most abundant for distribution in Ohio. The Brown County (Ohio) Board of Commissioners are the grantees of a recycling grant received by the Highland County (Ohio) Board of Commissioners (making the Highland County Board grantees of funds and grantors to the Brown County Board of Commissioners)!!! Obviously, the Brown County Board of Commissioners as grantees will not directly implement the recycling grant; it is to be passed through (granted again) to Adams/Brown Recycling, Inc. a not-for-profit! I have noted to the Brown County Board of Commissioners that Ohio Revised Code, Section 1702 prohibits the Board from acting as a conduit for state or federal funds in Civil Case No. 970242, Brown County Court of Common Pleas, and again, in Administrative Petition of 8/14/98. As of the date of this correspondence, I have received no response from the Board of Commissioners to 8/14/98 Administrative Petition.

DOE may, but should not, consider previous paragraph as distraction/off-the-point in DOE decision-making issue(s). Briefly stated, the multitude of agencies, governmental units, not-for-profits, quasi-governmental agencies, and private/public partnerships ARE ALL COOPERATING AGENCIES AND STAKEHOLDERS IN FUNDING DISTRIBUTION(S)! LIKEWISE, THEY ARE CO-OPERATORS IN DECISION-MAKING AND IMPLEMENTING. The public has, figuratively speaking, considerable difficulty in getting a foot-in-the-door in the decision-making process with so many insiders already huddled inside and poised to spring into various related action(s)! 3

In conclusion, I am quoting from Georgie Anne Geyer's editorial comment in today's CINCINNATI ENQUIRER:

> Where I came from, on the South Side of Chicago, complicity meant more than simply involving others-or being involved oneself -in an act, innocent, criminal, or in-between. It denoted the old Mafia idea of having everybody 'shoot at the corpse' so 1) nobody would talk about the real perpetrator of a crime and 2) guilt was dispensable. ATTACHMENT I, "The Quintessential Con Man"

The subject of Ms. Geyer's editorial is the American president, however, the substance of her observations are focused upon the shaping of public policy, and the considerable art of politics involved in making so many guilty of 'complicity' in following-the-leader. DOE is, in fact and practice, participating in 'shoot-at-the-corpse' decision-making with considerable federal (taxpayer) dollars involved in the process! The public deserves public hearings and decision-making process with considerably more access and much less complicity.

CAHALL, DIANA I.
PAGE 3 OF 4

Thank you for opportunity to comment on draft SPD EIS and for agency policy which allows for distribution of information allowing (somewhat) informed comment. 3

Respectfully submitted,

Diana I. Cahall

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Attachment

(VIA: THE U.S. POSTAL SERVICE, REGULAR MAIL, POSTAGE PREPAID ON 9/15/98, AND TELECOPIER TRANSMISSION TO 1-800-820-5656 ON 9/15/98.
at Approx. 3:15 P.M.

MD192

Attachment I

THE CINCINNATI ENQUIRER

EDITORIAL PAGE

FOUNDED 1841 • A GANNETT NEWSPAPER

Editor: Peter Bronson
Phone: 768-8359 Fax: 768-8610

A6 TUESDAY, SEPTEMBER 15, 1998

GEORGIE ANNE GEYER: Clinton makes us complicit in his lies

The quintessential con man

WASHINGTON — Not only are the problems of Bill Clinton's decadent presidency still out there, but so too are the questions: Why does he do these things? Where will his wanton habits lead this country? And, above all, why do so many Americans remain so tentative about making judgments about his admitted actions?

Of the billions of words that have been written (none of them, I contest, very gratifying), I note that one key word has not been used. The word is "complicity."

Where I come from, on the South Side of Chicago, complicity meant more than simply involving others — or being involved oneself — in an act, innocent, criminal or in-between. It denoted the old Mafia idea of having everybody "shoot at the corpse" so 1) nobody could talk about the real perpetrator of a crime and 2) guilt was dispensable.

The case of this American president is reminiscent of dictators or autocratic leaders who are essentially demagogues, "charismatic" authorities and (perhaps above all) con men. They tie their malleable followers to them by making the folowers dependent upon them and by giving them the impression that they are inexorably involved in the decisions, so much so that, even when the leaders fail, the followers cannot easily divest themselves of responsibility.

Above all, their tie to the people is emotional, not rational and not intellectual, and that truth lies at the heart of the complicitous bond. With emotions it is far more difficult to cut ties. You cannot just say, "I disagree and therefore I leave." You are tied forever, or you break away at the cost of substantial moral and physical trauma. You, after all, are the one who chose (or so you think!) to believe for so long.

Bill Clinton's ability to make the people around him complicitous in his actions and fate is, of course, infinitely inferior to the real historical complicity-mongers such as Fidel Castro or Joseph Stalin. Castro tied people to him so tightly that many of those who did break with him spent years trying painfully to reconstruct themselves, while Stalin's emotional and ideological tyranny was of such power that his closest followers got up in Russian courts in the 1930s and, though innocent, condemned themselves to death. They could not admit, as some communists said even this past decade, that their lives had been lived in the service of a false idol.

Admittedly, Bill Clinton is a poor man's charismatic leader, compared to those masters of the craft. Yet he has many of the same characteristics: the same dependence upon rhetoric over reality and the same quintessential con man's ability to make people want to believe, to cite two.

How else can one explain the degree to which so many Americans still need to believe in him so much that they refuse to condemn him? How can anyone really understand the troubling reality that virtually none of his White House "team" have resigned in protest over his actions?

They have all become his amoral accomplices.

How, too, can one explain Hillary? If she didn't know about Monica, she is too dumb and unperceptive to be first lady. Of course she did. But she made a Faustian pact with the devil many years ago that Bill Clinton would give her the political charisma to fuel her own abundant ambitions.

She made herself complicitous, and now there is no exit.

What is troubling is that, as the great German sociologist Max Weber wrote in the last century, the charismatic con men come to power (Weimar Germany, czarist Russia, pre-Castro Cuba) when a people is weak and disheartened. What does that say about so many Americans' amoral need to believe in this obviously flawed man today? In their willingness to cede their judgment to him?

What is troubling, too, is that so many Americans have accepted the Clintons' cynically distorted interpretation of life. They really believe there is no difference between one man's love affair and a leader's sexual predatoriness.

On the other hand, it is relatively easy to defeat these leaders if people have enough will to overcome their feelings of guilt and of self-imposed complicity. All they need to do is withdraw. That is the death knell for the charismatic leader, who in the end is also totally dependent upon them.

That hasn't happened yet, but as more of his disgraceful conduct is revealed, it very well may. Until then, those Americans who need so badly to believe in Bill Clinton are shooting at the corpse.

Georgie Anne Geyer is a Washington-based, syndicated columnist. Readers may write to her c/o Universal Press Syndicate, 4900 Main St., Kansas City, Mo. 64112.

MD192

STAND OF AMARILLO, INC.
HARRIET MARTIN
PAGE 1 OF 2

August 13, 1992

US Department of Energy
Office of Fissile Materials Disposition
PO Box 23786
Washington DC 20026-3786

Re: Pantex hearings on
plutonium processing - August 11, 1992
Amarillo, Texas -

To US dept of Energy:

As a former resident of Amarillo, TX, and a current member of STAND, I am writing to express my opinion that processing plutonium on an industrial scale, or for that matter, on any scale whatsoever, is contrary to common sense and irresponsible to the local residents and to the population of the USA. The Texas Panhandle is a prime agricultural area which deserves the best environmental protection this country can provide, and should not be endangered by the plutonium disposition problem. The air, soil, and especially ground water, if contaminated by with plutonium would be permanently lost to this country and the world. We can't risk that. 1

(~~over~~) next page

MD021

MD021–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. The analyses presented in Section 4.26.3.2.2 indicate that the normal operation of these facilities would likely have minor impacts on human health, agriculture, and livestock: Sections 4.17.1.4 and 4.17.2.4 address the potential radiological and hazardous chemical effects of the maximum-impact alternative on workers and the public at Pantex; Appendix J.3, the potential contamination of agricultural products and livestock, and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

STAND OF AMARILLO, INC.
HARRIET MARTIN
PAGE 2 OF 2

I am opposed to any industrial or profit motivated uses of plutonium. I believe fissile materials technology has a failing grade – a grade of 50% – that is, we know how to make it, but we don't know how to un make it. Until this technology is developed, plutonium production should be discontinued, I believe, and existing plutonium should be kept stable, guarded well – on site – and not moved around. The perfection of MOX would have to be demonstrated repeatedly, as the FDA drug trials – or much better than that, before industrial scale plans are made. MOX appears to be mostly on the drawing board to me. As a concerned citizen, I urge you at the Dept of Energy to take conservationist approaches to ever issue involving fissile materials, and I see your responsibility as guarding the country against exposure to them – until the ability to convert these products to stable elements is devised – 2

Sincerely
Harriet Martin
member of STAND
PO B 1219, Athens OH 45701

MD021

MD021–2 **DOE Policy**

DOE acknowledges the commentor's opposition to the industrial use of plutonium, the production of plutonium in general, and MOX fuel fabrication. The United States no longer produces plutonium and DOE is not proposing any option to make a profit. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this.

DOE analyzed numerous alternative disposition technologies in the *Storage and Disposition PEIS*. Immobilization and MOX fuel fabrication were chosen by DOE as the best options to further analyze in this SPD EIS. MOX fuel fabrication is not a new technology. The fabrication of MOX fuel and its use in commercial reactors have been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium.

ANONYMOUS
PAGE 1 OF 2

Given Secretary Peña's announcement that Savannah River will be the site of the new plutonium fuel manufacturing facility, ~~it would seem that~~ perhaps we should not thank you for not siting new plutonium manufacturing in the Northwest and take the rest of the evening off.

But, the same reasons why it is a bad idea for the Northwest apply anywhere ~~it would be~~. MOX is the worst method

- It is slow - must be run through reactor first (immobilizing plutonium)
- It involves subsidizing nuclear power reactors
- It risks pure forms of plutonium falling into the hands of people who wish to make n-weapons, particularly as part of the Russian MOX system
- It generates many additional tons and gallons of extremely hazardous nuclear and chemical wastes, and
- It costs a lot more than immobilization.

~~This~~ It is really a very simple ~~decision problem to consider~~ immobilization is a much better alternative.

What spews the decision in favor of MOX is the collusion of the Russian, and European American, nuclear power industries.

I would ask you, Mr. Knowlton, to carry a message to Secretary Richardson and Vice-President Gore

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ORD09

ORD09–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. DOE analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. By working in parallel with Russia, the United States can reduce the chance that weapons-usable nuclear material could fall into the hands of terrorists or rogue states and help ensure that nuclear arms reductions will never be reversed. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial

ANONYMOUS
PAGE 2 OF 2

we are not fooled. this is not a non-proliferation program. It is not a conversion of swords into plowshares, but it is the attempt of the nuclear power industry to convert ~~the world's economy~~ to ~~one~~ a plutonium-fuel economy, ~~and~~ subsidized by the US government.

Please explain to Mr. Gore, who wants to be our ~~pres~~ environmental President, that Northwest environmentalists ~~cannot~~ ~~fool~~ ~~to the~~ will figure out that this is a very risky dangerous, ~~very bad deal~~ sweetheart deal for the nuclear power industry. ~~would be worth explain that to them, especially~~ Politically, Mr. Knowlton, that could very hazardous for him out here, as we begin to explain MOX and why it is a bad idea for our WPPSS II reactor here at Hanford.

Thank you.

ORD09

1

reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

POSITIONS AND STATEMENTS
PLUTONIUM PROCESSING AND MIXED OXIDE (MOX) FUEL

"We oppose the processing, reprocessing and the production of mixed oxide fuel (MOX) in areas where there is possibility or risk of pollution and contamination of agricultural land, air, and groundwater."

State Policies of the Texas Farm Bureau. 1998. Pages 36-37, Section 137, Lines 24-28

American Farm Bureau Federation Policies for 1998, Page 112, Section 121, Lines 38-41 1

"The Party recognizes the value of alternative energy and supports continued private research and development of such sources, but we oppose the federal government using hazardous waste as an alternative energy source, such as the processing and/or reprocessing of plutonium and uranium for making Mixed Oxide fuel in agricultural areas and above major water sources."

Texas Republican State Party 1998 Platform for "Alternative Energy Sources" 2

"Since the manufacture of nuclear reactor fuel rods has usually led to environmental contamination of land, air, and water, and since the Pantex Plant near Amarillo, Texas is located over the Ogallala Aquifer, the country's largest aquifer, and in the midst of one of the country's largest grain-and-cattle-producing regions, the Democratic Party of Texas opposes the U.S. Department of Energy plan to produce Mixed Oxide (MOX) fuel from plutonium and uranium at the Pantex Plant, or any other form of plutonium processing."

Texas Democratic State Party 1998 Platform 3

"A consortium has been formed between Bechtel, BNFL International, and Westinghouse. GE chose not to participate. GE will not receive, store, process, transport, or take title to any material in any stage of the MOX process. I think you have other people to deal with on this one and not GE. Thank you very much."

Statement by General Electric Corporation Chairman of the Board Robert Welch at annual General Electric shareholders meeting, April 1998 4

ORD14

ORD14–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). This SPD EIS analyzes the potential environmental impacts associated with the MOX facility. As presented in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of construction and normal operation of the MOX facility would likely be minor.

ORD14–2 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed as an alternative energy source. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

ORD14–3 **MOX Approach**

Sections 4.17, among others, and 4.26.3 analyze impacts to the environment, including air, soils, and Ogallala aquifer due to construction and normal operation of the MOX facility at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water resulting from the proposed surplus plutonium disposition facilities at Pantex, either from minute quantities of air deposition into small water sources or from any potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. Appendix J.3 includes an analysis of potential contamination of agricultural products and livestock and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. This analysis indicates that impacts of

operating the MOX facility on agricultural products, livestock, and human health at Pantex would likely be minor.

ORD14–4 **MOX RFP**

DOE acknowledges GE's decision not to participate in the MOX approach.

This is a comment on the hearings for recycling plutonium waste. You know, we're opposed to it out here. Mixing MOX oxide and burning plutonium in commercial (reactors) is very bad. I personally want to see the waste vitrified and not used in commercial reactors. It's a very bad idea. Citizens are really opposed to this and the Department of Energy simply goes on with madness and more madness. Very bad and dangerous idea and I'm a citizen in Portland, Oregon and I don't want it done, period. 1

PD036

PD036–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

ANTTILA, EVERETT
PAGE 1 OF 2

United States Department of Energy

Comment Form

NAME: (Optional) EVERETT ANTTILA
ADDRESS: 3415 NE 22 AV
TELEPHONE: (503) 288 8970
E-MAIL: eantila@COHO.NET

U.D.E.

THE decision to eliminate all nuclear weapons all nuclear power & Proceed step by step IN this DIRECTION as a governmental policy of U.S.A IS LONGER OVERDUE.

THE EARTH CAN NO LONGER SUFFER THE Probability OF ANOTHER "CHERNOBLE", IN FACT THE "EXPLOSION" ~~MELTDOWN~~ IN THE UKRAINE FROM THE SAME NUCLEAR COMPLEX IS AGAIN Possible because OF THE UNKNOWN Combination OF elements brewing THERE. NATURALLY COAL & OIL SHOULD BE REPLACED BY ERERGY OF WIND, THERMAL & OTHER Energy Sources on which 1

ORD17

ORD17–1 **Other**

Consideration of the elimination of nuclear weapons systems and nuclear generated power in favor of renewable energy sources is beyond the scope of this SPD EIS. The scope of this SPD EIS is focused on analysis of alternatives on whether and how much U.S. surplus plutonium should be used as MOX fuel, which technology should be used for immobilization, where to construct the disposition facilities that are needed, and where to perform lead assembly fabrication and testing. By working in parallel with Russia to reduce stockpiles of excess plutonium, the United States can reduce the chance that weapons-usable nuclear material could fall into the hands of terrorists or rogue states and help ensure that nuclear arms reductions will never be reversed. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

United States Department of Energy

Comment Form

#2

NAME: (Optional) EVERETT ANTTILA
ADDRESS:
TELEPHONE: ( )
E-MAIL:

FUNDS as great AS are spent ON Expensive Nuclear Energy SHOULD TRANSFERED to sustainable Energy Sources. 1

MOX IS DEFINITELY ADDISIONALY MORE COSTLY THAN THE ORIGINAL URANIUM & SHOULD NEVER NEVER BE CONSIDERED AS A FUEL. 2

ORD17

ORD17–2 **MOX Approach**

The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

BLACK, GLORIA
PAGE 1 OF 1

My name is Gloria Black and my phone number is (503) 629-5495. I would like to urge the support of cleanup of Hanford and also to say that I oppose the MOX and my feeling is that it's too dangerous to transport plutonium in the Northwest. And also we don't need to create new nuclear waste. So I strongly urge the cleanup. Thank you. 1

PD031

PD031–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach, and support of cleanup at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

Hello, my name is Sylvia Bryant. I'm a United States citizen living in Oregon and I believe the MOX approach to handling plutonium is a bad idea. Thank you for giving me this opportunity to express my opinion. Bye-bye. 1

PD052

PD052–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

BUTTS, NATHAN
PAGE 1 OF 1

My name is Nathan Butts from Portland, Oregon and I'm calling to comment on the disposition of plutonium and the alternatives in the Draft EIS and I am opposed to the hybrid alternatives which, which allow the use of plutonium in nuclear plants for use as nuclear fuel. I'm concerned about the environmental effects of the waste generated from this process. I'm concerned about contamination in the making of the fuel, transportation of the fuel, both here and in Russia. There is no guarantees that they're going to handle it properly both during the process and after. With the nuclear waste will be generated and it's not a step towards non-proliferation. The right steps towards non-proliferation is the encapsulation of the plutonium and the best technology for that as is available now, would be the best alternative. At a later date when we have technology for lowering the threat of the use of this fuel as a, as nuclear weapons, then we can use it at that time. We will have it stored and we will have it monitored both here and in Russia, and we can have this as some type of international agreement between the two countries whereas we can't have an international agreement on waste or at least we don't have as firm of one as we should, since we can't even handle our own. That's the end of my comment. If you'd like to give me a call my number is 644-7760, area code 503 and I speak for my household of two. Thank you. 1

PD044

PD044–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

Potential waste management impacts of the proposed surplus plutonium disposition facilities are analyzed in this SPD EIS for each candidate site. Detailed analysis is provided in Appendix H. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel and would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a potential geologic repository built in accordance with the NWPA. Transportation impacts of the MOX approach are summarized in Chapter 4 of Volume I and Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

United States Department of Energy

Comment Form

8/8/97 (* TO ACCOMPANY ORAL COMMENT given @ Portland meeting)

NAME: (Optional) Andrew D Butz (REPRESENTING SELF ONLY)
ADDRESS: Mr Andrew D Butz, 2626 N Emerson St, Portland, OR 97217-3819
TELEPHONE: (503) 286-9999
E-MAIL: abutz@pcc.edu

Re: "surplus" PLUTONIUM DISPOSITION (Alternatives 11 & 12 are only ones near acceptable)

URGENT DEMANDS:

1) Public health/safety MUST be given the top priority in all actions 1
2) THUS, all considerations must prioritize IMMOBILIZATION & DEACTIVATION
a) GIVEN the level of investment (money, talent) in nuclear proliferation to date,
WHY CAN'T all further investment be directed exclusively toward:
i) immobilization ?
ii) deactivation/neutralization ? } THESE MUST BE THE ONLY OPTIONS PURSUED
iii) demilitarization* ?

STOP "MOX"! DON'T SUBSIDIZE THE NUCLEAR (WASTE) PRODUCTION INDUSTRY! 2

Sincerely,
Andrew D Butz
Social Science Faculty, Portland Community College

* I am thoroughly unconvinced that demilitarization of weapons-grade plutonium can only be done through MOX fission in commercial reactors

→ STOP THE COLD WAR PARADIGM; UNPLUG THE NUCLEAR PRODUCTION CYCLE!

ORD12

ORD12–1 **Human Health Risk**

DOE acknowledges the commentor's concern regarding the priority of public health and safety. The Human Health Risk sections presented in Chapter 4 of Volume I discuss the applicable human health risks associated with all alternatives considered. Decisions on the surplus plutonium disposition program will be influenced by these estimated risks.

ORD12–2 **Alternatives**

DOE acknowledges the commentor's support of disposition alternatives that consider only immobilization. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

DEMAIN INC. INVESTMENT CLUB
RIAN T. SMITH
PAGE 1 OF 2

4525 SE 70th
Portland, OR 97206-4450

August 03, 1998

U.S. Department of Energy (DOE)
Office of Fissile Materials Disposition
c/o SPD EIS
P.O. Box 23786
Washington, D.C. 20026-3786

To whom it may concern,

I read in The Oregonian that the DOE is asking for Public input in regards to the "Surplus Plutonium Disposition Draft Environmental Impact Statement."

In other words, the DOE has too much Plutonium and wants to justify the disposal of it. Well, instead of disposal, why not out some of the billions of dollars the DOE has to research and develop 'nuclear batteries' for Electric cars? Portable computers? Smoke Detectors?

The public already has nuclear Pacemakers, so why not expand on that? We used nuclear (Plutonium) batteries to Power experiments on the moon. What's stopping the use of such batteries to power portable tape Players (walkmans) or other electronic devices? 1

I would be willing to help fund and be a Part of an R+D team if the Department of Energy were to write back and show an interest, however

Page 1 of 2 MD009

MD009–1 **Other**

DOE acknowledges the commentor's offer of support to fund R&D on alternative uses of surplus plutonium 239. Plutonium batteries, however, are fabricated from plutonium 238. The United States has conducted research and found no current space application for plutonium 239. Because this material, along with Russian plutonium, poses a global proliferation threat, it must be disposed of in a manner that reduces the risk that it can be used by terrorists and rogue nations to build nuclear weapons. The actions proposed in this SPD EIS would implement current U.S. policy on nuclear nonproliferation and disposition of surplus plutonium.

Slight, in such an idea as I have stated. Here, I'm already verses in Government spending: "Why buy one, when you can buy two at twice the price."

Thank you for your time. 1

Sincerely,

Rian T. Smith
President / Treasurer
Demain Inc. Investment Club

MD009

DEMARIA, GREGG
PAGE 1 OF 4

US DOE needs to hear your voice NOW!

1. Should Clean Up be the sole mission at Hanford? | 1
   Yes No

2. Should the United States Government maintain its longstanding policy against the use of weapons Plutonium to fuel civilian nuclear reactors? | 2
   Yes No

3. Which alternative would you prefer to see the US Department of Energy pursue: | 3
   Immobilization (encasement of plutonium in glass-like tombs)
   Or
   The MOX plan (burning plutonium to fabricate fuel for use in a civilian nuclear reactor)?

4. Should Plutonium, to be used for processing and fabrication of MOX fuel, be imported to the Hanford site along the Columbia River? | 4
   Yes No

5. How concerned are you about the transportation of Plutonium through the Northwest?
   Not concerned slightly concerned very concerned completely opposed
   B. How concerned are you about the transport through the Northwest of fuel containing weapons Plutonium?
   Not concerned Slightly concerned Very concerned Completely opposed

6. Should commercial nuclear power plants be allowed to run on MOX fuel containing weapons Plutonium? | 5
   Yes No
   B. Should they be subsidized with tax dollars to do so?
   Yes No

7. Should MOX fuel containing weapons Plutonium be used to restart the FFTF reactor at Hanford to produce Tritium for nuclear bombs? | 6
   Yes No

Name GREGG DEMARIA
Address 3041 SE DIVISION, PORTLAND 97202
Phone 503-233-7631

Please return this to:
Hanford Action
25-6 NW 23rd Place #406
Portland, OR 97214
(503) 235-2531

MD295

MD295–1 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD295–2 **Nonproliferation**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

MD295–3 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. The remaining 17 t (19 tons) of surplus, low-purity, nonpit plutonium is not suitable for fabrication into MOX fuel because of the complexity, timing, and cost that would be involved in purifying those plutonium materials. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not a reasonable alternative and is not analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

MD295–4 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD295–5 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this

proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MD295–6 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

Additional Comments:

THE PRESENTATION AT THE MARKET ON AUG 18th GIVEN BY THE DOE, STRIKES OF "DONE-DEAL SYNDROME". IF WE ARE MOBILIZED IN THE NW TO DETER GOV'T GENOCIDE HOW CAN WE WITH LESS ORGANIZED GROUPS WHO STAND TO BE MISLED INTO DISASTROUS POLICY WHICH IN THE LONG TERM ECONOMIC PICTURE DRAG US INTO A PLUTONIUM BASED ENERGY ERA? 7

I AM INTERESTED IN HELPING. I AM TRAINED IN ARCHT / SUSTAINABLE DESIGN + HAVE EXPERIENCE IN TEACHING. I AM 26 YEARS OLD

PLEASE CALL

GREGG DEMARIA 233-7631

MD295

MD295–7 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concern regarding open communication and the opposition to the use of plutonium. DOE agrees that everyone has a stake in how plutonium is dispositioned and therefore provided various means for submitting comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Regardless of how they were submitted, all comments received on the SPD Draft EIS were given equal consideration and responded to. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this.

The remainder of this comment is addressed in response MD295–2.

DON'T WASTE OREGON CAUCAS
LYNN SIMS
PAGE 1 of 12

August 17, 1998 Sims

Thank you for the opportunity to comment upon the SPD Draft EIS, which is probably the most serious management issue that the world is facing today.

This disposition of plutonium warhead pits is a very profound and technical issue, but in common language I call this project the Great American DOE Arms-Pit Problem---because this dilemma stinks. Nobody in the world knows what to do with plutonium. No one knows how to adequately manage this very toxic and dangerous bomb material.

In light of the fact that the decisionmaking concerning this problem is so serious and has such long lived consequences, I must preface my remarks with the opinion that the Department of Energy has not done a very good job at either educating the general public or involving the public at large in this unprecedented monumental project. 1

I appreciate the fact that we have been granted a special hearing here in Portland...but the fact remains that the choice to hold interactive scoping meetings ONLY near sites that may be affected was totally inadequate. In reality, the sites that may be affected include not only the sites chosen for specific operations, but all sites along proposed transportation routes, all areas surrounding nuclear power plants that have submitted letters of intent to consider the MOX option, and all sites that may be contaminated by accidental spills, leaks and explosions which may be attendant to these operations! 2

Besides, holding hearings in only 5 locations, mainly where jobs are affected, brings local economic issues into a place of prominence when these decisions should be primarily based upon scientific evaluation and technical issues along with worldwide health and safety, environmental impact, proliferation and power source implications.

The decisions made today have significantly profound and dangerous implications for the future of the world. We must do a better job than those who chose to produce so much plutonium in the first place. We have created a terrible assault upon the 3

ORD07

ORD07–1 **General SPD EIS and NEPA Process**

DOE has initiated a number of activities and events to involve and educate the public about these very important issues. Since the inception of the plutonium disposition program, it has conducted public hearings in excess of the minimum required by NEPA regulations at various locations around the country, not just near the potentially affected DOE sites. DOE is also active in various supplementary public education initiatives: it continues to mail information (e.g., fact sheets) to interested members of the public; MD has established a Web site (http://www.doe-md.com) to provide current information to the public; and senior staff members make presentations to local and national civic and social organizations on request.

ORD07–2 **General SPD EIS and NEPA Process**

Although it was not possible to hold public hearings in all locations potentially affected by surplus plutonium disposition actions, DOE provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. All comments, regardless of how they were submitted, were given equal consideration and responded to.

ORD07–3 **MOX Approach**

DOE acknowledges the commentor's support of surplus plutonium disposition alternatives that consider no action (storage) or immobilization. Continued storage of surplus plutonium, as discussed under the No Action Alternative in Section 2.5, would not satisfy the surplus plutonium disposition program goal. The goal is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the

world environment and economy that has no apparent satisfactory solution. For these reasons we must choose with utmost care the direction we take. As we examine the situation there are many compelling reasons to eliminate the MOX option and choose vitrification or ceramic immobilization *or perhaps storage as Dominici has recently put forth,* as the only reasonable alternatives for this immediate point in time, until we develop advanced technologies to improve upon our ability to dispose of plutonium. 3

* We already know that a portion of surplus plutonium is suitable only for vitrification. In an economic sense, if this vitrification track must be followed, it makes little sense to spend comparable, and probably more, monies on a second track which takes longer to accomplish. MOX involves huge taxpayer subsidies to commercial nuclear power plants in order that they be able to compete with non-nuclear power sources. These plants will need repairs and modifications, they will encounter a higher risk of safe operation problems, and they will produce spent fuels which are more difficult to transport and store safely for the long term. Both wet pool and dry cask designs may have to be revisited to accommodate the hotter spent fuels.

The conclusions in the RAND WASTE HEAT IMPLICATIONS OF ALTERNATIVE METHODS FOR DISPOSING SURPLUS WEAPONS PU (DRU-1651-DOE JUNE 1997 states *"the increased heat output (of spent MOX produced by burning surplus weapons Pu in existing LWRs) will significantly increase the amount of space that the spent MOX fuel takes up in a geologic repository and therefore will significantly increase the cost to dispose of this material.* This increase in heat output is an inevitable consequence of the increased production of Am 241 which results from the use of MOX produced from WPu. This result holds true whether the MOX is burned in a LWR or a BWR." This issue needs to be adequately addressed in both safety and economic aspects. 4

** MOX fuel has been made on an industrial scale only from reactor grade plutonium NOT from weapons grade plutonium. With WPu There are unresolved fabrication issues such as gallium removal and the attendant wastes.*
Dr. Toevs and Dr. Beard from Los Alamos (LANL document LA-UR-96-4764) indicate that Pu pits do not all have the same concentration of gallium and the sintering process parameter would have to be adjusted as the gallium concentration changed 5

ORD07

world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

ORD07–4 **MOX Approach**

DOE acknowledges the commentor's concern about the preferred approach of using both immobilization and MOX fuel fabrication to surplus plutonium disposition. As discussed in response ORD07–3, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing either approach by itself.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

Section 4.28 was revised to discuss the environmental impacts of operating the reactors that would use MOX fuel. Commercial reactors in the United States are capable of safely using MOX fuel. Modifications would need to be made to the fuel assemblies that would be placed in the reactor vessel to support the use of MOX fuel, but the dimensions of the assemblies would not change. (Operating procedures, fuel management plans, and other activities would also need to be modified.) DOE has used selection criteria in the procurement process which ensure that the reactors chosen would be capable of safely and successfully completing the surplus plutonium

disposition program. In addition, NRC would evaluate license amendment applications and monitor the operation of the domestic, commercial reactors selected to use MOX fuel. After irradiation is complete, the spent fuel would be stored on the site pending eventual disposal pursuant to the NWPA.

MOX fuel would be handled the same as other fuels with regard to pools and dry casks. MOX fuel assemblies would be the same size and shape as the LEU fuel for the specific reactor. The only difference would be the additional decay heat from the higher actinides, especially americium, in the MOX fuel. Dry casks are designed and certified for a maximum heat load, so the additional decay heat would contribute to the total heat load and not require any redesign. The additional heat load may result in less spent fuel stored per cask. A more likely option is that the MOX fuel would be selectively packaged with cooler LEU fuel to obviate any overall heat output restriction. As a result, DOE does not expect any changes in the cask design, and thus no additional cost.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. Issues related to a potential geologic repository for HLW and spent nuclear fuel are beyond the scope of this SPD EIS, but are being evaluated in the *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999). Transportation of HLW or spent fuel would be required for either the immobilization or MOX approach to surplus plutonium disposition. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle*

Costs and Cost-Related Comment Resolution Document (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

The RAND study cited by the commentor analyzed a NWPA repository design that is very different from the reference repository design being analyzed by DOE. Moreover, the information in the study does not pertain directly to the disposition of surplus plutonium, and thus, was not used in the preparation of this SPD EIS.

Section 4.28 discusses the potential environmental impacts of operating the Catawba, McGuire, and North Anna nuclear stations, the reactors that would use the MOX fuel, should the decision be made to proceed with the hybrid approach. Operation of the proposed surplus plutonium disposition facilities is expected to take approximately the same amount of time for either approach. The difference in timing for the hybrid approach is associated with the amount of time that MOX fuel would be irradiated in domestic, commercial reactors. However, none of the proposed reactors are expected to operate longer under the hybrid approach than they would if they continued to use LEU fuel.

ORD07–5 Plutonium Polishing and Aqueous Processing

It is understood that weapons-grade plutonium has not been used to fabricate MOX fuel. At the time DOE issued the SPD Draft EIS, it believed the gallium content in the plutonium dioxide feed specifications for MOX fuel could be reached using the dry, thermal gallium removal method included in the pit conversion process. However, in response to public interest on this topic and to ensure adequate NEPA review in the event that the gallium specification could not be met with the thermal process, an evaluation of the potential environmental impacts of including a small-scale aqueous process (referred to as plutonium polishing) as part of either the pit conversion or MOX facility was presented in Appendix N of the SPD Draft EIS. On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from

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which is undesirable in an industrial-scale operation. MOX fuel with excessive gallium presents problems because it chemically attacks zirconium. The current technology for gallium removal is an aqueous process which results in the generation of large quantities of liquid radioactive wastes. A dry process is yet to be developed and would lengthen the MOX program. No problems involving gallium that would affect Pu vitrification have been identified, nor are they anticipated. 5

There are also unresolved safety issues when using WPu including:

1. the increase of structural stresses on power plants due to the higher temperatures of WPu MOX fuels
2. the stability of operation due to the lessening of delayed neutrons and
3. increased risks of the severity of accidents involving plutonium

*The introduction of these safety problems demand plant modification. The change in delayed neutrons will necessitate the addition of more control rods and the addition of boron to coolant water in order to help restore adequate control. More stresses upon the structural integrity of the plant will appear because of the higher temperatures involved with MOX fuel, and that problem must be seriously addressed as many of our plants are aging and already have steam tube cracking and containment embrittlement problems. The risk of catastrophic accidents should not be increased at any power plants and neither should the consequences of accidents be increased. *Therefore it should be absolutely a requirement the NRC must relicense any plant considering MOX and a new criteria should be developed with opportunity for public comment on these vital issues. This of course would have to apply to Russian plants also, since radiation knows no boundary.* 6

*The U.S. plants which have expressed interest in MOX want compensation far in excess of direct costs. Jack Bailey, vice president of Palo Verde, a leading candidate for MOX use stated in March 1996 "We also stress in our letters to DOE that any initiative should address potential benefits to ratepayers and shareholders...The benefits must be substantial. If not, the entire proposition is a non-starter. What I mean specifically is that any agreement involving Palo Verde would require more than 7

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the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing. While this additional step is expected to add to the estimated waste streams, the projected increases would be relatively small.

ORD07–6 **NRC Licensing**

The commentor expresses concerns that MOX fuel will result in a lower delayed neutron fraction, an increase of structural stresses due to higher MOX fuel temperatures and increased accident risks. These parameters require that the nuclear core designers accommodate these differences using verified and validated codes that incorporate these effects. Such nuclear codes have been used successfully in Europe and will be adopted and utilized by fuel designers in the United States. A reactor operating license amendment will be required for each individual reactor before it can use MOX fuel. The regulatory process will be the same as for other operating license amendment requests. The reactor licensee will initiate the process by submitting an amendment request in accordance with 10 CFR 50.90. Safety and environmental analyses, as required by NRC regulations, are submitted to NRC in support of, and as part of, the amendment request. The communities near the reactors proposed for irradiation of MOX fuel and all other interested parties will likely have the opportunity to submit comments during the NRC reactor license amendment process should the MOX approach be selected.

The licensing of Russian plants that may use MOX fuel is beyond the scope of this EIS. The remainder of this comment is addressed in response ORD07–4.

ORD07–7 **MOX Approach**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document*

the incremental costs associated with using MOX fuel instead of uranium. That kind of payment would be insufficient." (Third International Policy Forum: Deploying the Reactor/MOX Option for Plutonium Disposition Within the Current System of U.S. and Canadian Nuclear Reactors--Regulatory, Policy Impediments. Lansdown, VA March 21, 1996)
The MOX option involves huge taxpayer subsidies to plants for modifications, upgrades& repairs & beyond that, payment to keep competitive profits. It is the greatest corporate welfare scam ever perpetrated upon the people in the history of mankind. The only MOX benefit is profits to the nuclear industry at the expense of the environment, materials handlers and the population of the world. 7

*What are the changes in the Price Anderson Act to address the increased operational and safety risks? The true cost of MOX would be astronomical. 8

** In the context of human values, choosing the MOX option leads the world in the wrong direction for future energy generation, which should be focused on safer, less polluting sources. The MOX alternative is loaded with the creation of long lived hazardous materials from fuel fabrication to the spent fuel produced. At this time we are not able to cope satisfactorily with the amounts of chemical and radioactive wastes and spent fuel which has* 9

already been generated both in the military production and commercial sectors and it is irresponsible to add to this waste burden.

**Transport and onsite storage of fresh MOX fuel is a proliferation risk because it is very vulnerable to theft. At the present time there are no Russian agreements for IAEA security.* 10

**Fresh MOX fuels also incur higher expenditures because he shipments of these fuels demand military escort wherever they are and may require separate fresh fuel storage facilities since MOX fuel would emit higher gamma and neutron radiation.* 11

**There are more possibilities of proliferation risks with the MOX option because the accounting system for tracking amounts of plutonium along the MOX program leaves room for error. Even if no plutonium were diverted from the program, The Joint US/Russian* 12

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(DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

The remainder of this comment is addressed in response ORD07–4.

ORD07–8 **NRC Licensing**

To ensure reactor safety, NRC would evaluate license applications and monitor operations of the MOX fuel fabrication facility, as well as the domestic, commercial reactors selected to use MOX fuel. No change to the Price Anderson Amendment Act has been considered and none would be necessary.

ORD07–9 **MOX Approach**

The purpose of the surplus plutonium disposition program is not to provide future energy generation but to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

Potential waste management impacts of MOX fuel fabrication alternatives are summarized in Chapter 4 of Volume I and discussed in detail in Appendix H.

The remainder of this comment is addressed in ORD07–4.

ORD07–10 **Nonproliferation**

DOE acknowledges the commentor's concerns regarding transportation and MOX fuel storage. In order to address security against terrorist-related

incidents, all intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications and additional couriers. Further, the three DOE disposition facilities proposed in this SPD EIS are all at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Security for the proposed facilities would be commensurate with the usability of the material in a nuclear weapon or improvised nuclear device. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed inside are adequately protected. Closed-circuit television, intrusion detection, motion detection, and other automated materials monitoring methods would be employed. Furthermore, the physical protection, safeguards, and security for the MOX facility and domestic, commercial reactors would be in compliance with NRC regulations.

The implementation process for international inspection of U.S. and Russian surplus plutonium is not fully defined. That process is part of ongoing sensitive negotiations being conducted to reach a bilateral plutonium disposition agreement between the United States and Russia in accordance with the Joint Statement of Principle, which was signed by Presidents Clinton and Yeltsin in September 1998.

ORD07–11 **Transportation**

Transportation of surplus plutonium until it reaches its final disposition form would use DOE's SST/SGT system regardless of the approach taken. This system does not use a military escort, rather the SST/SGT system uses armed Federal officers. The cost of transportation to implement the surplus plutonium disposition program, regardless of the approach, is dependent on the number

of trips and the length of the various transportation segments. Table L–3 shows the number of trips and the distance traveled for each alternative. Some of the hybrid alternatives would require less transportation than some of the immobilization-only alternatives. However, the risks from transportation for all of the alternatives would likely be minor.

The MOX fuel would be managed essentially the same way as fresh LEU fuel. However, there would be tighter security and potentially higher costs. The plutonium would be received at the reactor site shortly before it would be inserted into the reactor. Any actual restrictions or requirements related to the storage of fresh MOX fuel would be imposed by NRC as part of the reactor operating license amendment.

ORD07–12 **MOX Approach**

If U.S. surplus plutonium is dispositioned as MOX fuel in the United States, it would be done with the stipulation that the material could only be used once and not reprocessed. U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). There is no intention to change this policy to allow reprocessing at any time in the future.

The remainder of this comment is addressed in response ORD07–10.

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Plutonium Disposition Study states "...Russia will ultimately recycle any plutonium left in the [MOX spent] fuel." And, "the U.S. objective of plutonium disposition" appears to be satisfied if MOX spent fuel "is stored for several decades before reprocessing." (Joint US/Russian Plutonium Disposition Study, September 1996, p. ExSum-2.) Therefore, if we choose the MOX option, the United State will be supporting the infrastructure for a plutonium economy in Russia and indeed perhaps promoting eventual reprocessing in the United States. This is a dangerous and intolerable outcome. 12

FOR ALL THE ABOVE REASONS THE DOE SHOULD DISCONTINUE THE MOX APPROACH FOR SURPLUS PLUTONIUM DISPOSITION. 13

**As far as the political maneuvers are concerned (noticing that Russia views Pu as an asset while the general view in the USA ranges from Special Nuclear Material to Economic and Environmental Liability) that just because Russia seems determined to jump over the edge of the cliff it does not mean that we must follow!! Instead we should remember that the United States in reality has the ultimate persuasion because we have more money and will be aiding Russia with its plutonium disposition.* Russia has not seriously considered using MOX in LWRs until now.

Russian operating VVER-1000 reactors would not be able to consume 50 metric tons of surplus plutonium within the timeline of 20 to 40 years set by the joint panels. In order to have that happen, 3 partially built reactors would have to be finished, or reactors in Ukraine would have to be loaded with MOX or reactors would have to operate beyond their lifetimes which would increase safety risks. The MOX option in Russia is further complicated by the crumbling economy and the temptation of the black market. Instead we should offer subsidies to build pilot vitrification plants. 14

*The MOX option is completely unacceptable, but the vitrification process is also not without risk. Converting plutonium pits for glassification also involves health and safety risks and the creation of sidestream wastes. 15

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ORD07–13 **MOX Approach**

This comment is addressed in response ORD07–3.

ORD07–14 **Nonproliferation**

Close cooperation between the two countries is required to ensure that nuclear arms reductions cannot be easily reversed. Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. In fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

ORD07–15 **Alternatives**

DOE acknowledges the commentor's concerns regarding health and safety risks associated with proposed surplus plutonium disposition facilities. All facilities for surplus plutonium disposition would be constructed and operated to meet applicable health and safety standards and some facilities may be subject to international inspection. DOE takes into consideration pollution reduction techniques to minimize environmental releases when designing, constructing, and operating its facilities. Analysis in this SPD EIS indicates that impacts to health, safety, and waste management from routine operation of the pit conversion, immobilization, and MOX facilities would likely be minor.

DOE has evaluated alternatives for immobilizing all of the surplus plutonium, however, DOE has identified as its preferred alternative the hybrid approach. As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach, which includes both immobilization and MOX fuel, would be more expensive than the immobilization-only approach. However, pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential

*If we are concerned for a swift resolution to the proliferation risk posed by plutonium, then vitrification is the better alternative because it can be accomplished in less time than the MOX option, is less expensive and has fewer facilities to manage and safeguard.
Any facilities used should be in strict compliance with the most stringent safely regulations and be under constant inspection. When sidestream wastes are generated it must be guaranteed to be isolated from the environment. Transport of hazardous materials must be kept at a minimum. 15

The people of Oregon do not want more contamination at Hanford. We have had to implore the DOE for a comprehensive assessment of Hanford waste upon the Columbia River. We have not received enough money for adequate monitoring let alone good containment or aggressive clean up. We will not tolerate MOX operations on any level at Hanford. Too many risks are involved. NOR WILL WE TOLERATE MOX ANYWHERE.

Contrary to the slogan advertisement of Hanford as a site of Environmental Excellence, we have seen as recently as the 5/14/97 explosion in the Plutonium Reclamation Facility that the management is inadequate. Even an ordinary chemical accident happened because of improper monitoring. Compounding the implications of such mismanagement is the fact that the official DOE NEWS release of May 28 stated "The team has verified that no radioactive materials were involved in the accident..." The admission of the presence of plutonium was not admitted until July. This implies that either management did not know what was happening or that issues vital to public safety were deliberately covered up. We will never be assured that the personnel at Hanford, or any workers anywhere for that matter, will be able to satisfactorily manage the MOX program. Hanford is not the site to handle any portion of the MOX program, we have enough problems on our hands 16

Why are we even considering the MOX option? It is more dangerous, more risky, more expensive, more problematic, involves more transport of fissile materials, opens more opportunities to terrorists and black market dealers and leaves us with spent fuels that are difficult and expensive to store for the long term. RUSSIA HAS STATED THAT THEY WOULD WANT TO REPROCESS, WHICH PROMOTES A PLUTONIUM ECONOMY AND 17

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disadvantages of implementing either approach by itself. It is also gives the United States more leverage in negotiations with Russia as discussed in response ORD07–3. Operation of the proposed facilities is expected to take approximately the same amount of time for either the immobilization-only approach or the hybrid approach. The difference in timing for the hybrid approach is associated with the amount of time that MOX fuel would be irradiated in domestic, commercial reactors.

While DOE prefers to minimize the transportation of plutonium, it is routinely and safely transported in the United States. As described in Appendix L.3.3, transportation of nuclear materials would be performed in accordance with all applicable DOT and NRC transportation requirements. Interstate highways would be used, and population centers avoided, to the extent possible.

All shipments of surplus plutonium that had not been converted to a proliferation-resistant form would use DOE's SST/SGT system. The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

ORD07–16 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities; however, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

The News Release of May 28 correctly stated that the explosion did not involve radioactive materials. It reported: "The team has verified that no radioactive materials were involved in the accident that blew the steel lid off

the storage tank, rupturing the overhead fire protection water line." This was reiterated in the eighth paragraph, which stated: "No evidence of radioactivity release during the accident has been found." This statement was correct and the Summary Report of the Accident Investigation Board (July 26, 1997) confirmed in the last sentence of the third paragraph that no radioactive materials were involved in the explosion. It states: "Results of extensive sampling, contamination surveys, and stack monitoring data, show that nondetectable airborne radioactivity was released from the facility." The May 28 News Release did acknowledge the potential presence of plutonium as part of the after-effects of the explosion. It stated in the last paragraph that: "analysis of water collected inside the building showed no chemical contamination. It contained radioactive contamination slightly above-background levels, which is believed to have come from a prior incident resulting from previous operations in the building." The investigators were sure that this was not directly from the explosion. However, efforts did continue throughout the investigation to determine if the contamination had been carried from some other part of the building by the water that flowed from a cut in a small fire-suppression water line. However, this survey was complicated due to the preexisting spots of contamination in the same areas. This included contamination surveys where water had flowed out building doors. The result of this was a conservative position that the very small amount of contamination found outside, which was barely above-background counts, "was likely" carried out by the water. This was reported in the accident summary report as, "Water from the cut water line flooded the building, and some of it flowed out through various facility exit doors. Extensive surveys conducted inside and outside the building revealed radioactive contamination on the first floor of the facility, and a small area of slightly above-background levels of radioactive contamination outside, that was isolated and immobilized. The contamination found outside was likely the result of water flowing across walls and floors of contaminated areas of the facility, carrying radioactive material outside the building." Following the May 1997 explosion at Hanford, a review of the emergency management response indicated that multiple programs and systems failed in the hours following the accident. In a letter to Secretarial Offices, Secretary of Energy Federico Peña identified action to be taken at all DOE sites to implement lessons learned as discussed in Section 3.2.4.5 of this SPD EIS. It is DOE's

INCREASES HANDLING AND PROLIFERATION RISKS. RUSSIA ALSO WANTS THE WEST TO FINANCE THE OPERATIONS AND OFFER MONETARY INCENTIVES...MORE REASONS TO NIX MOX. 17

The state of the world plutonium problem is so severe that it will be a miracle if we accomplish the disposition task. IT MAKES MOST SENSE TO CHOSE STORAGE WHILE DEVELOPING IMMOBILIZATION TECHNIQUES AND FINANCING ONLY THOSE OPTIONS WHICH DO NOT PROMOTE A PLUTONIUM ECONOMY. 18

Respectfully submitted,

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policy to place public safety above other program goals. DOE is committed to public and worker safety during the construction, operation, and deactivation of the proposed surplus plutonium disposition facilities, and would implement appropriate controls and procedures to ensure compliance with all applicable Federal, State, and local laws, rules, regulations, and requirements.

ORD07–17 **MOX Approach**

This comment is addressed in responses ORD07–3, ORD07–12, and ORD07–14.

ORD07–18 **MOX Approach**

This comment is addressed in response ORD07–3.

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AUGUST 18, 1998 Sims page I

SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT PUBLIC COMMENT

Thank you for holding a hearing regarding Plutonium Disposition in Portland. Even more hearings must be held on this important national and international policy making environmental impact statement. Plutonium policy must be democratized, not just made still in semi-secret, mainly holding hearings only in areas in the vicinities of involving those who are directly impacted by plutonium related jobs programs. 1

I take issue with the basic DOE statement that "this draft SPDEIS identifies reasonable alternatives for plutonium disposition." The dual track strategy is on the wrong track headed over the cliff to catastrophe. The MOX option promotes more handling, more transport, increased risk of accidents, increased risk of health problems, increased expenses, more problematic spent fuel disposal and more security risks than guarded storage or prompt immobilization. The Department's continued emphasis upon MOX fuels, in light of all we know today, as a reasonable disposition option, seems to reflect a lingering institutional insanity. 2

The Nuclear Control Institute argues that "using MOX fuel for commercial nuclear power plants is simply too expensive and too risky. Stimulating commerce in plutonium is a recipe for disaster. Mox takes too long. MOX costs too much. Tens of billions of dollars will probably be needed to underwrite the Russian nuclear power industry so that it can use MOX fuel. MOX is too dangerous. MOX fuel reduces the stability of reactor cores. MOX increases the severity of certain accidents. MOX undercuts non-proliferation and arms control." (Paul Leventhal, The Case Against Using Military Plutonium as Civilian Fuel, March 12, 1998)

This SPDEIS states that "the purpose of and need for the proposed action is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner." MOX is neither environmentally safe nor timely. Moreover, we have just had a terrible confirmation of the saying that "nuclear power, powers nuclear bombs" when India exploded the "peaceful atom". MOX would not curb proliferation. The more plutonium is handled and transported, the more risk there is of inaccurate accountability and diversion. If our purpose is to reduce the availability of plutonium, then promoting a plutonium economy, MOX fuel and Russian reprocessing is obviously THE WRONG TRACK. 3

In early August 1998 even Senator Domenici had called for a new approach to Plutonium Disposal in face of the astronomical expenses. The ENERGY DAILY explained that Senator Domenici learned from the Russian minister of atomic energy that Russia would pursue its MOX program only if the West paid for the construction of a MOX fuel fabrication plant in Russia... And paid additional compensation to encourage Russia to use the MOX in their reactors. This stupendous military-industrial complex corporate welfare would wreck the world budget.

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ORD06–1 General SPD EIS and NEPA Process

DOE held a number of regional hearings in places such as Boston, Chicago, Denver, and San Francisco during the preparation of the Storage and Disposition PEIS. To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites, and therefore, with the most directly affected population. To encourage participation and comment by all interested citizens not in the vicinity of those public hearing locations, DOE provided a number of means for submitting comments: mail, a toll-free telephone and fax line, and the MD Web site. All comments submitted, orally and in writing, were considered equally in the preparation of this SPD EIS. DOE does not believe any additional hearings are necessary.

ORD06–2 Alternatives

DOE acknowledges the commentor's opposition to the MOX approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. By working in parallel with Russia to reduce stockpiles of excess plutonium, the United States can reduce the chance that weapons-usable nuclear material could fall into the hands of terrorists or rogue states.

Operation of the proposed surplus plutonium disposition facilities is expected to take approximately the same amount of time for either approach. The difference in timing for the hybrid approach is associated with the amount of time that MOX fuel would be irradiated in domestic, commercial reactors. However, none of the proposed reactors are expected to operate longer under the hybrid approach than they would if they continued to use LEU fuel.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs

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Domenici believes Russian officials would support conversion of plutonium to unclassified shapes and storage under international oversight. This is an idea that makes some kind of common sense for fast track securing of plutonium.

On top of all the economic, health, environmental and proliferation liabilities of the MOX option is the significant fact that no nongovernmental organization, public interest group or environmental organization either here or in Russia wants MOX to happen. In Russia the Center for Nuclear Ecology and Energy Policy of Socio-ecological Union of 200 environmental organizations has a special resolution against MOX fuel. Hundreds of Western groups signed on to a letter calling for an end to all policies and practices that would allow or encourage the use of plutonium as a fuel in nuclear power reactors in March of this year. We the people have the right to determine what future we want regarding the profound subject of plutonium disposition. It is very telling that it is only people who make money from MOX projects support it. This is the kind of damaged reasoning that places greed before responsibility to the people, the environment and future generations. 3

We don't want MOX operations at Hanford, or Pantex, or INEEL or Savannah River or at any site in Europe or Asia. Nobody in their right mind wants a plutonium economy and we ask you to do the right thing and reconsider going forward with MOX plans and concentrate only upon swift guarded storage and immobilization technologies.

Respectfully submitted,

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associated with the various alternatives. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

ORD06–3 **DOE Policy**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

DOE's surplus plutonium disposition program is not a profit-making venture. This SPD EIS does not consider the impacts of any of the alternatives on the Russian plutonium disposition program. However, DOE is working diligently to ensure that Russia continues to pursue plutonium disposition with the same vigor as the United States. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain surplus plutonium disposition activities in order to encourage the Russians and set an international example.

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Sara Ennis
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Portland, OR 97213

To the Secretary of Energy, 8 11 98

I am outraged by this environmentally and economically unjustifiable pursuit of nuclear energy as proposed by the plan to burn MOX fuel at Hanford or Savannah River, SC.

With the toxic facts in front of you, such as how long MOX requires to cool, problems of storage and transport, hazards of production how can you knowingly put a nuclear threat of such magnitude into anyone's back yard? 1

FD204

FD204–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Neither Hanford nor SRS has been proposed for irradiation of MOX fuel. Both sites, however, have been evaluated as candidate sites for the fabrication of MOX fuel. As indicated in the revised Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise.

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

It would seem that the only economic reason for pursuing the incineration of MOX fuel, would be to boost the nuclear industry. Clearly the foreseeable costs are enormous and the unforeseeable costs, I suspect are beyond speculation

The project in and of itself is blatantly stupid, but in consideration of the missed opportunity to develop clean, renewable sources of energy, I find the proposal absurd 1

I sincerely hope that in the near future you take on a global perspective of health + safety in energy production

Sincerely, Sara Ennis

FD204

FALLINGSTEAD, JOYCE
PAGE 1 OF 1

Hello, my name is Joyce Fallingstead and I'm a concerned citizen from Portland, Oregon. I'm calling to say that I would like the MOX fuel, the mixed oxide fuel, to not be used in commercial nuclear reactors. I believe it is dangerous to distribute plutonium to reactors around the country both in regard to the handling involved, as well as the decentralization, as well as the transportation. I believe the immobilization of surplus plutonium through vitrification would be a much safer way of working with our surplus plutonium. I would like very much for the plutonium to not be used as a mixed oxide fuel, and, thank you for taking my comment. Bye-bye. 1

PD065

PD065–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS.

Yeah, I would like a copy of the Surplus Plutonium Disposition Draft Environmental Impact Study. My name is Loren Fennell and my PO Box is 4111 Portland, Oregon 97208. Yeah, I would also like to make a comment on this, this disposition that, number 1) I know for a fact that there is, like, thousands of gallons of high and material of highly radioactive waste leaking in, into the watershed of the Columbia River and/or at least heading that way. 1

How many years do we have to wait, you know, before that's cleaned up and any more MOX fuel factories that will make and utilize other waste. I mean it's just, it's kind of crazy. It's not a very safe concept and I don't approve of it and I would just you know, hope that you know, we wake up to the alternatives to energy like wind, solar and bio-mass conversion of our garbage waste for example. So please take this into consideration and I would like a copy as soon as possible. And I thank you very much. Bye. 2

PD040

PD040–1 **Water Resources**

DOE acknowledges the commentor's concern regarding the quality of the Columbia River. Section 3.2.7 provides a description of water resources at Hanford, including their present condition. Section 4.26.1.2 summarizes the potential impacts on surface and groundwater that would result from the proposed surplus plutonium disposition facilities at Hanford. Surface water would not be used in construction or operation nor would there be direct discharges of wastewater from the facilities. Likewise, there would be no direct discharge of wastewater into the groundwater aquifer. All wastewater would be treated prior to discharge in facilities designed to meet NPDES permit limitations. Therefore, no impact on surface or groundwater quality or availability would be expected from the proposed facilities.

PD040–2 **Other**

DOE acknowledges the commentor's concern with the safety of the MOX approach, and support of alternative energy sources. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to

the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

My name is Bruce Frazier. My address: 2012 South East Hemlock Ave, Portland, Oregon 97214. My telephone number: area code 503 238-8665. I'm calling to request a summary of the environmental impact statement on the draft Surplus Plutonium Disposition Environmental Impact Statement. I know a hearing was had here in Portland recently. I did not able to attend, but I want to get a copy of that and prepare written comments. So if you could send that off. Also, I do want to make the comment that I believe that the only safe disposition of excess and surplus plutonium and waste containing high percentages of plutonium is through vitrification and permanent storage. I do not favor any disposition of excess or surplus plutonium or associated nuclear materials through the use of MOX- mixed oxide fuel- or for burning in any kind of reactor or test facility. That's my immediate comment. But please send me the indicated materials. Thank you very much. Good bye. 1

PD034

PD034–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

GEROULD, STEVEN
PAGE 1 OF 1

This is my comment: I am against the MOX and would like the money used towards Hanford cleanup. Thank you. | 1

PD039

PD039–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach and support of cleanup at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission. Furthermore, funds for the surplus plutonium disposition program and environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably.

Hi there. This is Jessica Hamilton. I am a resident of Portland. My address is 831 Southwest Vista Avenue, Apartment 302, Portland, Oregon 97205 and I'm calling because I want to make sure that Hanford gets cleaned up and that you do not implement MOX. And I do not want to see you guys burn the weapon's plutonium and use it for commercial nuclear reactors. Thank you very much for the opportunity to comment. 1

PD030

PD030–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach, and support of cleanup at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

HANFORD WATCH
PAIGE KNIGHT
PAGE 1 OF 4

TESTIMONY ON THE SURPLUS PLUTONIUM DRAFT EIS
BY PAIGE KNIGHT, PRESIDENT OF HANFORD WATCH
August 18, 1998

Physicians for Social Responsibility had the courage and foresight years ago to designate radiation pollution as a "national public health and safety emergency" - a kind of creeping Chernobyl, spreading insidiously through our land, our food, our water.

Nuclear waste is continuing to accumulate with nowhere to go. Yucca Mountain, the supposed nuclear waste geological repository, in Native Shoshone land in Nevada, is costing millions upon millions of dollars and is proving to be scientifically unsound; it is not the safe dry place hoped for by politicians and the Nuclear Power Industry.

The Waste Isolation Pilot Project in New Mexico has been delayed once again because it does not yet measure up to the environmental standards deemed protective of public health and safety. Illegal dumping and release of wastes continue world wide into our oceans and into the land and into the sources of our groundwater. 1

Industry and politicians seek solutions that keep the waste problem --out of sight, out of mind-- in hopes of gaining more short-sighted profit and selfish economic advantage over the masses.

They wave, once again, their biblical prophecies and try to lull us into buying their sacrilegious interpretations of "turning swords into plowshares" only to hide from themselves and us that they will be plowing our fields with more toxic radioactive wastes with half-lives longer than the life of the human race thus far. They may bring about the demise not only of humankind but of planet earth because it is a "good business deal".

What has the nuclear endeavor brought us? Even now, with over eight nations calling for nuclear weapons to be declared illegal, the power struggle wages on with India, Pakistan, Israel, and Iran recently declaring themselves, through the testing of nuclear devices, to be nuclear capable and players at the "big table". The preferred option in this Draft EIS refuses to consider the global picture. The "Peaceful Atom" program has brought us to a point in history where the most deadly substance known to humankind (and created by us as well) is considered more powerful than peace, and more valuable than our gold money standard. This bodes ill for future generations. 2

Here are some of our "dividends" from the "Peaceful Atom":

- We have over 170 tons of commercial nuclear reactor waste world-wide;
- We have approximately 55,000 tons of "excess" military plutonium in the U.S.
- The U.S. taxpayer has paid between $5.5 and $6 **trillion** for nuclear weapons since 1940.
- Nuclear waste is being considered as an international asset rather than the most deadly waste known to humankind, and proliferation of plutonium and uranium abounds.

Dr. James C. Warf, who worked on the first atomic weapons and was the inventor of the *PUREX* technology, in recent years has stated that "I have come to learn that there are often large proliferation and other environmental impacts from such endeavors a reprocessing, despite the initial paper proposals that promise smooth operations.." We fear more of the same with the stakes becoming even higher in this age of terrorism and lack of moral integrity by the powerful brokers of the nuclear and weapons industry. 3

The 1988 shutdown of U.S. plutonium production reactors occurred because of several factors:

ORD01

ORD01–1 **Repositories**

DOE acknowledges the commentor's concerns regarding waste management. Radioactive waste cleanup is a DOE priority, and activities conducted under the surplus plutonium disposition program would be coordinated with other ongoing DOE programs including those associated with waste management, as discussed in Section 1.8.2.

ORD01–2 **DOE Policy**

DOE acknowledges the commentor's views on the surplus plutonium disposition program. The purpose of this proposed action is to safely and securely disposition the surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

ORD01–3 **DOE Policy**

In September 1993, President Clinton issued the Nonproliferation and Export Control Policy in response to the growing threat of nuclear proliferation. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Toward that end, this SPD EIS analyzes a nominal 50 t (55 tons) of surplus weapons-usable plutonium. In addition to 38.2 t (42 tons) of weapons-grade plutonium already declared by the President as excess to national security needs, the material analyzed includes weapons-grade

the devastating Chernobyl accident of 1986 which led to the discovery of the DOE's reactors' inadequate containment buildings and other essential safety features; citizen's growing knowledge of the serious state of negligence in the nuclear weapons complex; and the reality of the enormous surplus of military plutonium. 3

The government has yet to deal with the environmental legacy left by a half of century of weapons production; cleanup is not being adequately dealt with leaving future generations contaminated water resources growing health and safety threats; the wastes that do exist have no safe storage place nor safe containment at this point in time and yet the proposed MOX alternative would add about three million gallons of highly radioactive liquid waste to storage tanks that are already fraught with safety problems. We have not found the will or way to stop the spread of nuclear arms and yet the terrorist acts in our own country and around the world continue to multiply. The plutonium in spent fuel is least likely to be stolen or diverted for violent purposes precisely because it has *not* been extracted through reprocessing. 4

The USDOE is contending that the options are equal in cost; this soft fact does not mesh with the National Academy of Sciences review of the options a few years ago. Their report concluded that the "MOX" option was by far the most expensive option. There has never been a nuclear reactor to my knowledge that has not run far over cost and presented unacceptable safety problems; one of the major safety problems identified by researchers is a greater risk of loss of control during reactor operation. As I have stated before, major concerns of public health and safety and proliferation of nuclear materials have not been adequately addressed. We join with the Hanford community is calling for a new draft EIS, but because all options and all impacts are not fully addressed. We also agree that politics has influenced the options presented to us in the EIS, rather than sound science that should far outweigh even the economics of these proposals. If these decisions are based solely on politics and economics the DOE is once again showing the public that we are expendable–health of the race and the planet means nothing to them. 5 6

I conclude with the following recommendations:

- Place all weapons-usable material that are extracted from leftover materials under international monitoring and safeguards.
- Fully fund improvements of underwater storage of corroding spent fuel, then to interim dry storage.
- Stop all actions and policies that encourage and subsidize the American Nuclear Industry and Russian plans to build a plutonium economy.
- Avoid a plutonium fuel cycle and economy for electrical generation anywhere in the world.
- Base decisions on a rational approach of analyzing truly long-term consequences nationally and globally.
- Limit all current reprocessing that is taking place at Savannah River Site to the legacies of our production years.
- Limit the transport of nuclear materials from one place or country to another.

7

Let me close with some pertinent quotes from Senator Mark Hatfield who has long seen through the nuclear myths perpetrated on the public by the spin meisters of the Nuclear Industry: 8

ORD01

plutonium that may be declared surplus in the future, as well as weapons-usable, reactor-grade plutonium that is surplus to the programmatic and national defense needs of DOE.

Although the Chernobyl accident of 1986 led to further reviews of DOE's production reactors, it did not lead to the discovery of the inadequacy of containment structures nor the decision to shut down these reactors in 1988.

ORD01–4 **DOE Policy**

DOE acknowledges the commentor's concerns regarding wastes associated with the MOX approach. Analyses presented in Appendix H indicate that no HLW would be generated by the MOX facility and that all other waste types would be treated, stored, and disposed of in accordance with current site practices and procedures, WM PEIS RODs, WIPP ROD, and applicable agreements. Analyses presented in Section 4.28 indicate that the use of MOX fuel in domestic, commercial reactors would not appreciably change the characteristics or quantities of waste generated at the proposed reactor sites. The resulting spent nuclear fuel from these commercial reactors would continue to be managed in accordance with current practice and in a manner required by applicable regulations.

Further, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

ORD01–5 **Cost**

DOE acknowledges the commentor's concern regarding the cost of the MOX approach. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition*

HANFORD WATCH
PAIGE KNIGHT
PAGE 3 OF 4

MARK O. HATFIELD

January 14, 1998

Ms. Paige Knight
Hanford Watch
2285 SE Cypress
Portland, OR 97214

Dear Ms. Knight:

Thank you for your invitation to participate in today's Department of Energy hearing on altering the 1989 Hanford Tri-Party Agreement and restarting the Fast Flux Test Facility (FFTF) for the purpose of producing tritium for nuclear weapons. I regret that previous commitments prevent me from attending this critical event.

The persistence by some to exhume nuclear weapons production activities at Hanford never ceases to amaze me. It is shameful enough that the region has not taken steps to close its only operating commercial nuclear reactor, the WNP-2 plant at Hanford, even though an excellent case can be made against it now on purely economic grounds. This abdication of responsibility pales in comparison, however, to the insidious proposal to restart the aging FFTF research reactor for the purpose of producing tritium, a radioactive substance that enhances the destructive capability of nuclear weapons.

It is disappointing that this issue is even being seriously discussed here, a region of the country that has learned the hard way that the price of nuclear technology is much higher than the experts and proponents of nuclear power are ever honest enough to acknowledge. For example, the WPPSS nuclear debacle was one of the greatest economic disasters of the century, and continues to cost the region's electricity customers over $500 million a year. The Department of Energy was forced to stop lying to the public and close the N Reactor at Hanford in 1988 when it was revealed that hundreds of millions of taxpayer dollars were being wasted producing a product (plutonium) for which there was no critical need. The clean up of the Hanford Reservation will cost hundreds of billions of dollars, take decades to accomplish, and continue to threaten human health and safety. The Trojan nuclear power plant in Oregon was closed because it was uneconomic, and still awaits decommissioning.

Considering all this, how could any rational person or bureaucracy consider adding to the nuclear misery already visited upon the Pacific Northwest? How many lessons do we have to learn before we turn away from the broken promises of nuclear myths? Hanford already is the

ORD01

(DOE/MD-0009, July 1998), which analyzes the cost and schedule estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

ORD01–6 General SPD EIS and NEPA Process

This SPD EIS presents the potential impacts on public health and safety of each of the alternatives considered in the document. The text reflects DOE's efforts to carefully collect comparable data on all of the alternatives, analyze those data in a consistent manner using well-recognized and accepted procedures, and present the results in a full and open manner. The range of reasonable alternatives was established using the screening criteria listed in Section 2.3.1 and public input. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

ORD01–7 DOE Policy

International inspections would take place throughout the surplus plutonium disposition process, starting at the end stages of the pit disassembly and conversion process. Section 2.4 discusses the sensitive negotiations taking place between the United States and Russia to implement international inspections. Spent fuel storage would take place at the commercial reactors that use the MOX fuel. Spent fuel onsite at the reactors has been and continues to be safely stored. These reactors are regulated by NRC.

Use of MOX fuel in commercial reactors is not proposed in order to subsidize the commercial nuclear power industry or produce electricity. As discussed in response ORD01–2, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard.

Ms. Paige Knight
January 14, 1998
Page 2

greatest environmental threat to the people of the Pacific Northwest. Restarting any nuclear reactor for weapons production purposes is misguided at best, and transparently evil, at worst. It also is a clear violation of the spirit and intent of the Tri-Party Agreement and a complete reversal of our focused mission over the last 20 years to clean up the largest environmental disaster area in the Nation.

Long ago the Northwest made decisions that turned us away from nuclear production of weapons material and electricity. It is time again to reject the sermons of the nuclear proselytizers and say no to those who preach death, destruction and ruin to our world and the region.

I commend you for your continued commitment to protecting the people and the environment of the Pacific Northwest. Do not hesitate to let me know if I can be of further service to your endeavors.

With kind regards.

Sincerely,

Mark O. Hatfield

ORD01

The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Furthermore, the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

Transportation of special nuclear materials would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. As discussed in Section 2.3.1, minimizing transportation was a consideration in developing the alternatives.

The proposed action does consider national and global long-term consequences of removing 50 t (55 tons) of plutonium considered surplus from both U.S. and Russian stockpiles. Decisions on the U.S. surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

ORD01–8 **DOE Policy**

DOE acknowledges the commentor's quotes from Senator Mark Hatfield.

JANZON, GRETCHEN
PAGE 1 OF 3

The U.S. Department of Energy needs to hear you voice NOW!
What do you think about a new era of nuclear proliferation?

Hanford Action of Oregon will forward this questionnaire to USDOE. Please circle your responses.

1. Should clean-up be the sole mission at Hanford? — 1
   Yes No

2. Should the United States government maintain its longstanding policy opposing the use of weapons plutonium to fuel civilian nuclear reactors? — 2
   Yes No

3. Should commercial nuclear reactors be allowed to run on MOX fuel containing weapons-grade plutonium? — 3
   Yes No

3a. Should they be subsidized with tax dollars to do so?
   Yes No

although I don't have confidence, the entombing materia

4. Which alternative would you prefer to see the U.S. Department of Energy pursue: — 4
   Immobilization (encasement of plutonium in glass logs or in cannisters for entombment)
   OR
   The MOX plan (processing plutonium into fuel for use in civilian nuclear reactors).

5. How concerned are you about the transportation of plutonium through the Northwest to Hanford? — 5
   Not concerned Slightly Concerned Very Concerned Completely opposed

6. How concerned are you about transporting plutonium MOX fuel through the Northwest to Hanford?
   Not concerned Slightly Concerned Very Concerned Completely opposed

7. Should MOX fuel be used to restart the Fast Flux Text Facility (FFTF), a risky liquid-metal reactor at Hanford, to produce tritium for nuclear bombs? — 6
   Yes No

Name Gretchen Janzon
Address 2323 NE 57th Ave. PDX OR 97213
Phone ____ e-mail ____

Please return to Hanford Action of Oregon by September 10, 1998.

Hanford Action of Oregon
25-6 NW 23rd Pl. #406 tel: (503) 235-2924 fax: (503) 736-0097 e-mail: hannie@aol.com

MD227

MD227–1 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD227–2 **Nonproliferation**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

MD227–3 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would

displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MD227–4 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. DOE has determined that 17 t (19 tons) of surplus, low-purity, nonpit plutonium is not suitable for fabrication into MOX fuel because of the complexity, timing, and cost that would be involved in purifying those plutonium materials. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not a reasonable alternative and is not analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

Testing is underway to confirm that the immobilized plutonium would meet the performance criteria for disposal in a potential geologic repository pursuant to the NPWA.

MD227–5 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD227–6 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

The U.S. Department of Energy needs to hear you voice NOW!
What do you think about a new era of nuclear proliferation?

Hanford Action of Oregon will forward this questionnaire to USDOE. Please circle your responses.

1. Should clean-up be the sole mission at Hanford? do you mean burying this? — 1
   Yes No
2. Should the United States government maintain its longstanding policy opposing the use of weapons plutonium to fuel civilian nuclear reactors? if this has already been so - why do we have so much to dispose of. — 2
   Yes No
3. Should commercial nuclear reactors be allowed to run on MOX fuel containing weapons-grade plutonium? why are we producing this Material. — 3
   Yes (No)
3a. Should they be subsidized with tax dollars to do so? No wonder that Iran does not want to cooperate! — 4
   Yes (No)
4. Which alternative would you prefer to see the U.S. Department of Energy pursue:
   Immobilization (encasement of plutonium in glass logs or in cannisters for entombment)
   OR
   ✓ The MOX plan (processing plutonium into fuel for use in civilian nuclear reactors).
   But this is ultimately very dangerous.
5. How concerned are you about the transportation of plutonium through the Northwest to Hanford? — 5
   Not concerned Slightly Concerned Very Concerned (Completely opposed)
   where was it manufactured?
6. How concerned are you about transporting plutonium MOX fuel through the Northwest to Hanford? — 6
   Not concerned Slightly Concerned Very Concerned (Completely opposed)
   if it was not too risky to develop - then keep it there.
7. Should MOX fuel be used to restart the Fast Flux Text Facility (FFTF), a risky liquid-metal reactor at Hanford, to produce tritium for nuclear bombs?
   Yes (No)

Name Rose Mary Joslin
Address 3134 NE 62nd
Phone 503-282-8998 e-mail

Please return to Hanford Action of Oregon by September 10, 1998.

Hanford Action of Oregon
25-6 NW 23rd Pl. #406 tel: (503) 235-2924 fax: (503) 736-0097 e-mail: hannie@aol.com

MD299

MD299–1 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD299–2 **Nonproliferation**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile.

MD299–3 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MD299–4 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. The remaining 17 t (19 tons) of surplus, low-purity, nonpit plutonium is not suitable for fabrication into MOX fuel because of the complexity, timing, and cost that would be involved in purifying those plutonium materials. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not a reasonable alternative and is not

analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

MD299–5 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD299–6 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

JUERGENS, KATHLEEN
PAGE 1 OF 1

Kathleen Juergens
3229 NE 7th Ave.
Portland, OR 97212

TESTIMONY GIVEN AT USDOE PUBLIC HEARING
August 18, 1998
Portland, Oregon

My name is Kathleen Juergens, and I'm a working person who lives in Northeast Portland. I'm here on behalf of myself, and I'm also here in solidarity with all the other people of our region of Cascadia, and all my sisters and brothers throughout the rest of the country.

I am not here to debate the DOE's plan to convert surplus plutonium into so-called "MOX fuel" and burn it in commercial reactors. We all know this is a bad idea. We all know there is not one shred of evidence that the MOX fuel plan will provide us with safe and useable energy, or a sustainable source of jobs, or even with a method of disposing of plutonium! We all know that the MOX plan will leave us with far more hazardous radioactive waste in our communities than we had before. We all know that the MOX plan will cost far more than vitrification, and will pump many more billions of our hard-earned tax money into the nuclear welfare state. We all know that NOBODY stands to benefit from this insane plan except a handful of rich nuclear industrialists. We know all these things, and DOE knows them too.

I am not here to beg and plead and ask nicely: Please stop poisoning the air and the water. Please stop giving us cancer. Please stop creating more lethal radioactive waste. Please stop threatening us with nuclear annihilation. Here in the Northwest, we are way past "please." We have asked nicely, and DOE has not listened. 1

No, I am here to express my OUTRAGE at the fact that I have to be here at all. At the fact that, after hearing loud and clear, over and over again, from almost everybody in the Northwest, that this nuclear nightmare in our backyard has got to end, the DOE comes back to us yet again, with yet another plan that insults our intelligence and assaults our spirits. I am outraged that anybody ever even THOUGHT about abandoning the cleanup mission at Hanford. If anybody at DOE had ever listened to the people of the Northwest--or cared at all for our health, our livelihoods, our survival--this MOX plan would never have been proposed in the first place. This whole hearing is an outrage.

I am here to DEMAND that the MOX plan be withdrawn. We do not want MOX here at Hanford. We do not want MOX at Savannah River, South Carolina. We do not want MOX anywhere. Vitrification is not a wonderful alternative, but it's the best thing we've come up with so far for temporarily dealing with--not solving--the problem of plutonium disposal. The MOX plan is nothing but an outrage. Withdraw it, and withdraw it NOW!

Page 1 of 1 ORD05

ORD05–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

Question/ Information Request Card

Name: Maura McLoughlin
Address: PO. Box 22946
Portland OR 97269
Phone: 251-4928 Fax:
E-mail:
Question/ Request: Re: Surplus Plutonium Report
I would like it edited way down.
I found it extremely tedious.
Also, I found the tables general toward
professional rather than the public

For further information contact:
U.S. Department of Energy, Office of Fissile Materials Disposition, MD-4
Forrestal Building, 1000 Independence Ave., SW, Washington, D.C. 20585
1-800-820-5156

1

ORD15

ORD15–1 **General SPD EIS and NEPA Process**

DOE has and will continue to work toward the goal of presenting technical information, in writing or verbally, in readily understandable language and avoid the use of jargon (technical slang). Specifically, our aim is to provide information at a high school comprehension level. Because the disposition of surplus plutonium is a technically complex program, we must use some scientific and technical terms in order to accurately describe how DOE proposes to dispose of surplus plutonium, and the environmental effects of taking those actions. For further clarification of the issues addressed in this SPD EIS, duplication of information is eliminated where possible, and various reader aids (e.g., a glossary, a list of acronyms, a metric conversion chart) are incorporated.

McLoughlin, Maura
Page 2 of 2

Thank you for sending me the report, I hope in future for a report geared toward the public.

Thank you again,

Maura McLoughlin

ORD15

METRICK, NANCY
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Nancy Metrick
ADDRESS: 2031 NW Johnson #3 Portland, OR 97209
TELEPHONE: (503) 221-9480
E-MAIL:

I DO NOT WANT MOX! PERIOD! 1

ORD13

ORD13–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

OREGON HEALTH SCIENCES UNIVERSITY
MARTIN DONAHOE
PAGE 1 OF 1

Yes, my name is Dr. Martin Donahoe. I'm a physician on faculty at Oregon Health Sciences University, interested in environmental issues and I teach these issues to both our medical students and our internal medicine residents and I wanted to weigh in with my opinion against the MOX, mixed oxide, fuel approach to using plutonium and uranium in reactors. I certainly would favor the other option being immobilization which would be less expensive, safer for the environment and also send a message to Russia and the rest of the world that we think of plutonium more as a, a dangerous waste product that it is rather than a source of energy. My number is (503) 494-6495. Thank you. 1

PD063

PD063–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

This SPD EIS identifies and analyzes potential environmental and human health impacts that might result from the construction and normal operation of proposed surplus plutonium disposition facilities. As described in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of any of the proposed activities would likely be minor. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

OREGON OFFICE OF ENERGY
MARY LOU BLAZEK
PAGE 1 OF 14

Oregon

John A. Kitzhaber, M.D., Governor

Department of Consumer and Business Services
Office of Energy
625 Marion St. NE
Salem, OR 97310-0830
Phone: (503) 378-4040
Toll Free: 1-800-221-8035
FAX: (503) 373-7806
Web site: www.cbs.state.or.us/external/ooe/

September 9, 1998

Mr. Howard R. Canter
Acting Director
Office of Fissile Materials Disposition
US Department of Energy
PO Box 23786
Washington, DC 20026-3786

Re: Oregon Office of Energy's Comments on Surplus Plutonium Disposition Draft Environmental Impact Statement

Dear Mr. Canter,

Thank you for the opportunity to comment on the Surplus Plutonium Disposition Draft Environmental Impact Statement (EIS). The citizens of the State of Oregon are vitally interested in this issue from both a regional and international perspective.

Our most urgent concerns are:

Hanford has been described as the most contaminated site in the Western Hemisphere. A review of table 2-4 in the EIS also shows that in nearly all cases, siting any portion of the surplus plutonium mission at Hanford results in a measurably greater human health risk than conducting the mission at another site. As a result, we recommend that cleanup remain Hanford's only mission and Hanford not be considered for any task related to surplus plutonium disposition. 1

The use of Mixed Oxide (MOX) fuel in the Hanford Fast Flux Test Facility reactor or in any other Department of Energy or commercial reactor to produce tritium for nuclear weapons represents a weapons use of surplus weapons plutonium and must not be considered as an option. This appears to violate the spirit of our agreement with the Russians to remove this plutonium from the weapons cycle. 2

The EIS does not consider the environmental impacts of burning MOX fuel in commercial reactors as part of the MOX option. Until these impacts are analyzed, it is impossible to make a rational choice between the hybrid alternative and the total immobilization alternative. 3

The EIS assumes a geologic repository for immobilized plutonium will be available. The validity of this assumption is highly suspect. The completion of work on Yucca Mountain has been delayed time and time again and there is no reason to anticipate any 4

MD170

MD170–1 **Alternatives**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. Although there may be differences in human health risk factors between the sites, the differences are not large enough to be a discriminating factor in the decisionmaking process. DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD170–2 **DOE Policy**

DOE acknowledges the commentor's opposition to using MOX fuel in DOE or commercial reactors to produce tritium for nuclear weapons. As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium. Furthermore, MOX fuel in domestic, commercial reactors would not be used to produce tritium.

MD170–3 **MOX Approach**

The SPD Draft EIS used a generic reactor analysis because the specific reactors had not yet been identified. DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. As a result of this procurement process, DOE identified the reactors proposed to irradiate MOX fuel as part of the proposed action in this EIS. Section 4.28 discusses the potential environmental impacts of operating the reactors, should the decision be made to proceed with the hybrid approach (i.e., immobilization and MOX fuel fabrication).

MD170–4 **Repositories**

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress, through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel.

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improvement in this performance. We recommend an analysis be done to determine the effects of long term storage of the immobilized plutonium at the candidate sites. 4

The EIS analyses of the radiological consequences of accidents, construction and normal operations of the facilities proposed for Hanford under the various options were limited to a radius of 50 miles centered on Hanford. The presence of the Columbia River on the Hanford Site and the River's proximity to the major population centers of Oregon makes Hanford's situation unique. We recommend the analysis of radiological consequences be extended down the Columbia River at least to the John Day Dam. 5

Attached are further specific comments on the EIS. Should you have any questions, please contact Douglas Huston of my staff at (503)378-4456.

Sincerely,

Mary Lou Blazek
Administrator, Nuclear Safety Division
Oregon Office of Energy

cc: Ms. Donna Powaukee - Nez Perce Tribe
Mr. J. R. Wilkerson- CTUIR
Mr. Michael Wilson - Washington Ecology
Mr. Douglas Sherwood - EPA
Mr. Russell Jim - Yakama Nation

MD170

DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. The *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE/EIS-0200-F, May 1997) includes an analysis of the impacts of the long-term storage of 21,600 canisters of vitrified HLW. As described in Section 2.4.2, if all surplus plutonium were immobilized, the surplus disposition program would produce an additional 272 canisters using the ceramic process or 395 canisters using the glass process. For the hybrid approach, these totals are reduced to 101 canisters (ceramic) and 145 canisters (glass), respectively. Accordingly, potential impacts associated with storage of these canisters are not significant when compared with the much larger bases for analyses noted above.

MD170–5 **Human Health Risk**

Both DOE and NRC evaluate radiological impacts to the population out to a distance of 50 miles (80 kilometers) from a site. This distance was first specified in Paragraph D, Section II of Appendix I to 10 CFR 50. It had been determined that essentially all of the dose to the population would be received within this 50-mi (80-km) radius. Further, predictions of atmospheric dispersion beyond this distance are not accurate because of changes in wind direction and speed that take place over time and distance from the points of radiological releases.

There are not expected to be any liquid radioactive discharges as a result of normal surplus plutonium disposition activities at Hanford. If there were, due to the dilution capability of the Columbia River, as well as FMEF's distance from the Columbia River, there should be no discernible contamination of aquatic biota (fish) or drinking water resulting from surplus plutonium disposition activities at Hanford, either from minute quantities of air deposition into the Columbia River or from any potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways.

Oregon Office of Energy Comments on the Surplus Plutonium Disposition Draft Environmental Impact Statement.
Page 1 of 5

Section 1.1, Background, reserves the CANDU option for burning of Mixed Oxide (MOX) fuel. The Oregon Office of Energy opposes this based on recently revealed technical and financial problems associated with the CANDU reactors and increased proliferation risks. 6

Section 1.5 states that the Department Of Energy (DOE) is deferring the examination of the impacts and costs of final shutdown, cleanup and demolition of these facilities to some later Environmental Impact Statement. It is essential that these factors be considered in this Environmental Impact Statement in order to make an informed, reasonable analysis of the various options. 7

Section 1.7 asserts that waste will be disposed in accordance with decisions reached in various Records of Decision issued for the Waste Management Programmatic Environmental Impact Statement. This document was widely criticized for its inadequacy and we recommend that in making decisions concerning the fate of surplus plutonium disposition waste DOE take these criticisms into account. 8

In Section 2.3.1, Development of Facility Siting Alternatives, the criteria used to reduce possible facility and site combinations do not contain waste capacity/handling criteria. Would the site be able to handle and accommodate the amount and types of waste expected to be generated by these processes? We recommend that these criteria be added and the various candidate sites evaluated against them. 9

In several places, the Surplus Plutonium Disposition Enivironmental Impact Statement (EIS) contains statements about designing facilities to withstand natural phenomena such as earthquakes and tornadoes. Specifically what design criteria will be used, the Nuclear Regulatory Commission's (NRC), DOE's, state, or commercial standards? The Oregon Office of Energy recommends that the criteria to be used be specifically stated in the EIS. At a minimum, these standards should be set to the most conservative of the standards specified by the DOE, NRC, or commercial standards. 10

The EIS also does not discuss what general building and fire codes will be used in the construction of the various proposed facilities. These issues need to be discussed in the EIS. The EIS should specify compliance with the appropriate state and national codes. 11

For Hanford, the current Tank Waste Remediation System (TWRS) Privatization Contract does not include provisions for surplus plutonium disposition canister filling as described in Section 2.4.2.2.2, Immobilization Process. The impacts of this strategy on the TWRS Privatization contract should be evaluated and discussed. 12

MD170

MD170–6 **Parallex EA**

In the SPD Draft EIS, DOE retained the option to use some of the surplus plutonium as MOX fuel in CANDU reactors, which would have only been undertaken in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the Draft was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is no longer actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. A separate environmental review, the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999), analyzes the fabrication and proposed shipment of MOX fuel rods for research and development activities involving the use of limited amounts of U.S. MOX fuel in a Canadian test reactor. A FONSI was signed on August 13, 1999. Both of these documents can be viewed on the MD Web site at http://www.doe-md.com. If a decision is made to dispose of Russian surplus plutonium in Canadian CANDU reactors in order to augment Russian's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

MD170–7 **General SPD EIS and NEPA Process**

D&D is discussed in Section 4.31. DOE will evaluate options for D&D or reuse of the proposed facilities at the end of the surplus plutonium disposition program. At that time, DOE will perform engineering evaluations, environmental studies, and further NEPA review to assess the consequences of different courses of action. Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading

rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MD170–8 **Waste Management**

The statement that waste would be disposed of in accordance with decisions reached in the various WM PEIS RODs was included in this SPD EIS to assure the reader that waste management activities would be handled in a manner consistent with the larger decisions being made in the WM PEIS. Comments on the WM PEIS are beyond the scope of this SPD EIS.

MD170–9 **Waste Management**

Impacts to waste management from the various alternatives for surplus plutonium disposition are described in the Waste Management sections in Chapter 4 of Volume I and Appendix H. None of the proposed alternatives would be expected to generate wastes that exceed current site capabilities with the exception of LLW and TRU waste at Pantex as described in the Pantex waste management sections (e.g., see Section 4.17.2.2). Decisions on the surplus plutonium disposition program will be based on environmental analyses (including analyses of waste management impacts), technical and cost reports, national policy and nonproliferation considerations, and public input.

MD170–10 **Facility Accidents**

As described in Appendix K.1.3.2, the proposed facilities for surplus plutonium disposition would be expected to meet or exceed the requirements of DOE Order 420.1, *Facility Safety* (October 1995), and *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities* (DOE-STD-1020-94, April 1994), and for new construction, NRC requirements, as appropriate. For example, the MOX facility would meet the NRC requirements.

MD170–11 **Infrastructure**

As stated in Section 5.1, it is DOE's policy to conduct its construction and operation activities in an environmentally safe manner in compliance with all applicable Federal, State, and local statutes, regulations, and standards.

MD170–12 **Immobilization**

As discussed in Section 2.4.2.2.2, DOE anticipates that the use of the HLW vitrification plant at Hanford to fulfill plutonium disposition requirements would likely result in minor impacts to the operations of the TWRS contractor. Additional provisions would primarily be in the form of increased worker shielding requirements, and any necessary changes to the planned TWRS facility design would be made prior to construction. Programmatically, although several hundred additional canisters would need to be produced to support the surplus plutonium disposition program, this would represent a relatively small increase to the more than 10,000 canisters already anticipated to be produced over the course of the Hanford HLW mission. Further, no additional vitrified HLW would be needed to accomplish immobilization activities at Hanford.

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There is no indication in this EIS that DOE will develop a comprehensive transportation plan in consultation with the appropriate corridor states and local tribes. We recommend that a comprehensive transportation plan be developed and that a statement to this effect be included in the EIS. 13

The EIS does not adequately discuss the technical properties of the immobilized plutonium. For example: What is the amount of plutonium in each unit of immobilized plutonium and how does this relate to a possible critical mass? How much shutdown margin does the immobilized waste form provide? We recommend that a discussion of the physical and nuclear properties of the immobilized plutonium be included in the EIS. 14

Section 2.4.3.1, MOX Facility Description, contains specific design details not included in the Statement of Work for the Request for Proposals for MOX Fuel Fabrication and Reactor Irradiation Services. These documents need to be reconciled. 15

The area required for various missions at Hanford seems to vary widely. For example: For immobilization, alternative 4b requires 6,698 square meters, and alternative 4a requires 13,694 square meters for the identical mission. These figures need to be clarified.

Further, alternative 6a states that 14,000 square meters is 150, 700 square feet, and alternative 6b states that 14,000 square meters is 146,400 square feet. Actually 146,400 square feet is about 13,000 square meters. These figures need to be corrected. 16

Section 2.17.1, Process Description, states that about 100 kilograms of plutonium would be converted to MOX fuel from 321 kilograms of plutonium total. This varies significantly from the statement in the EIS Summary page S-19 that states that 100kg of plutonium would be converted to MOX from 600 kilograms of plutonium total during lead assembly fabrication. This discrepancy must be addressed. 17

The table on page 3-1 titled "Selected Characteristics of the Candidate Sites for Surplus Plutonium Disposition Facilities," does not contain units for the various numbers presented. These should be included. 18

The footnotes to Table 3-1 state that no sources of lead emission have been identified at Hanford. However, lead contaminated soil has been identified in the 300 Area burial ground. The source of this lead should be identified and a determination should be made if this soil or the source of its contamination constitute a lead emission source. 19

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MD170–13 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the WM PEIS and *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD170–14 **Immobilization**

Section 2.4.2.2.2 discusses the immobilization process and states that between 26 kg (58 lb) and 28 kg (61 lb) of plutonium would be present in the canisters that would be sent to a potential geologic repository. These estimates are based upon each canister containing 28 individual cans of plutonium–ceramic (with each can containing a plutonium loading of 10 percent by weight), or 20 cans of plutonium–glass (with each can containing a plutonium loading of 8 percent by weight). Numerous R&D studies of the immobilized plutonium forms have been conducted by DOE and the national laboratories, in part to ensure all environmental, health and safety requirements are met including criticality repository performance concerns. Several technical studies continue. In order to avoid the possibility of a criticality, neutron absorbers are incorporated into the fabrication of the plutonium–ceramic or plutonium–glass. Evaluations of the immobilized forms under a range of potential repository conditions, including if the material were in a degraded state and exposed to water, have been conducted. All have indicated that the occurrence of a criticality would be extremely unlikely given the amounts of plutonium relative to the amounts of neutron–absorbing materials that would be present.

"Shutdown margin" is a term generally used in association with controlling the reaction in a nuclear reactor and it is not applicable to the immobilization process; as such this parameter has not been analyzed relative to the immobilized form.

For enhanced readability of this SPD EIS, supporting documentation and detailed analyses of the chemical, physical, and nuclear properties of the immobilized forms were published separately. Information on specific technical aspects of the immobilized forms can be found in the following documents: (1) the immobilization data reports published in conjunction with this SPD EIS; (2) *Report on Evaluation of Plutonium Waste Forms for Repository Disposal* (DI: A-00000000-01717-5705-00009, Rev. 00A, March 1996); (3) *Report on Intact and Degraded Criticality for Selected Plutonium Waste Forms in a Geologic Repository, Volume II: Immobilized in Ceramic* (DI:BBA000000-01717-5705-00020, Rev. 01, October 1998); (4) *Immobilization Technology Down-Selection Radiation Barrier Approach* (UCRL-ID-127320, May 1997); and (5) *Fissile Material Disposition Program Final Immobilization Form Assessment and Recommendation* (UCRL-ID-128705, October 1997). These documents are available to the public at DOE sites and regional reading rooms; the latter two are also available on the MD Web site at http://www.doe-md.com.

MD170–15 **MOX RFP**

Section 2.4.3 contains information from supporting technical reports that show how the MOX facility would be constructed and operated at each candidate site. Those supporting reports, the SPD Draft EIS, and other relevant documents were made available to the prospective bidders during the MOX procurement process. There was no need to duplicate all the information in both the SPD EIS and the MOX RFP. This EIS has been revised to include information received and analyzed during the MOX procurement. Section 4.28 discusses the potential environmental impacts of operating the reactors that would use the MOX fuel.

MD170–16 **Alternatives**

The amount of space for the immobilization facility in FMEF differs depending on how it is configured—alone (Alternative 4A) or collocated with either the

pit conversion or MOX facility (Alternative 2 or 4B, respectively). Sections 2.6, 2.8, 2.12, and 2.15.1 were revised to discuss the revision in the size projections for the immobilization facility; the facility is larger than as characterized in the SPD Draft EIS, and when collocated in FMEF with either of the other two proposed facilities, requires an additional annex. Total space requirements still differ somewhat due to the amount and location of space available in FMEF and how the functions can be accommodated within the available space.

The editorial error in the conversion between square meters and square feet was corrected.

MD170–17 **MOX Approach**

DOE cannot find this discrepancy in the SPD Draft EIS. Both Section 2.17.1 and page S–19 of the *Draft Summary* make the same statement that about 100 kg (220 lb) of plutonium would be made into MOX fuel each year, using a total quantity of 321 kg (708 lb) of plutonium.

MD170–18 **Candidate Sites**

The subject table, Selected Characteristics of the Candidate Sites for Surplus Plutonium Disposition Facilities, contains units for the numbers presented. As shown in the column titles, areas are in square kilometers (km^2), populations are in number of people, MEI doses are in millirems (mrem), and population doses are in person-rem.

MD170–19 **Candidate Sites**

Table 3–1 addresses general regions of influence for the affected environment and does not have footnotes. Table 3–3, Comparison of Ambient Air Concentrations From Hanford Sources, describes process emissions and does not include possible existing lead contamination of soils. The condition of a burial ground in the 300 Area is beyond the scope of this SPD EIS. This comment has been forwarded to the Richland Operations Office.

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Although a partial failure of the Grand Coulee dam is discussed in Section 3.2, there is no discussion of any type of failure of the Priest Rapids Dam which is immediately upstream of Hanford. We recommend that a discussion of this failure, or whether its consequences are bounded by the Grand Coulee failure, be included in this document. 20

Section 3.2.1.2.1, General Site Description, Page 3-8, second paragraph, discusses peak and off-peak noise levels along the major automobile traffic routes near the Hanford site. The peak noise level is described as 62 dBA, and the off-peak at 70dBA - this would appear to be backwards. 21

The Regional Economic Area (REA) defined in Section 3.2.3, Socioeconomics, is too small. The presence of the Columbia River on the Hanford Site and the potential impacts of Hanford operations on the one million Oregonians who live downstream along this River make Hanford a unique case. The REA should be expanded to include those areas in Oregon along the Columbia River. 22

Section 3.2.7, Water Resources, does not discuss Hanford's vadose zone contamination problems. A discussion of these should be included in this section. 23

Figure 3-8 shows a "West Pond." Section 3.8.1.1 refers to a "West Lake." These names should be consistent. 24

Section 3.2.9, Cultural and Paleontological Resources, refers to the "Cultural Resources Management Plan," (Batelle 1989). This document was found unacceptable by the Yakama Nation and is currently being re-written. Any decisions made based on this document must be re-visited once the new document is complete. 25

Section 4.2.11.1 states that the cultural and paleontological aspects of continued storage of plutonium under the no-action alternative would be independent of the proposed action. This is logically inconsistent. This statement needs to be clarified. 26

Section 4.2.13.1 does not discuss the need for more and more extensive maintenance on facilities at Hanford as they age under the no-action alternative. We recommend that this aspect of the no-action alternative be evaluated and formally discussed in the EIS. 27

Section 4.3, Alternative 2, does not discuss the impact on Hanford's high level waste of using the High Level Waste Vitrification (HLWVF) Plant for part of the immobilization process. It would reasonably be expected to impact the processing schedule, which would leave wastes in the tanks longer and constitute an increased risk. We recommend that this aspect of Alternative 2 and all other alternatives that involve use of the HLWVF Plant be evaluated and discussed. 28

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MD170–20 **Facility Accidents**

The analysis that postulates a partial failure of the Grand Coulee Dam also assumes the failure of all subsequent downstream dams as a result of the influx of water caused by the postulated Grand Coulee failure. This bounds the hazard from a postulated failure of the Priest Rapids Dam alone. Details of the analysis can be found in the documents referenced in Section 3.2.7.

MD170–21 **Air Quality and Noise**

Section 3.2.1.2.1 was clarified to state that both the peak and offpeak equivalent sound levels (1 hr) from State Route 24 were 62 dBA, and both the peak and offpeak equivalent sound levels (1 hr) from State Route 240 were 70 dBA.

MD170–22 **Socioeconomics**

Hanford is located in the Richland/Kennewick/Pasco, Washington economic area, which was delineated by the DOC's Bureau of Economic Analysis. An economic area is defined by one or more economic nodes (metropolitan areas or similar areas that are centers of economic activity) and the surrounding counties that are economically related to the nodes. Commuting patterns play a major factor in defining the economic areas.

MD170–23 **Water Resources**

The vadose zone contamination largely occurs beneath the HLW tanks in the 200 Area. The construction and operation of the HLW Vitrification Facility are described in the *Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement* (DOE/EIS-0189, August 1996). Although the proposed immobilization approach would use the vitrification plant in the 200 Area, it is not expected to contribute to any vadose zone contamination.

MD170–24 **Water Resources**

Figure 3–8 was revised to read "West Lake."

MD170–25 **Cultural and Palentological**

DOE acknowledges the commentor's concerns regarding cultural resources management. The concerns of the Yakama Indian Nation over the effects of

any surplus plutonium disposition activities at Hanford would be taken into account during government-to-government consultation conducted by DOE with the tribe in accordance with Federal laws, treaties, and agreements. Cultural resources management activities related to the surplus plutonium disposition program conducted at the site would be performed in accordance with the most current Hanford Cultural Resources Management Plan. The Yakama Indian Nation was contacted by letter in October 1998 as shown in Appendix O. To date, a response has not been received.

MD170–26 **Cultural and Palentological**

Section 4.2.11 was revised to clarify that any impacts to cultural and paleontological resources from the continued storage mission under the No Action Alternative would be addressed through ongoing regulatory compliance procedures and consultations as described in the *Storage and Disposition PEIS*.

MD170–27 **Infrastructure**

The planned completion date for the Hanford site cleanup is 2046 as described in *Accelerating Cleanup: Paths to Closure* (DOE/EM-0362, June 1998). Therefore, maintenance of the site infrastructure would be provided to support Hanford's cleanup mission during this period, regardless of decisions related to surplus plutonium disposition. Impacts associated with providing continued surveillance and maintenance are beyond the scope of this SPD EIS. Surplus plutonium disposition activities, including D&D, are expected to be completed by 2019, which is well before the site is expected to be cleaned up in 2046.

MD170–28 **Immobilization**

The use of the HLW facility for canister filling would not be expected to seriously impact the schedule for processing Hanford tank wastes because the canisters with surplus plutonium would feed directly into the line and would make up a small percentage of the total number of HLW canisters that need to be vitrified.

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Tables 4-55 and 4-56 should be labeled to indicate which table presents Hanford data and which table is for Pantex.	29
The Hanford and Pantex statistics in Table 4-57 should be separated in the table for easier reference even though clarification is available in the paragraph following the table.	30
Noise impacts on wildlife are not consistently discussed from alternative to alternative. We recommend that discussions of these impacts be included in all alternatives.	31
The EIS assumes that the Waste Isolation Pilot Plant (WIPP) will be open on schedule. Recent events suggest that this might not be the case. We recommend that the impact of a 1-year delay in the opening of WIPP be evaluated and its impact on all the alternatives discussed.	32
The facility accidents sections of each alternative do not contain any discussion of possible synergistic effects of accidents in buildings where more than one processing function is in progress. For example, Alternative 6b: Pit Conversion and MOX co-located in the Fuels and Materials Examination Facility at Hanford. We recommend that this discussion be included in this section for all alternatives that involve co-located facilities.	33
Section 4.32 does not include the Groundwater/Vadose Zone/Columbia River integration project at Hanford as a reasonably foreseeable action. We recommend that this be included and evaluated.	34
Section J.1.1.5, Other Calculational Assumptions, states that ground surfaces were assumed to have no previous deposition of radionuclides. This statement needs to be clarified for Hanford since there is a large amount of currently contaminated ground surface on the Hanford Site.	35
Table K-1 should include units for the values listed.	36
Section K.14.2, Modeling of Dispersion of Releases to the Environment, makes the statement that ingestion pathways have been studied and found not to contribute as significantly to dosage as inhalation. This is not necessarily true if you consider the Native American Subsistence Scenario. We recommend that this assumption be re-evaluated.	37

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MD170–29 **Waste Management**

The titles for Tables 4–46 and 4–47 already contain the name of the site for which the impact data are presented. Table 4–46 provides the potential waste management impacts of construction at Pantex; Table 4–47, the corresponding impacts at Hanford.

MD170–30 **Socioeconomics**

DOE acknowledges the commentor's request for clarification. The data for Hanford and Pantex in Table 4–48 are already separated. The "Pit Conversion" column contains the Pantex data; the "Immobilization" and "MOX" columns, the Hanford data. The title of Table 4–48 indicates that the data are for pit conversion at Pantex and immobilization and MOX at Hanford.

MD170–31 **Ecological Resources**

The Ecological Resources portions of Section 4.26 were revised to make the discussions of potential noise impacts on wildlife more consistent. The Air Quality and Noise sections in Chapter 4 of Volume I discuss the noise impacts for each of the candidate sites, which would bound the impacts for each of the alternatives at each particular site. No Federally listed threatened or endangered species or their critical habitats would be affected because, with the exception of SRS, none have been sighted on or near the proposed site locations. At SRS, the American alligator has been observed near F-Area, but its occurrence there is seen as uncommon. Noise impacts on ecological resources would be of short duration and would likely be minor for each alternative.

MD170–32 **Waste Management**

This SPD EIS did not assume that WIPP would open on schedule. However, WIPP began receiving shipments of TRU waste for permanent disposal on March 26, 1999. As described in Appendix F.8.1, and the Waste Management sections in Chapter 4 of Volume I, it is conservatively assumed that TRU waste would be stored at the candidate sites until 2016 at which time it would be shipped to WIPP in accordance with DOE's plans.

MD170–33 **Facility Accidents**

Synergistic effects become significant when accidents at multiple facilities can affect the same receptor (person or location). For the proposed surplus plutonium disposition facilities, synergistic effects were taken into account for seismic events (i.e., design basis or beyond-design-basis earthquakes). The synergy here is due to the common cause initiator (i.e., seismic ground motion). This is accounted for by summing population doses and LCFs for these scenarios for facilities located at the same site. This analysis is presented in the Facility Accidents sections in Chapter 4 of Volume I. Doses for the MEI were not summed because an individual would only receive a summed dose if he or she were located along the line connecting the release points from two facilities and if the wind were blowing along the same line at the time of the accident. A brief discussion of synergistic effects was added to Appendix K.1.3.2.

MD170–34 **Cumulative Impacts**

Section 4.32 was revised to include additional and updated reasonably foreseeable actions at each of the candidate sites, including Hanford. The Groundwater/Vadose Zone/Columbia River integration project is not expected to impact the cumulative impacts studied in this SPD EIS.

MD170–35 **Human Health Risk**

The calculations were performed to assess the doses from operating the proposed surplus plutonium disposition facilities. The presence on the ground of previously deposited radionuclides does not affect the doses specifically associated with operating these facilities. Doses from existing ground contamination are included in the current Hanford site doses reported in Section 3.2.4. The total doses from existing contamination and from operating the proposed surplus plutonium disposition facilities are reflected in the cumulative doses given in Section 4.32. There would be no releases of radioactivity during the construction of the proposed surplus plutonium disposition facilities, and therefore no associated radiological impacts (e.g., see Section 4.3.1.4).

MD170–36 **Facility Accidents**

DOE appreciates the feedback on the SPD Draft EIS. Table K–1 was revised to include units for the values.

MD170–37 **Facility Accidents**

The Native American subsistence scenario represented exposures to a Native American who engaged in both traditional lifestyle activities (e.g., hunting, fishing, and using a sweat lodge) and contemporary lifestyle activities (e.g., irrigated farming). Exposure pathways included those defined for the residential farmer scenario plus additional pathways unique to the Native American subsistence lifestyle (such as sweat lodge use). The exposures were assumed to be continuous for 365 days per year over a 70-year lifetime. The scenario used native food ingestion rates. This scenario was developed for the *Tank Waste Remediation System Final Environmental Impact Statement* (DOE/EIS-0189, August 1996). It was found that by incorporating subsistence lifestyle activities and native food ingestion rates, this scenario resulted in exposures that would be approximately 5 times higher than the exposures for the residential farmer scenario. It must be realized, however, that this scenario was developed within the context of post-remediation risk (the risk resulting from residual contamination remaining on the site after remediation is completed) as opposed to the risk from accidents. The analysis of accidents in the above-referenced EIS was performed in a similar manner to that of this SPD EIS, restricting the dose pathway to inhalation and setting (dry) deposition velocities to zero. Also, the *Tank Waste Remediation System Final EIS* (DOE/EIS-0189, August 1996) was concerned with the radioactive contaminants in the waste tanks at Hanford, which contain primarily fission products. Many of these fission products are far more mobile through soil and water pathways than plutonium, the primary radiological hazard in this SPD EIS. Consequently, the current facility accident methodology is considered to be adequate in light of the Native American subsistence scenario and consistent with the assessment of consequences in the *Tank Waste Remediation System Final EIS* (DOE/EIS-0189, August 1996).

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Section K.14.2, Modeling of Dispersion of Releases to the Environment, states criticality doses are based on 1 x 10^{19} fissions. Most prior criticality accidents have been self-limiting for a variety of reasons, including boiling of water in solutions. It is not clear that the potential accidents for these facilities would be conservatively bounded by these assumptions. Therefore, we recommend that the basis for the number of fissions assumed in the criticality accidents be discussed. 38

The ground surface accelerations used in Section K.15.1, Beyond Design Basis Earthquake, are outdated. We recommend the most recent ground surface accelerations be used. 39

The adjustment of the damage ratio for plutonium in the vault from 0.5 to 0 on a beyond design basis earthquake (page K-15) is not realistic. Some of the plutonium containers will be damaged. We recommend that, to be conservative, the damage ratio be re-set to 0.5. 40

The following typographical or grammatical errors were discovered:

Summary, page S-22, "summarize" should be "summarizes."
Section 2.1.3, page 2-8, second paragraph, first sentence – the words "a potential" appear to be extraneous.
Section 3.2.8.2.2, page 3-36, third paragraph, last sentence – the verb should be "are" rather than "is."
Section 3.2.9.3.1, page 3-39, first paragraph, second sentence – "Yakima" should be "Yakama." 41

MD170

MD170–38 **Facility Accidents**

Appendix K.1.4.2 does not address the criticality source term, so it is assumed that the commentor is referring to Appendix K.1.5.1, where it is stated that the source term for the analyzed criticality is based on a fission yield from 1.0×10^{19} fissions in an oxide powder. This value is conservative compared with the guidance in *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities* (DOE-HDBK-3010-94, October 1994), which specifies a reference yield level of 1.0×10^{18} fissions for fully moderated and reflected solids, and 1.0×10^{17} for dry powder and metal (Sections 6.3.2 and 6.3.3, respectively).

MD170–39 **Facility Accidents**

Appendix K.1.5.1 was revised to delete the out-of-date ground acceleration data referred to by the commentor.

MD170–40 **Facility Accidents**

The proposed surplus plutonium disposition facilities would be designed to Category 1 seismic criteria, meaning that a building collapse would be extremely unlikely. The assumption of vault survivability of the beyond-design-basis earthquake is based on the fact that the vaults would be designed with significantly more robustness than the balance of the proposed facilities. These requirements for the additional robustness derive from a desire for increased protection of the vault contents against physical catastrophes such as aircraft crash and against the threat of nuclear proliferation. Design features to address these concerns would increase vault survivability of a beyond-design-basis earthquake. Specifically, the vault would be expected to survive seismic events of sufficient magnitude to collapse the processing areas of the proposed facilities. The assumptions incorporated into this SPD EIS analyses are considered to be appropriate for assessment of environmental impacts and comparison of alternatives considered.

MD170–41 **General SPD EIS and NEPA Process**

DOE appreciates the feedback on the SPD Draft EIS. The errors were corrected.

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Testimony Before the
U.S. Department of Energy
on the Surplus Plutonium Draft Environmental Impact Statement

Michael Grainey, Assistant Director
Oregon Office of Energy
August 18, 1998

Good afternoon. My name is Michael W. Grainey. I am Assistant Director of the Oregon Office of Energy. I am here today on behalf of the State of Oregon. I will make a few remarks here today, and later we will submit more extensive written testimony on the Surplus Plutonium Draft Environmental Impact Statement.

We thank you for holding this hearing in Oregon and for the opportunity to express our concerns about the disposition of surplus plutonium. We recognize that the fate of surplus plutonium is an issue that transcends regional interests. The State of Oregon applauds the efforts to reduce nuclear weapons inventories worldwide and the related efforts to reduce the available stores of plutonium. 1

At the same time, we are especially concerned about any action at Hanford that would increase what is already a fundamental threat to the Columbia River — and a threat to the well-being of the millions of Oregonians who rely on the river. We remain opposed to any activities at Hanford that would detract from cleaning up what has been described as the most contaminated site in the Western Hemisphere. Because of this concern about Hanford cleanup, we support the draft statement in its selection of other sites as superior to Hanford for the fabrication of mixed oxide fuel. 2

We also support former Secretary Peña in his recent announcement that Hanford's mission should be exclusively focused on cleanup. For example, the use of the Hanford Fuels and Materials Examination Facility for weapons disassembly or fuel assembly would contaminate a clean facility at Hanford. We oppose the contamination of yet even more buildings at Hanford. 3

So do Oregon citizens. Three years ago, we held statewide public forums for more than 800 citizens to hear their opinions on plutonium disposition. Three messages clearly emerged from the forums: Cleanup must remain the only mission at Hanford. Vitrification is the least objectionable option for plutonium disposal. And Oregon must have a stronger voice on Hanford issues. In 1997, Oregon's Legislature mirrored this popular support for cleanup by passing a bill opposing any Hanford operations that would create more waste at the site and divert cleanup efforts. 4

ORD03

ORD03–1 **Alternatives**

DOE acknowledges the commentor's support of the surplus plutonium disposition program.

ORD03–2 **Alternatives**

DOE acknowledges the commentor's concern about potential contamination of the Columbia River. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

ORD03–3 **Alternatives**

DOE acknowledges the commentor's opposition to the use of FMEF at Hanford for surplus plutonium disposition activities.

ORD03–4 **Alternatives**

DOE acknowledges the commentor's support for the immobilization approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

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We know that the scope of this hearing and the draft environmental impact statement does not include the issue of where mixed oxide fuel will be burned once it is fabricated. As we said earlier in this process, we continue to believe that vitrification is a faster and safer option than burning — and poses less risk to both people and the environment. Vitrifying could also be less costly than the burn option. We continue to urge the Department to seriously consider a 100 percent vitrification option for the surplus plutonium. 4

Thank you.

ORD03

69th OREGON LEGISLATIVE ASSEMBLY–1997 Regular Session

Enrolled

House Bill 3640

Sponsored by Representative SOWA; Representative ROBERTS, Senators DERFLER, TROW

CHAPTER 00617

AN ACT

Relating to nuclear facilities.

Be It Enacted by the People of the State of Oregon:

SECTION 1. The Legislative Assembly and the people of the State of Oregon find that:

(1) The maintenance of healthy, unpolluted river systems, airsheds and land are essential to the economic vitality and well-being of the citizens of the State of Oregon and the Pacific Northwest.

(2) Radioactive waste stored at the Hanford Nuclear Reservation is already leaking into and contaminating the water table and watershed of the Columbia River and radioactive materials and toxic compounds have been found in plants, animals and waters downstream from the Hanford Nuclear Reservation and constitute a present and potential threat to the health, safety and welfare of the people of the State of Oregon.

(3) The Hanford Nuclear Reservation is now one of the most radioactively contaminated sites in the world, according to government studies, and will require billions of dollars in costs for cleanup and the ongoing assessment of health effects.

(4) In November 1980, the people of the State of Oregon, by direct vote in a statewide election, enacted a moratorium on the construction of nuclear power plants, and no nuclear power plants are presently operating in the State of Oregon.

(5) In May 1987, the people of the State of Oregon, by direct vote in a statewide election, enacted Ballot Measure 1, opposing the disposal of highly radioactive spent fuel from commercial power plants at the Hanford Nuclear Reservation.

(6) In 1995, the Legislative Assembly resolved that Oregon should have all legal rights in matters affecting the Hanford Nuclear Reservation, including party status in the Hanford tri-party agreement that governs the cleanup of the reservation.

(7) Throughout the administrations of Presidents Ford, Carter, Reagan and Bush, the policy of the Federal Government banned the use of plutonium in commercial nuclear power plants due to the risk that the plutonium could be diverted to terrorists and to nations that have not renounced the use of nuclear weapons.

(8) The Federal Government has announced that it will process plutonium from weapons with uranium to produce mixed oxide fuel for commercial nuclear power plants and other nuclear facilities. The Hanford Nuclear Reservation, located on the Columbia River, is a primary candidate site being considered for the production facilities.

(9) The production of mixed oxide fuel will result in enormous new quantities of radioactive and chemical wastes that will present significant additional disposal problems and unknown costs.

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MICHAEL GRAINEY
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SECTION 2. The Legislative Assembly and the people of the State of Oregon:

(1) Declare that the State of Oregon is unalterably opposed to the use of the Hanford Nuclear Reservation for operations that create more contamination at the Hanford Nuclear Reservation, divert resources from cleanup at the Hanford Nuclear Reservation and make the Hanford Nuclear Reservation cleanup more difficult, such as the processing of plutonium to fuel nuclear power plants, reactors or any other facilities, and further declare that vitrification in a safe manner is the preferred means to dispose of excess plutonium, in order to protect human health and the environment.

(2) Request that the President of the United States and the Secretary of the Department of Energy continue their previous policy of banning the use of plutonium to fuel commercial power plants and nuclear facilities.

(3) Request that the Federal Government honor the Federal Government's original mandate to implement and complete the cleanup and restoration of the Hanford Nuclear Reservation.

SECTION 3. Not more than 10 days after the effective date of this Act, the Secretary of State shall transmit copies of sections 1 and 2 of this Act to the President of the United States, the Secretary of the Department of Energy, the Majority Leader of the United States Senate, the Speaker of the United States House of Representatives, each member of the Oregon Congressional Delegation, the Governors of the other 49 states and the tribal councils of the federally recognized Indian tribes in Oregon, Washington and Idaho.

Passed by House June 10, 1997

Ramona J. Kenady
Chief Clerk of House

Speaker of House

Passed by Senate June 19, 1997

President of Senate

Received by Governor:
2:08 P.M. July 4, 1997

Approved:
3:29 P.M. July 25, 1997

Governor

Filed in Office of Secretary of State:
4:43 P.M. July 25, 1997

Phil Keisling
Secretary of State

Enrolled House Bill 3640 (HB 3640-A)

Page 2

ORD03

United States Department of Energy

Comment Form

NAME: (Optional) GERRI PECK
ADDRESS: 2405 NE 46th Ave. Portland, OR 97213
TELEPHONE: (503) 288-2497
E-MAIL: gerri@europa.com

MOX SHOULD NOT BE ALLOWED ANYWHERE. MY Grandson shooting an environmental film on the Columbia says the River has Orange sludge on it - a "gift" of all the chemicals which abound. I work with young children in the public schools. Wonderous children who at the age of 5 & 6 can read & write & spell & do numbers. ASTOUNDING - to me. But what kind of world for these baby geniuses? What of THEIR future? Can we promise them a clean, safe, healthy environment? WHY NOT? And what of all the healthy people who will be rendered ill? All of us in good conscience must say NO to these mad nuclear machinations. SO, I support ALL the slogans: No to nuclear proliferation! Clean up Hanford! Save the beautiful Columbia - in Woody Guthrie's name! NIX MOX. There are alternative forms of energy which are acceptable and sane... and inexpensive. The future is in your hands. If we don't survive, it will be on your conscience. If you are still around. Think carefully. Think about the people. Do not poison us - the atmosphere, the environment, the water. Keep it ALL safe, healthy & clean. We are DEPENDING on you to take care of us. DO YOUR JOB WELL. Be on the side of the people, not the corporations. SAVE THE EARTH. Look before you leap... & listen closely & carefully to these voices of protest. Voices who want a future. 1

ORD16

ORD16–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

PETERSON, DON
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Don Peterson
ADDRESS: 1366 S.W. Taylors Ferry Ct. Portland, OR. 97219
TELEPHONE: (503) 244-3933
E-MAIL:

Relative to the proposed MOX program at Hanford, Wash. I reject this proposal and demand that you do not pursue it any further. I am opposed to any increase in nuclear waste when in fact we (the U.S.) have no safe place for storage because there is no place and can never be any "safe" storage of such deadly dangerous substance as radioactive waste. the shipment of waste produced by MOX is also highly objectionable, endangering communities and the environment wherever it may travel. 1

NO! to MOX
NO! to nuclear energy
NO! to uranium extraction

Sincerely, D. Peterson

MD247

MD247–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition, and in particular siting the MOX facility at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a potential geologic repository built in accordance with the NWPA.

W. P. Mead, Director
Public Safety Resources Agency
P. O. Box 724
Portland, OR 97207-0724

GENERAL NOTE

Much of the following information was presented on Tuesday, August 18, 1998 at a Public Meeting held in Portland, Oregon on the above-captioned subject. Additional comments, based on information received after that date, are also included to sustain questions that were raised at that Public Meeting.

Although these comments are being sent directly to the Department of Energy, other recipients are strongly encouraged to forward this information to other contacts to achieve the widest-possible distribution and to assist in developing additional lines of inquiry.

Much of this information was developed during and preparatory to a research tour of Canada and the mid-western United States during the period of June 23 through August 7, 1998. This research included reviewing available public printed and WWW documents; e-mail and telephone communications with persons employed by AECB, AECL and Ontario Hydro; and a subsequent review of Ontario Hydro's engineering and design documents at their Bruce NPD facility.

Readers may contact PSRA at the above addresses regarding questions about this information or additional related data that has been referred to in this comment and which is undergoing review.

W. P. Mead, Director
Public Safety Resources Agency
Portland, Oregon
September 16, 1998

TO: United States Department of Energy
Office of Fissile Materials Disposition
c/o SPD EIS
P. O. Box 23786
Washington, D. C. 20026-3786

FROM: W. P. Mead, Director
Public Safety Resources Agency
P. O. Box 724
Portland, OR 97207-0724
E-mail: "billm@bandl.bandwidth.net"

DATE: September 16, 1998

RE: Public Comments - Surplus Plutonium Disposition;
Draft Environmental Impact Statement

MD236

PUBLIC SAFETY RESOURCES AGENCY
W.P. MEAD
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INTRODUCTORY COMMENTS

The disposal of Surplus Weapons Plutonium has been channeled into two primary processes: Immobilization, and MOx Fuel that would be "burned" in nuclear reactors. Most of the comments we've reviewed about the SPD DEIS appear to overwhelmingly favor immobilization (vitrification within high-level radioactive wastes from our nuclear defense legacy) over the MOx Fuel option. 1

While MOx Fuel is technically not a satisfactory answer for disposal of all Surplus Weapons Plutonium, Immobilization of the entire inventory of Surplus Weapons Plutonium is technically feasible and could be achieved much more rapidly and with less cost, fewer security risks, fewer adverse societal ramifications, and without creating additional waste streams to endanger the environment and public health and safety.

The use of MOx Fuel introduces many additional factors that may lessen the degree of control over the reactor's core. MOx Fuel requires higher operating core temperatures and pressures and significantly reduces the "margin of error" that is allowed when operating the reactor. Also, we have no true operational experience with these types of core loadings. Therefore, what we have based our "findings" on to date are, in reality, only conjecture about what we hope to achieve. 2

Regardless of the increasing body of research that now indicates that MOx Fuel is an expensive and risky alternative, the fact remains that it most likely will be used as a primary disposal option. Acting under that assumption, PSRA explored alternatives to existing LWRs (Light Water Reactors) in the United States.

Most of the persons and organizations who oppose the MOx Fuel option have concentrated on the safety issues that are associated with using MOx Fuel in Light Water Reactors such as those currently used to produce power in the United States, however it is important to also determine whether MOx Fuel can be safely used to run CANDU Reactors as was proposed as an alternative and/or supplemental platform.

PSRA has studied this issue and hopes to focus additional attention on this option and the safety, societal and security concerns that must be addressed before using MOx Fuel in CANDU power reactors currently operating in Ontario, Canada. To that end, we offer the following comments for the public record. 3

SPECIFIC COMMENTS

The National Academy of Sciences' 1995 Report ["Management and Disposition of Excess Weapons Plutonium Reactor-Related Options for the Disposition of Excess Weapons Plutonium, Committee on International Security and Arms Control, National Academy Press, Washington, D.C., 1995] raised questions about the CANDU Reactor's role in the disposition of Surplus Weapons Plutonium by using it as MOx Fuel in existing Canadian reactors.

NAS reported that the information cited in their Report had been submitted by AECL too late to undergo Peer Review of AECL's claims of CANDU's suitability and safety when using MOx Fuel.

It is important that we realize that the selection of MOx Fuel as a disposal option vastly changes the dimensions of the joint agreement between Russia and the United States. The inclusion of the MOx Fuel option has opened-up new industrial and marketing channels throughout the world, including Great Britain, Europe and Japan. 4

MD236

MD236–1 **Alternatives**

DOE acknowledges the commentor's concern about the use of MOX fuel in domestic, commercial reactors. The fabrication of MOX fuel and its use in commercial reactors have been accomplished in Western Europe, and electricity was generated from MOX fuel on a demonstration basis in the United States in the early 1970s. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

Potential waste management impacts of the proposed surplus plutonium disposition program are analyzed in this SPD EIS for each candidate site, and a detailed analysis is provided in Appendix H. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

Decisions on the surplus plutonium disposition program will be based on national policy and nonproliferation considerations, environmental analyses, technical and cost reports, and public input.

MD236–2 **MOX Approach**

Only a partial, not full, MOX fuel core would be used in the selected reactors, which would require only slight modifications to reactor operations. Core load and safety analyses would be performed, and an NRC license amendment approved, prior to MOX fuel being introduced into any reactor. Operations and maintenance procedures would be revised as necessary to accommodate the use of MOX fuel. Section 4.28 was revised to provide reactor-specific analyses and discuss the potential impacts of using a partial MOX core during routine operations and reactor accidents.

Disposition of surplus plutonium will cost money, regardless of the method used. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

MD236–3 **Parallex EA**

In the SPD Draft EIS, DOE retained the option to use some of the surplus plutonium as MOX fuel in CANDU reactors, which would have only been undertaken in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the Draft was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is no longer actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. A separate environmental review, the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999), analyzes the fabrication and proposed shipment of MOX fuel rods for research and

PUBLIC SAFETY RESOURCES AGENCY
W.P. MEAD
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Instead of limiting the proliferation of Plutonium, these countries will be the controlling interests in spreading a Plutonium-based economic infrastructure in areas that do not currently have readily-accessible Plutonium. 4

Much of PSRA's recent e-mail has been forwarded on behalf of persons who live in the State of Michigan and the adjacent areas of the Province of Ontario, Canada, that will be the site of MOx Fuel transportation, testing and disposal once the MOx Fuel has been irradiated in CANDU reactor(s) at the Bruce Nuclear Power Development facility near Tiverton, Ontario.

In an effort to better understand these issues, I visited these areas in July 1998. Although the findings stated below are only preliminary as of this date, the on-going review process has shown no valid reason why they should not be included in our comments.

First, it should be clearly understood that the inclusion of the CANDU Reactor as a MOx Fueled disposal option adds another three separate entities to the current equation that already includes the Russians, the United States, potential infrastructure contractors in Europe and the United States, and the owner/operators of civilian power reactor utilities. These three entities are: 3

1. **AECB (Atomic Energy Control Board)** - The Canadian Government's equivalent to the Nuclear Regulatory Commission here in the United States.

2. **AECL (Atomic Energy of Canada, Limited)** - The design, construction and marketing arm that is heavily involved in Russian plutonium operational planning; and

3. **Ontario Hydro** - The reactor operators in Ontario;

Now that we've identified the Canadian entities, it's time to see how this puzzle fits together, why it soon becomes controversial, and to bring to light some of the misunderstandings and/or inconsistencies that have been presented by these three parties.

1. **AECB:**

PSRA contacted AECB in May 1998 to determine its role in the MOx Fuel project. AECB stated that its sole role would be to ensure the safety of the fuel and reactors, and that it would establish rules to ensure compliance. AECB had already posted information on its Website that related to the requirement of safe and secure transportation and storage of MOx Fuel.

It is interesting to note that recent statements in the Canadian Press attributed to AECL contradict this information about secure transportation while in Ontario. The U. S. Department of Energy has stated that MOx Fuel shipments would comply with SST-2 [Safe Secure Transport - 2] levels to ensure security while in the United States. 5

This would include armed escorts to counter any attempted hijacking of MOx Fuel. While Canada's AECB had stated it would comply with this standard, AECL has made statements that contradict AECB's. Has AECL superseded AECB's role in safeguarding plutonium?

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development activities involving the use of limited amounts of U.S. MOX fuel in a Canadian test reactor. A FONSI was signed on August 13, 1999. Both of these documents can be viewed on the MD Web site at http://www.doe-md.com. If a decision is made to dispose of Russian surplus plutonium in Canadian CANDU reactors in order to augment Russian's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada. Activities in Canada would be conducted in accordance with applicable Canadian laws and regulations and would be regulated by the appropriate government authorities.

MD236–4 **Nonproliferation**

DOE believes the MOX approach to surplus plutonium disposition would help implement rather than change the commitments between Russia and the United States. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile.

The remainder of this comment is addressed in response MD236–1.

MD236–5 **Parallex EA**

DOE is no longer actively pursuing the CANDU option as discussed in response MD236–3.

The following is an excerpt from Tom Spears' article in the Ottawa Citizen [Page A1-A2, Sunday 30 August 1998: "AECL's Cold War cargo - Plutonium from nuclear warheads to pass through Ottawa Valley to Chalk River."].

According to that report, AECL's spokesman, Larry Shewchuk, stated that high security won't be needed for the imported weapons material. *"There's no police escorts or anything like that."*

(AECL has consulted the Ontario Provincial Police about the shipment, but the OPP said it sees no security problems and won't be involved in the shipment.)

The exact timing of the test shipment is secret. While it may be possible to conceal the transportation from Los Alamos, New Mexico, to Chalk River, Ontario, of the initial test MOx Fuel, it is extremely doubtful that SST-2 shipments to the U.S./Canadian border could be concealed from the public.

The initial test will consist of MOx Fuel that contains approximately 600 grams (1.3 pounds) of Surplus Weapons Plutonium in the fuel assemblies; a full core loading in an average CANDU Reactor at the Bruce NPD facility uses nearly 3,185,600 pounds of natural Uranium Dioxide.

There are three possible routes from Los Alamos to Chalk River:

One would cross the border at Sarnia and come east along Highway 401, turning north at Belleville toward Pembroke.

Another would come through Watertown, New York, cross the St. Lawrence River at the Ivy Lea Bridge, then turn east to Brockville and north through Smiths Falls, Carleton Place, Almonte and Arnprior on the way to Chalk River.

The third would cross into Canada in Manitoba and travel north of Lake Superior on the Trans-Canada Highway. 5

Having recently driven many of these routes in both an RV and small car, I can make several observations with certainty based on my personal experiences in Canada and the midwestern United States:

1. Canada's roadways are not up to the safety and design standards that Americans take for granted: There were literally *miles* of vehicles following each other at high speed and close intervals through winding hills without passing lanes or even a place to pull off the highway. Highways are being upgraded, but some areas are still without travel services.

2. There are environmental and ecological considerations that Americans don't even contemplate: Traffic along the Trans-Canada Highway frequently stops during night time hours due to the danger of hitting a moose.

3. Incidents of "Road Rage" have become so frequent in Ontario that new - mandatory - programs have been linked to traffic enforcement efforts along many of the routes identified for MOx Fuel shipments.

Even though it's AECL policy not to say publicly which route it will use, or when the shipment will come through, it is important that local emergency planners along the route be notified. Municipal officials in Lanark County, Smiths Falls and Carleton Place -- all on one of the possible shipping routes -- said they didn't know about the shipment.

While this secrecy may hold true for the initial test run, PSRA seriously doubts that the increased security necessary for large MOx Fuel shipments will remain unnoticed by citizens who live in farming and natural resources areas along these routes.

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W.P. MEAD
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2. **AECL:**

Robert Gadsby is the Program Director of AECL's MOx Fuel project. As such, he and his team have visited sites in the United States and Russia in an effort to facilitate using AECL's CANDU Reactors to dispose of Surplus Weapons Plutonium.

Mr. Gadsby and I began our communication via e-mail on June 16, 1998 and continued our communication via e-mail and telephone calls. At first, Mr. Gadsby's primary object appeared to be to determine why PSRA was interested in AECL's CANDU design and who would receive our report.

Although I had requested only general information in my first e-mail to Mr. Gadsby's office, I had to follow-up that request with specific quotes from the NAS Report to convince Mr. Gadsby that I had read the report and was following up on the NAS Report's findings. These specific quotations from the NAS questions are included below for reference:

==========

[FROM 06/17/1998 E-MAIL: PSRA to AECL]

Wednesday; 17 June 1998
Robert,

Yes, I've already made arrangements with Ontario Hydro for my visit at Bruce NPD, but I was hoping that I would be able to get some general information about the CANDU design before I visited their facility.

I've been dealing with Catherine Williams at Bruce, and she sent me some very general information. I then contacted AECB who referred me to AECL as the manufacturer of the CANDU reactor. 5

I believe my visit to Bruce would be more productive if I had a better understanding of the points listed below. This would allow me to focus on site specific training and operational history during my visit at Bruce.

To that end, I still would like to visit AECL's offices to get a better understanding of the CANDU reactor: Is there anyone else in the office who could discuss the CANDU's "non-MOX" operation as it is currently fueled at Bruce? It seems that since 20 CANDUs are operating in Ontario - and that the AECB referred me to your offices - that I should be able to get general (non-MOX) information about the reactor's design and operational safety features from someone in Mississauga.

I'm sorry that it seems that we won't be able to meet on July 16th. As the Director of AECL's MOX Project, talking with you would have been the most productive way to approach this. Perhaps you could put together an "Information Kit" on the MOX Project for me to pick up while I'm in that area. I would then be able to review that information before I visit the Bruce facility, and I would be able to follow up on this area of research when I return to Portland.

In reviewing the National Academy of Sciences' documents on using the CANDU reactors at Bruce, they were very clear that the information stated in those documents: "The panel notes that for this option virtually all of the information made available to the panel was provided by the vendor, and had not yet been reviewed by DOE or other organizations." [page 144]

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The report then presents several pages of discussions on the advantages and/or disadvantages of using the CANDUs in that role. On page 151, the report included footnote 22:

"The panel was informed by representatives of the vendor that this figure was arrived at not by analysis designed to estimate the maximum plutonium loading that could be safely accommodated in CANDU reactors, but rather because this was the loading required to meet DOE's specified goal of consuming 100 tons of WPu (the potential combined excess stocks of the United States and Russia) in 25 years of operation, given the estimated capacity of the FMEF fabrication facility (Feinroth 1994). Additional studies should be pursued to determine the maximum safe plutonium loading; higher plutonium loadings would increase the rate of plutonium disposition and reduce the number of fuel bundles that would have to be fabricated, potentially lowering costs."

The report continues along several other threads, however the main reason for our interest here in the Northwestern United States is that the FMEF, cited above, is located at Hanford, and AECL apparently wants to use this facility. On page 152, the report cites "Fuel Fabrication: Like the United States, Canada has no MOX fuel fabrication capacity. Fabricating MOX fuel for CANDUs at the Hanford FMEF facility would be the most expeditious approach, with the same caveats as is the LWR case. The vendor has in fact examined fabrication of MOX fuel in the FMEF in considerable detail, and believes that large throughputs of CANDU MOX fuel (over 160 MTHM/yr) are possible, by taking advantage of additional floor space not used by the current MOX fabrication line in the facility (AECL 1994)."

Since much of the report on the CANDU option was based solely on AECL's preliminary information that had not been reviewed by USDOE or other agencies, we're interested in reviewing the updated findings. Although the majority of the workforce in the communities surrounding Hanford's FMEF is understandably in favor of pursuing the MOX option, it appears that the majority of the populations in the states surrounding that area have questions about the advisability of increasing FMEF production at a time when they had been informed by USDOE that FMEF's mission would be ending. 5

If I can report that AECL's latest research indicates that the CANDU reactor can use a higher level of MOX fuel than was stated in the NAS report, then it could be assumed that FMEF operations could be shortened by several years. If we can pass the questions of how to contain potential FMEF site contamination and transportation - security issues there appears to be a better probability for agreement about using FMEF in that new role.

I believe that most persons, regardless of how they feel on the use of MOX fuel, agree that MOX-fueled reactors will be a part of our future. The President has declared this will be done, the industry is widely in favor of it, and most persons don't want to waste a "product" that they already have paid for and can provide future energy needs.

While the general public in the Northwestern United States may not be in favor of using FMEF for a 25 year program for LWRs in the U.S., they may well reverse that opposition if they understand that the plutonium was being sent out of the country for use in a "safe" reactor.

Based on my preliminary understanding of the CANDU design that would be used at Bruce to contribute to this project, CANDU appears to be a logical choice for the disposition for WPu, however I still cannot give a final recommendation to our states until we have information that is more recent than the NAS report that is commonly cited in this discussion.

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I also have reviewed AECB's 1997 summary regarding the use of MOX fuel in CANDU reactors and the associated issues. I think you'll agree that the project is feasible from a purely engineering standpoint, and that the CANDU would be a better platform than would a LWR. These factors appear to be strongly in favor of the CANDU, and I'd like to update the information we currently have.

As to my original request, I would appreciate any information you could provide on the following topics:

1. A general overview of the CANDU 's safety and control features as it is _currently_ operating (non-MOX mode);

2. Discuss how a MOX-fuel core loading would modify those operating characteristics; and,

3. Better understand what design modifications might be required to accommodate the use of MOX fuel.

I will be in Mississauga on 16 July 1998 and would like to visit AECL's offices to talk with someone on the general characteristics of a CANDU reactor operating in a "standard" (non-MOX) mode. I also would appreciate any information you are able to provide to update the NAS's 1995 report. I realize that you will not be personally available to meet with me on July 16th, however I sincerely hope that someone can provide me with the above information so I have a better understanding of the CANDU platform before I visit the Bruce NPD on the following day. 5

Thanks for your assistance in this matter. I will be leaving on a family vacation and research trip next week, so I'd greatly appreciate any help you can provide via e-mail or telephone. As far as receiving printed information, I'd like to have the opportunity to review it before visiting the Bruce facility, so I would want to personally collect that on July 18th when I'll be in Mississauga for other meetings.

PSRA's report is due in mid-August, and I hope to be able to report that AECL has provided us with the information our states need to make an informed decision about the use of specific facilities at the Hanford Reservation.

I hope to meet one of your co-workers on July 17th.

Sincerely,

W. P. (Bill) Mead, Director
Public Safety Resources Agency
P. O. Box 724
Portland, OR 97207-0724

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Following these specific questions, Mr. Gadsby stated that the U.S. Department of Energy had funded at least one additional (subsequent) study that showed that MOx Fuel was suitable for use in AECL's CANDU Reactors. When I requested a copy of that study's findings, Mr. Gadsby stated that it was "AECL's proprietary information" and that it was not to be released. 6

MD236

MD236–6 **Parallex EA**

This comment is addressed in responses MD236–3 and MD236–5.

Instead, Mr. Gadsby sent me a copy of a general talk he had presented to a Japanese pro-MOx forum. Mr. Gadsby's latest information was non-technical and did not answer many of the specific questions I had asked, so I clearly restated my request for information:

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[FROM 06/17/1998 E-MAIL: PSRA to AECL]

Wednesday; 17 June 1998
Robert,

Thanks for your reply to this morning's e-mail. I have reviewed the file you attached, and it appears that the CANDU reactor would be a better platform for this project than would a LWR of the type we commonly use in the United States. ...

Based on your presentation, it initially appears that a CANDU program would have several benefits over a siting within the United States. Primary among these are (1) the WPu would truly would be able to achieve the Spent Fuel Standard, (2) the length of time for the reduction program could be shortened if the CANDUs were allowed to operate as you described in your report, (3) the CANDU's design would not require making physical changes to its core, (4) AECB already has stated that it would provide a level of physical security equivalent to USDOE's to safeguard the fuel while within Canada, and (5) that the spent fuel would remain in Canada instead of being returned to the United States.

These are all points that the average citizen would likely accept, however most of the information we've received to date was not clear on those points. Given that, you can understand why many of them have had reservations about the MOX program. 6

This is only my personal opinion, but based on several years of work in both the business _and_ the area, I still believe additional information would be needed to allay the doubts of several persuasive organizations who have political weight in the decision-making process: The fact is that the President made a decision to pursue a dual-track disposal option and it will happen; the reality is that solid technical arguments must be presented to overcome political opposition that may be based on what appears to be faulty information that we have received to date. ...

You asked about our clients: They are several voting members - a majority - of an official interstate waste board and several adjunct agencies who are working on site remediation issues at the Hanford Reservation. ...

This has led me to perceive that the opinion of a majority of the citizens in the Northwestern United States is opposed to a MOX-fuel option; particularly if Hanford's FMEF and/or FFTF facilities are involved in that process. USDOE has just announced that public hearings and comments will be accepted on these proposals until approximately mid-August. PSRA has been asked to have our report ready in time to allow the clients to review those findings, and with sufficient time for them to then submit comments prior to that deadline.

I had been aware of several other studies similar to the ones you've mentioned, however most of the published studies deal with LWRs, not CANDUs. Is there any non-proprietary information you could allow me to review? Also, is there anyone whom I could contact about the general _non-MOX_ operations of a CANDU reactor?

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W.P. MEAD
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AECL has been identified as the manufacturer of the CANDU reactor, yet the general public really doesn't know much about how it operates. I'm not asking to be allowed to rummage through AECL's corporate secrets; only that I be allowed to get general (non-MOX) information about the reactor's design and operational safety features from someone in Mississauga.

To repeat what I've requested in my previous e-mails: I still would like to visit AECL's offices to get a better understanding of the CANDU reactor. Is there anyone in the office who could discuss the CANDU's "non-MOX" operation as it is currently fueled at Bruce? It seems that since 20 CANDUs are operating in Ontario - and that the AECB referred me to your offices - that this is a reasonable question.

Our concern here in the Northwestern United States is based on the potential long-term role as a MOX-fuel fabricator, with the possible (and currently, proven) diversion of funding by USDOE from the remediation of contaminated sites at the Hanford Reservation.

To this end, Hanford's FMEF directly enters into the equation: MOX will be a fact of life, therefore Hanford will play a central role in achieving those goals. If CANDU can speed up that process while reducing the time needed, then the cleanup of existing sites could be accomplished sooner than if LWRs in the United States were used to achieve those goals.

My gut feeling is that our clients - and the majority of the persons in the Northwestern United States who are not associated with the Tri-Cities workforce - will accept virtually any solution that will result in a reduction of the contamination at Hanford while concurrently relieving them of the potential creation of more irradiated spent fuel. Thus, if CANDUs can do this work and Canada is willing to retain possession of the spent fuel, then that is a major "selling" point that should be included in our report. 6

As I stated to you in my previous message: While the general public in the Northwestern United States may not be in favor of using FMEF for a 25 year program for LWRs in the U.S., they may well reverse that opposition if they understand that the plutonium was being sent out of the country for use in a "safe" reactor.

As to my original request, it appears that we've been successful in answering most of my questions, however I would appreciate any information you could provide on the following two remaining points:

1. A general overview of the CANDU 's safety and control features as it is _currently_ operating (non-MOX mode); and,

2. Discuss how a MOX-fuel core loading would modify those operating characteristics.

I will be in Mississauga on 16 July 1998 and would like to visit AECL's offices to talk with someone on the general characteristics of a CANDU reactor operating in a "standard" (non-MOX) mode. I believe I now have a better understanding of the design characteristics of the platform, but I would like to understand the actual operational and safety differences between CANDUs and the LWRs with which I am more familiar.

Thanks, again, for your assistance in this matter. You've taken a lot of time to respond to my questions, and I very much appreciate the supplemental information you've provided. If you have any information of a "general" (non-MOX-fueled core) nature for CANDU reactors, I really would like to be able to review that material before visiting the Bruce NPD facility.

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I will be leaving Portland early next week, and probably would not receive that information before I leave. However, as I will be staying in the Mississauga - Port Credit area during early July, it would be easier for me to collect any written information during that time period.

To summarize what I said earlier today: PSRA's report is due in mid-August, and I hope to be able to report that AECL has provided us with the information our states need to make an informed decision about the use of specific facilities at the Hanford Reservation.

I hope to meet one of your co-workers or at least be able to pick up the requested AECL information on July 17th.

Sincerely,

W. P. (Bill) Mead, Director
Public Safety Resources Agency
P. O. Box 724
Portland, OR 97207-0724

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Mr. Gadsby returned my telephone call and we spoke on these topics for approximately twenty-five minutes. He stated that although he and his team would be in Russia during the time of my visit (I was staying just a few miles away from AECL's office complex in Mississauga, Ontario), that he would arrange for someone to talk with me and would prepare an information package for me to receive during my visit on July 16, 1998. 6

On the morning of July 16th I telephoned Mr. Gadsby's office at AECL's office complex and was advised (1) that they had no package waiting for me; (2) that no one had been scheduled to discuss the questions Mr. Gadsby had agreed to respond to; and (3) that although Mr. Gadsby had gone to Russia, that no one had been designated to act on Mr. Gadsby's behalf during his absence.

In the end, it appears that although Mr. Gadsby stated that AECL had new findings that supported the ability of CANDU Reactors to safely operate on MOx fuel, the facts are that he admitted that this fuel had not been used in CANDU Reactors of that design, and he was not able to produce the documentation to substantiate his claims on behalf of AECL's unsupported statements in the 1995 NAS Report.

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3. **Ontario Hydro:**

Although it is not intentionally deceptive, the name "Ontario Hydro" is somewhat misleading when first viewed by citizens of the United States.

Most persons who live in the Northwestern United States associate the word "Hydro" as referring to a dam that produces electricity. In fact, when I first began making reservations for the Canadian portion of this summer's research trip, I thought the managers of the RV parks were asking if we wanted to connect to a water faucet.

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W.P. MEAD
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"Hydro" is the Canadian term for "electrical power." While this may have been accurate fifty years ago, the underlying source of that electricity has changed from "hydro" to "nuclear": Ontario Hydro now produces about 60% of its electricity in twenty CANDU Reactors. Of these, eight are sited at the Bruce Nuclear Power Development ("Bruce NPD") facility. Of those eight, four have been identified by the U. S. DOE as being considered for using MOx Fuel from the joint U.S.-Russian agreement to dispose of Surplus Weapons Plutonium.

In reviewing Ontario Hydro's operations and safety history before visiting their facility, I discovered (1) that Ontario Hydro had received several warnings from AECB about safety conditions at their nuclear facilities; and (2) their senior management had been reorganized due to the "fallout" from those critical reviews.

I later learned that in an effort to set a record for operating one of the CANDU Reactors at the Bruce NPD, that senior management had decided to intentionally by-pass taking the reactor off-line for scheduled maintenance. This decision resulted in excessive wear on the reactor's physical plant and kept the reactor shut down and off-line for an extended period of time. As I stated in my oral comments at Portland's Public Meeting in August, this is not the type of behavior that should be attempted with this technology. 6

As part of our research, PSRA was authorized to review technical documents for the eight CANDU Reactors at Ontario Hydro's Bruce NPD. The four reactors in Unit A differed from the four reactors in Unit B in several important design and safety aspects.

At the time of our pre-tour and on-site research the only CANDU Reactors that had been identified for the MOx Fuel role at Bruce NPD were the newer models of Unit B. These four reactors have a total net rating of 3,440MW(e) and produced their first electricity during the years of 1984-1987. However, in late August we received reports from Canadian sources that the older reactors of Unit A were the CANDUs under consideration for this project.

Unit A's four reactors have a total net rating of 3,076MW(e) and produced their first electricity during the years of 1976-1978. This requires clarification and, if true, a re-evaluation of those reactors on the basis of their design, safety and longevity.

The U.S. Department of Energy should clearly identify the specific reactors that are currently being considered for the MOx Fuel disposal option. If reactors in foreign nations are being considered, the Department should also clearly identify those specific reactors and verify that list with the governing agencies of those nations.

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ADDITIONAL CONCERNS

1. **Access to all USDOE/AECL CANDU Studies:**

According to Mr. Gadsby, AECL's MOx Project Director, the United States Department of Energy funded the subsequent AECL study that he alleges proved the CANDU Reactor was a satisfactory platform for the MOx Fuel disposal option. Mr. Gadsby also stated that this information was proprietary and was not to be released.

MD236

PSRA questions why - if this was a true statement - the citizens of the United States funded what can essentially be considered an R&D project for a foreign corporation but cannot review the results of those studies. 6

The U. S. Department of Energy should release the entire text of these reports, including their references and attachments, for review by the general public and peer review of technical findings that would enable replication of those findings by independent researchers.

2. Disposition of Spent MOX Fuel used in CANDU Reactors:

PSRA was informed that spent MOx Fuel from the initial test at Chalk River, Ontario would remain in Canada for disposal in a geologic repository. As yet, no such repository exists for Canadian spent fuel.

If MOx Fuel is to be used in Canada's CANDU Reactors, then it also should remain in Canada after irradiation.

Canada's two major players in the MOx Fuel disposal option are AECL and Ontario Hydro. During our research, both parties stated their contributions were beneficial to world peace by helping to eliminate the available supply of Weapons Plutonium. Their altruism should be ensured by a binding agreement stipulating that once the MOx Fuel leaves the United States that it will never return to our country.

Mr. Gadsby stated that the Russians trusted Canada to ensure that Weapons Plutonium used in the MOx Project would not find its way back into nuclear weapons. It logically seems that the only way this could be achieved would be to have the final repository for ***all*** spent MOx Fuel to be sited within Canada and be monitored by other neutral countries and organizations such as the IAEA. 7

If Canada is serious about wanting to "help" ensure the goals of removing this material from circulation, then it should also accept it as the end-user and be willing to co-exist with MOx Fuel from the time it enters the border into Canada as un-irradiated plutonium, and it should safeguard the irradiated spent fuel at a level equivalent to those required by the U. S. Department of Energy.

The U. S. Department of Energy should require that Canada assume perpetual control of MOx Fuel at the time that fuel enters Canada, and that Canada's safeguards be equivalent to those established by USDOE for transportation and storage within the United States. Furthermore, USDOE should not be permitted to accept spent MOx Fuel from any other country, including Russia or other participants in present or future agreements to dispose of Weapons Plutonium of non-U. S. origin.

3. Clarification/Identification of Reactors proposed for using MOx Fuel:

PSRA has recently received reports that several owners and/or operators of reactors under consideration for the MOx Fuel disposal option have withdrawn from participation. In many instances, other owner/operators have been substituted to replace the original owners, but those operators have stated that they did so only to allow one or more of the consortiums to remain in the selection process. 8

If the withdrawal of a component disqualifies a consortium from the selection process, then it also indicates that the owners of that component realized that their participation in the MOx Fuel program was ill-advised.

MD236

MD236–7 **Parallex EA**

Spent fuel generated by the Parallex Project would be managed in Canada by the Canadian spent fuel program. The remainder of this comment is addressed in response MD236–3.

MD236–8 **MOX RFP**

DOE acknowledges the commentor's concern about the procurement process. It is common business practice for potential bidders to pursue expressions of interest among qualified potential teaming partners, and as part of that process, determine which are in fact qualified to bid on the scope of work before settling on a team. It is not unusual, especially in large procurements, for teams to undergo several iterations before they are finalized. DOE will not speculate as to the intentions of any members of any responding teams, or others that may have decided in the end not to respond to the RFP. However, DOE agrees that a contract should only be awarded to a team meeting substantially all the requirements of the solicitation. DOE awarded the contract for the MOX fuel fabrication and irradiation services to a consortium that met all required elements.

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By allowing "front" reactors to join a consortium merely to include their name on a form so another reactor owner can later join the consortium violates the intention of the process. This demonstrates a lack of good faith by the parties of those consortiums and also on the U. S. Department of Energy for allowing this farce to continue. 8

PSRA calls on the U. S. Department of Energy to disqualify any consortium that does not include all components that were originally specified by USDOE for participation in that selection process.

4. **Safeguards, Security, Operational, Environmental, Health and Safety Concerns that require further in-depth evaluation.**

It appears that the United States Government still believes that the only time radiation crosses international boundaries is when a reactor is accidentally destroyed at Chernobyl. This phenomenon was repeatedly brought to our attention not only throughout our studies in the United States, but also by environmental remediation agencies during our 1998 research tour in Canada.

While the world-wide radiologic contamination from that incident received global attention and was thoroughly documented by the United States, it is ironic that fallout from nuclear weapons tests originating in the United States - that were monitored throughout the U. S. and showed unusually high radiation levels that extended right to our border with Canada - abruptly ended as the radiation plumes entered Canada. 5

The U. S. Department of Energy should require all Canadian parties to the MOx Fuel disposal option to comply with USDOE's standards of Safeguards, Security, Operational, Environmental, Health and Safety protection, and it should additionally conduct an on-going monitoring program of all aspects of foreign participation.

All reports, including radiologic monitoring of foreign facilities and transportation routes should be made available to the public via USDOE's WWW site. In cases where foreign regulatory agencies such as Canada's AECB have initiated action against a participant (such as Ontario Hydro), USDOE should retain the right to immediately halt further participation by those parties until the issues have been satisfactorily resolved.

5. **Paying the financial costs of the MOx Fuel disposal program.**

During my discussions with AECL's Mr. Gadsby, he stated that AECL would require funding by the United States to proceed with further implementation of the MOx Fuel program.

Also implied, but not specifically stated, was the indication that the U. S. would have to provide a MOx Fuel fabrication facility because no such facility exists in Canada. Russia also has no facilities to produce MOx Fuel, and has stated that it will require several billion dollars of assistance to move forward with its plans to use MOx Fuel in its reactors. 9

PSRA opposes any contribution of United States' funding to further a MOx Fuel disposal option. We believe better disposal alternatives exist, and that construction of a MOx Fuel fabrication facility would contribute to a dangerous proliferation of MOx Fuel use.

MD236

MD236–9 **MOX Approach**

Plutonium is regarded by most countries except the United States as a valuable resource. U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. Irrespective of this, the United States will maintain its existing commitments regarding the use of plutonium in civilian nuclear programs in Western Europe and Japan. Russia may choose to reprocess its spent fuel and reuse the plutonium. It will be the responsibility of IAEA to monitor this activity and ensure that the material remains committed to civilian use.

The remainder of this comment is addressed in responses MD236–1 and MD236–3.

If Canada wants to use MOx Fuel in its CANDU Reactors as a part of this program, it should finance that construction and infrastructure entirely as a sovereign (internal) national undertaking.

Also, the United States should not assist Russia in converting to a MOx Fuel option. If Russia is determined that the use of MOx Fuel is in its best national interest, then it has the responsibility to pay for those programs.

The U.S. and Russian disposal options do not truly require direct linkage. Russia views Plutonium as a national asset; PSRA views Plutonium as a worldwide threat and cannot support its use per the current proposals.

The United States should not contribute to additional proliferation in any manner. 9

CONCLUSION

The Public Safety Resources Agency recommends *against* the use of Surplus Weapons Plutonium in Mixed Oxide Fuel. PSRA strongly urges that Surplus Weapons Plutonium of *all* origins/nations be disposed of by other alternative technologies such as vitrification within mixed "High-Level" wastes, and that the disposal process not be linked to the demands made by the Russian government.

The United States is a sovereign nation that still maintains a significant nuclear and conventional advantage over potential non-terrorist threats, and can readily afford to unilaterally dispose of its Surplus Weapons Plutonium without linkage to another nations' programs. 1

W. P. Mead, Director
Public Safety Resources Agency
P. O. Box 724
Portland, OR 97207-0724

SUPPLEMENTAL NOTE

In the interest of being fair while researching this report, PSRA attempted to contact participants on both sides of the nuclear issues. Our initial contact attempts were made via e-mail and telephone calls.

Several persons in Ontario Hydro returned our telephone and e-mails, and subsequently allowed us to review documents such as the Bruce NPD Safety Report as a part of our on-site research. Although we were not permitted to photocopy or photograph Ontario Hydro's documents, they did provide a quiet room, candid talk, several technical volumes about their facilities, and permitted us to make written notes of that material.

We found AECL's Mr. Gadsby to be extremely well-versed not only in AECL's project, but also in the political realities of both Russia and the United States. During our telephone conversation Mr. Gadsby stated that "AECL always understood that CANDU Reactors would have to share the MOX program because of political and financial interests of the nuclear power reactor operators in the United States."

PSRA also tried to contact "anti-nuke" organizations. We were not successful, therefore the information presented above is based on the research developed from the cited resources. It is telling that even without the input from anti-nuclear activists, that the information that is currently available has overwhelmingly convinced us that the use of MOX Fuel in CANDU Reactors is not the best disposal option.

MD236

REIF, DAVID
PAGE 1 OF 4

US DOE needs to hear your voice NOW!

1. Should Clean Up be the sole mission at Hanford? 1
   Yes No

2. Should the United States Government maintain its longstanding policy against the use of weapons Plutonium to fuel civilian nuclear reactors? 2
   Yes No

3. Which alternative would you prefer to see the US Department of Energy pursue: 3
   Immobilization (encasement of plutonium in glass-like tombs) ← THIS, BUT NEITHER IS PERMANENTLY ACCEPTABLE
   Or
   The MOX plan (burning plutonium to fabricate fuel for use in a civilian nuclear reactor)?

4. Should Plutonium, to be used for processing and fabrication of MOX fuel, be imported to the Hanford site along the Columbia River?
   Yes No

5. How concerned are you about the transportation of Plutonium through the Northwest? 4
   Not concerned slightly concerned very concerned completely opposed
   B. How concerned are you about the transport through the Northwest of fuel containing weapons Plutonium?
   Not concerned Slightly concerned Very concerned Completely opposed

6. Should commercial nuclear power plants be allowed to run on MOX fuel containing weapons Plutonium?
   Yes No
   B. Should they be subsidized with tax dollars to do so? 5
   Yes No

7. Should MOX fuel containing weapons Plutonium be used to restart the FFTF reactor at Hanford to produce Tritium for nuclear bombs? 6
   Yes No

Name DAVID REIF
Address 5205 NE Mallory Portland OR 97211
Phone 331-3910

Please return this to:
Hanford Action
25-6 NW 23rd Place #406
Portland, OR 97214
(503) 235-2531

MD291

MD291–1 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD291–2 **Nonproliferation**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

MD291–3 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of

surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. The remaining 17 t (19 tons) of surplus, low-purity, nonpit plutonium is not suitable for fabrication into MOX fuel because of the complexity, timing, and cost that would be involved in purifying those plutonium materials. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not a reasonable alternative and is not analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

MD291–4 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD291–5 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MD291–6 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

Additional Comments:

~~Given that the military is responsible for the weapons-grade plutonium & tax dollars paid for the production of waste material with no projected technology for safe disposal, I feel it essential that all the groups responsible for that production, both commercial & government, pay for the cleanup without further impact on the taxpayer. This, to me, means existing military budget funds be used for research & development of disposal means that truly meet standards for environmental & human safety factors. Given that private companies have profited from nuclear subsidies, they too bear the primary burden of paying for their mistakes, even at their expense of their operation.~~

In short, existing profits & budget of the commercial/military nuclear energy experiment are the only funds properly spent to correct the waste disposal problem in a prompt & environmentally safe fashion. 7

It was seriously stupid to play with this material in any way in the first place. This was all predictable from the onset & we have hurt our health & our planet severely at Chernobyl, 3 Mile, Rocky Flats, Hanford, etc. Why play again with this ignorant MOX program? Shut it down, get rid of it, don't make the victims pay twice.

MD291

MD291–7 **Cost**

DOE acknowledges the commentor's concern regarding funding responsibility for weapons-grade plutonium disposition and cleanup, and opposition to the MOX approach. Funding for the U.S. surplus plutonium disposition program is allocated annually by Congress, which is committed to the goals and objectives of the program. However, funding policies are beyond the scope of this SPD EIS.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. To accomplish this goal, DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

SCOTT, COURTNEY
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Courtney Scott
ADDRESS: 2639 NE Clackamas, Portland OR 97232
TELEPHONE: (503) 288-6142
E-MAIL: scottwrk@teleport.com

I am opposed to the use of MOX fuel for nuclear energy or other commercial plutonium purposes. It is unfortunate that nuclear weapons ever proliferated in this country. Surely the enormous problems of cleaning up the waste should serve as a lesson against further creation of weapons of mass destruction. I recommend immobilization and vitrification as the best solution I have heard so far. Profit should not play a part in the decision whatsoever. If nuclear power corporations wish to use MOX fuels, at the very least they should pay for it to take the burden off the taxpayer. I doubt they would agree to this. 1

If you are sincere about responding to public opinion please ~~contact~~ advise upon current plan of action for disposing of excess plutonium. NO MOX.

ORD11

ORD11–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

My name is Nick Spurgeon and I live in Portland, Oregon, and I'm leaving a comment about the Hanford nuclear plant and the proposed plans to use the plutonium from warheads for nuclear energy. I think that's insanity. I think the Department of Energy should put its energy into exploring alternative energy sources like solar. Stop spending our money on poison that's going to kill us. I'm really sick of it and I'm really disgusted with it. Thank you. 1

PD038

PD038–1 **Other**

DOE acknowledges the commentor's opposition to the MOX approach and support of alternative energy sources. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

TRACY, NANCY LOU
PAGE 1 OF 1

August 18, 1998

Bill Richardson
Secretary of Energy
100 Independence Ave.
Washington, D.C. 20585

Dear Secretary Richardson,

This evening concerned citizens meet with DOE officials to discuss destruction of our nation's surplus weapons plutonium. If the object we seek is to destroy this deadliest of all nuclear elements, we'll turn it into glass. We need to be clear that we have the same objective in mind. The choices under discussion do not bear this out. 1

The one: to immobilize our entire supply into glass logs. The other: to put 2/3s of this plutonium into MOX fuel for commercial nuclear reactors, a dangerous breach in separation of military weapons production and commercial reactors.

The MOX option is little more than a transit system for moving plutorium - with all of its attendant risks to workers and the public - 100% of plutonium into MOX fuel, 99% plutonium remaining as waste, 1% destroyed.

Because MOX appears to be the DOE's choice, it seems that destruction of plutonium is not its objective. It is hard to understand the DOE's continued advocacy for nuclear power with its nightmare history of accidents. In a 5-city area around the Pilgrim nuclear power plant in Mass., following a silent, invisible accidental release of radioactive gases, the lukemia rate among children is 4 times the national average. To throw a load of plutonium into the fuel of commercial reactors and hope for some kind of safe retrieval of the 99% remaining is insanity. 2

If MOX is to be used as a means of stockpiling plutonium for future weapons production, should the case be made that preparing for war is the best means for insuring a lasting peace, then that is what we should be talking about.

Why does the DOE continue its single-minded advocacy of nuclear power with its accident-prone history and legacy of overfilled, leaking, explosive-hot waste sites of which Hanford is a prime example? It's time we stopped messing up lives of future generations. 3

I have a dream that one day in my lifetime the USDOE will advocate for safe, clean, efficients alternative energy sources. What a joyous use of our tax dollars that will be!

Sincerely,
[illegible]
Sub
731
Por

Copies to Senators Smith and Wyden

FD203

FD203–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

FD203–2 **MOX Approach**

The DOE acknowledges the commentor's opposition to nuclear power. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. The objective of reactor irradiation is plutonium disposition, not power generation. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

FD203–3 **DOE Policy**

The purpose of the MOX approach is to convert surplus plutonium to a form that meets the Spent Fuel Standard, thereby providing evidence of irreversible disarmament and setting a model for proliferation resistance. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

The U.S. Department of Energy needs to hear you voice NOW!
What do you think about a new era of nuclear proliferation?

Hanford Action of Oregon will forward this questionnaire to USDOE. Please circle your responses.

1. Should clean-up be the sole mission at Hanford? (Yes) No — 1
2. Should the United States government maintain its longstanding policy opposing the use of weapons plutonium to fuel civilian nuclear reactors? (Yes) No — 2
3. Should commercial nuclear reactors be allowed to run on MOX fuel containing weapons-grade plutonium? Yes (No) — 3
3a. Should they be subsidized with tax dollars to do so? Yes (No)
4. Which alternative would you prefer to see the U.S. Department of Energy pursue: — 4
   Immobilization (encasement of plutonium in glass logs or in cannisters for entombment)
   OR
   The MOX plan (processing plutonium into fuel for use in civilian nuclear reactors).
5. How concerned are you about the transportation of plutonium through the Northwest to Hanford? — 5
   Not concerned Slightly Concerned Very Concerned (Completely opposed)
6. How concerned are you about transporting plutonium MOX fuel through the Northwest to Hanford?
   Not concerned Slightly Concerned Very Concerned (Completely opposed)
7. Should MOX fuel be used to restart the Fast Flux Text Facility (FFTF), a risky liquid-metal reactor at Hanford, to produce tritium for nuclear bombs? — 6
   Yes (No)

Name Nancy Lou Tracy
Address 7310 SW Pine St. Portland OR 97223
Phone 503-246-6190 e-mail —

Please return to Hanford Action of Oregon by September 10, 1998.

Hanford Action of Oregon
25-6 NW 23rd Pl. #406 tel: (503) 235-2924 fax: (503) 736-0097 e-mail: hannie@aol.com

With what I have twice read is a 400 billion price tag for cleaning up Hanford - we must get on with the job - however overwhelming the odds of complete success. Those businesses which want — 7

MD298

MD298–1 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD298–2 **Nonproliferation**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

MD298–3 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would

displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MD298–4 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. The remaining 17 t (19 tons) of the surplus, low-purity, nonpit plutonium is not suitable for fabrication into MOX fuel because of the complexity, timing, and cost that would be involved in purifying those plutonium materials. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not a reasonable alternative and is not analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

MD298–5 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes

and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD298–6 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

TRACY, NANCY LOU
PAGE 4 OF 4

to have a second run of profit from plutonium need to be told "no". To impose further risk to commerce and industry of the area is foolhardy. The Columbia River, for many centuries ahead, will not 'roll on' clean, safe and productive as it has for eons past. It is long past time to put plutonium, incredible killer that it is, permanently out of commission. 7

MD298

MD298–7 **DOE Policy**

As described in Section 4.26.1.2, surface water would not be used in the construction and operation of proposed surplus plutonium disposition facilities at Hanford. In addition, there would be no discharges of contaminated wastewater to the Columbia River. Therefore, no impacts on the Columbia River would be expected.

The remainder of this comment is addressed in response MD298–1.

Hi. My name is Lee Ann Ward and I live in Portland, Oregon, down river from Hanford and I strongly object to the Department of Energy trying to produce fuel or anything else at Hanford and would like to see it cleaned up and nothing more done there. It's destroyed our river and the environment around here and I am very, very much opposed to any further use of Hanford for any production of fuel. Please, just clean up the mess that is there and leave it alone. Thank you. 1

PD037

PD037–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

WARD, RAYNER
PAGE 1 OF 1

1998-010168 Aug 31 P 1:59

United States Department of Energy

Comment Form

NAME: (Optional) Rayner Ward
ADDRESS: 2235 N. Alberta Portland, OR 97217
TELEPHONE: ( )
E-MAIL: Rayner1@juno.com

I would like to go on record as one who is against the MOX program in any form. I think that the best answer for the future of all plutonium on the Earth would be to vitrify it and bury it on site, at least it was to begin with, not to be moved anywhere else, also ground. One of the most troublesome problems of our time is the creation, use + proliferation of fissionable materials of all kinds, + the concomitant nuclear waste generated thereby. Despite the lame, misplaced optimism of many modern technophiles, there is no viable solution to "fix" these problems at present. Nuclear power in all its forms is responsible for massive pollution of the earth, widespread disease and death, the government (industrial/bureaucratic) treasury + attempts notwithstanding. Though I am thankful that, at least, we will not have to face MOX at Hanford I am alarmed in my view that we are in the United States should face the spectre of MOX. It is an insult and a crime to bring nuclear waste from abroad for us to deal with. The transportation problem alone is an obscenity. Leave these materials onsite until, someday, hopefully (tho I won't hold my breath) a more enlightened future people will be able to solve the problem or until the half life finally runs out, in the case of plutonium, some 250,000 years.

Rayner Ward

P.S. I don't buy the "what if the Russians make bombs" argument. Isn't it time to stop trying to frighten people into going along with insane policies. The U.S. needs to set a good example, i.e. eschew any and all use of fissionable materials including nuclear fuel and medical isotopes.

1

MD164

MD164–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The surplus plutonium disposition program is limited exclusively to U.S. surplus plutonium and not to foreign plutonium. Transportation impacts of the MOX approach are summarized in Chapter 4 of Volume I and Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

Yes, hello my name is Mona Warner. I'm calling from Oregon and I would like to express my opposition to the MOX plan to use fuel for making energy. I really feel very strongly that this is a bad idea. It's a lot, it will cost a lot more, the disposition is close, it's a lot slower and it possesses a much greater possibility of proliferation of nuclear power and I really would like to encourage anyone who is in any position to stop the idea of the generation of this fuel. And I think we should have it in storage and put it away until we can figure it out, figure out what to do with it safely and so that it is not helping proliferate nuclear, what could be eventually nuclear war, who knows. But I would like and, and I would like to express that feeling. Thank you very much. Good-bye. 1

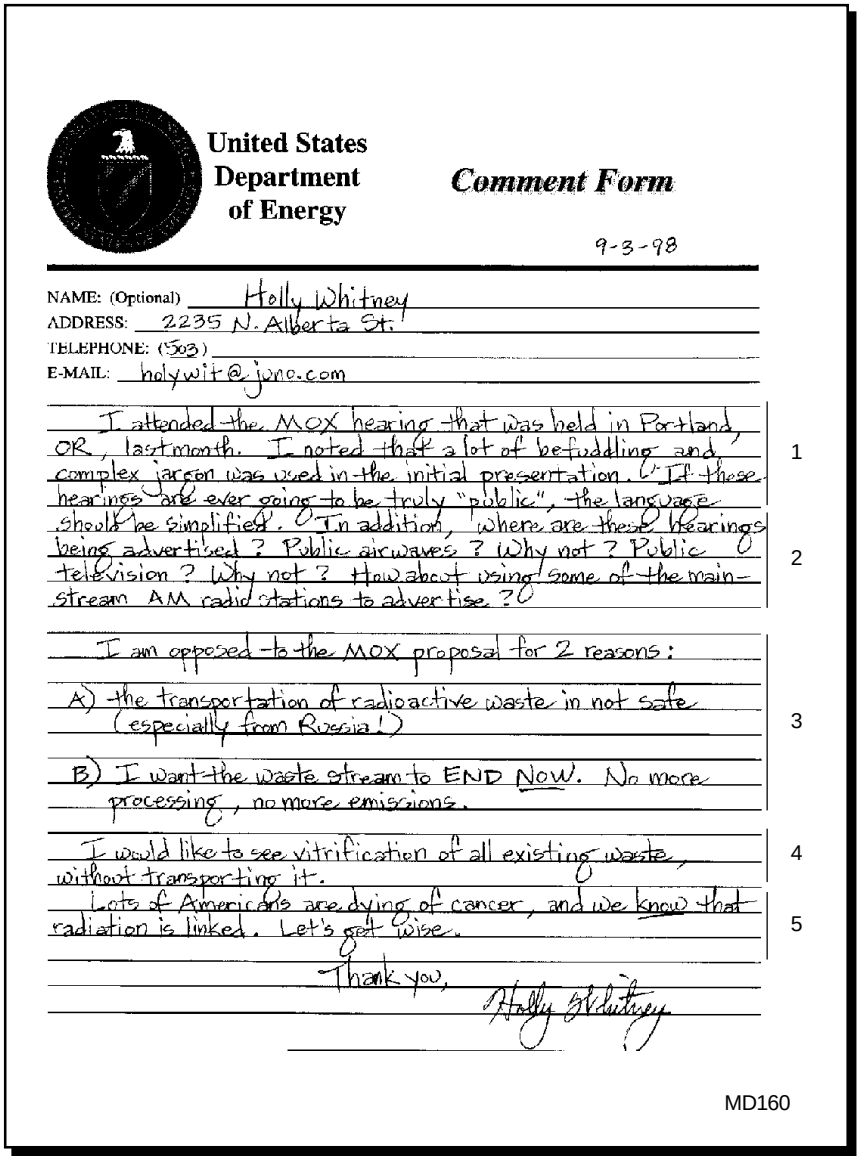
PD048

PD048–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. The use of MOX fuel in domestic, commercial reactors is not proposed in order to produce energy. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing. By working in parallel with Russia to reduce stockpiles of excess plutonium, the United States can reduce the chance that weapons-usable nuclear material could fall into the hands of terrorists or rogue states and help ensure that nuclear arms reductions will never be reversed. Converting the surplus plutonium to more proliferation-resistant forms allows a lesser, albeit still high degree of custodial care than maintaining facilities for the material in its current form. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

WHITNEY, HOLLY
PAGE 1 OF 2



United States Department of Energy

Comment Form

9-3-98

NAME: (Optional) Holly Whitney
ADDRESS: 2235 N. Alberta St.
TELEPHONE: (503)
E-MAIL: holywit@juno.com

I attended the MOX hearing that was held in Portland, OR, last month. I noted that a lot of befuddling and complex jargon was used in the initial presentation. If these hearings are ever going to be truly "public", the language should be simplified. In addition, where are these hearings being advertised? Public airwaves? Why not? Public television? Why not? How about using some of the mainstream AM radio stations to advertise? 1 2

I am opposed to the MOX proposal for 2 reasons:

A) the transportation of radioactive waste in not safe (especially from Russia!) 3

B) I want the waste stream to END NOW. No more processing, no more emissions.

I would like to see vitrification of all existing waste, without transporting it. 4

Lots of Americans are dying of cancer, and we know that radiation is linked. Let's get wise. 5

Thank you,
Holly Whitney

MD160

MD160–1 **General SPD EIS and NEPA Process**

DOE has and will continue to work toward the goal of presenting technical information, in writing or verbally, in readily understandable language and avoid the use of jargon (technical slang). Specifically, the aim is to provide information at a high school comprehension level. Because the disposition of surplus plutonium is a technically complex program, DOE must use some scientific and technical terms in order to accurately describe how DOE proposes to dispose of surplus plutonium, and the environmental effects of taking those actions.

MD160–2 **General SPD EIS and NEPA Process**

For all public hearings, DOE placed ads in large-circulation newspapers in the hearing areas and provided public service announcements for area commercial and public radio stations. Notification was also provided by means of mailing lists, Web site announcements, and bulletin boards at each DOE site. Individual notices were also mailed to over 5,000 members of the public who had expressed an interest in the program.

MD160–3 **Transportation**

DOE acknowledges the commentor's opposition to the MOX approach and transportation of MOX fuel. Surplus plutonium would be shipped from Russia to the United States as a result of the alternatives being evaluated in this SPD EIS. Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

DOE is committed to waste minimization and pollution prevention and is doing everything in its power to limit the amount of waste that would be

generated during this process. As described in Section 2.18.3, the potential impacts of waste generation and emissions due to the MOX approach are expected to be minor.

MD160–4 **Alternatives**

DOE acknowledges the commentor's preference for immobilization in glass at the site where it is currently located. This EIS evaluates the environmental impacts of immobilization in ceramic and glass at Hanford and SRS. The option of immobilization was considered in the *Storage and Disposition PEIS*, but only Hanford and SRS were chosen in the ROD because these sites have, or are scheduled to have, the infrastructure to provide the needed HLW or cesium radiation barrier to make the immobilized plutonium meet the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

MD160–5 **Alternatives**

The Atomic Energy Act of 1954 authorizes DOE to establish standards to protect health or minimize dangers to life. Radiation protection standards are based on controlling radioactive releases to ALARA levels in recognition of the potential risk of radiation exposure. The extremely small cancer risks presented in this SPD EIS are a direct result of the small quantities of material (e.g., plutonium) expected to be released from the proposed facilities. Calculation of these cancer risks is based on methodologies presented in *Health Effects of Exposure to Low Levels of Ionizing Radiation*, BEIR V (1990).

WOMAN'S INTERNATIONAL LEAGUE FOR PEACE AND FREEDOM
BARBARA DRAGEAUX
PAGE 1 OF 1

Women's International League for Peace and Freedom
PORTLAND BRANCH
1819 NW Everett, Portland, OR 97209
(503) 224-5190

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August 18, 1998

RE: Surplus Plutonium Disposal

I'm speaking as co-chair of WILPF (Women's Internatioinal League for Peace and Freedom). Our ROI (Region of Influence) includes more than 42 National Sections around the world. I believe that I can represent the position of our members as against the use of plutonium for the production of energy, for weapons or any other active use. We insist that the only proper future for plutonium is containment in a permanently unuseable form such as vitrification.

Re-ordering the U.S. Federal budget has long been a priority of U.S.WILPF. WILPF has developed a "Woman's Budget" in the past and an updated version is currently being prepared. It is my view that Longsuffering Citizen Funders are not interested in seeing their tax assessments used to further the goals of Maximally Enriched Institutions whose demands for federal dollars encourage the use of this dangerous substance in yet to be designed (at government expense) facilities. To continue to bill us for the risky transport of plutonium and its proposed by-products (such as MOX) back and forth across the country; to continue to impose on us the cost of the dealing with the resulting waste; and to add to the wealth of corporate vultures at our expense is beyond reason. Our NOI (Notice of Intent) is that we will gather all the resources within our ROI to demand that weapons plutonium be properly and permanently disposed of . . . at Hanford, in the northwest and anywhere else in the U.S. 1

Barbara Drageaux, co-chair
WILPF: Portland Branch
4811 NE 31
Portland, OR 97211
503-284-3116

ORD08

ORD08–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS in Chapter 4 of Volume I and Appendix L.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

July 28, 1998

U. S. Department of Energy,

Like other people say clean Hanford clean up nuclear waste. Our country doesn't need surplus plutonium. If DOE agreed billion dollar deal with British company to begin converting waste into glass will take years. 1

Jane Wood
Portland, OR

MD005

MD005–1 **Purpose and Need**

DOE acknowledges the commentor's opposition to new missions at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

YAZZOLINO, BRAD
PAGE 1 OF 2

Dear Email submission. Sept. 15 11:30 pm PDT. I was in attendance at the Portland, Oregon, public meeting on the SPD EIS, although I did not speak at that meeting. I ask that the following be considered as my comment on the subject.

I am opposed to a policy of Mixed Oxide Fuels processing, this is an expensive non-solution to the problem of nuclear waste. MOX is perpetrated primarily by those who will profit economically from it. 1

In the long run, it will be far more more expensive in dollars and ultimate human misery than declaring Plutonium a waste and diligently setting the good example of entombing it with reliable oversight. It is now well known that MOX programs will result in a large net increase in nuclear waste, and will encourage similar practices worldwide by people even less well prepared than ourselves to attempt such folly.

Also I do not want to allow anything but active waste clean-up to occur at the Hanford, Washington site. Hanford, though over 120 miles distant from the 3 million people in the Portland metro area, will be a real threat to long term livability in our beloved region unless a competent clean up program is conceived, adhered to, and fully carried out. (As someone who has observed and followed events at Hanford for over fifteen years, I say "Yes, the pro-nuclear zealots have backed off a bit, but they still desire to make their fortunes in the same misguided way; by devising ever more elaborate and unworkable schemes to make use of an inherently dirty and dangerous power source that is even now only barely understood because it's real damage is 2

WD022

WD022–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the cost and schedule estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

done over TIME, something that humans cannot buy, make, or ultimately control."

2

Please have the foresight to realize, the solution to high level waste is clean-up, vitrification, or some other carefully controlled entombment, and the active persuasion of other countries to do the same.

Thank you.
Brad Yazzolino
Portland, Oregon

WD022

WD022–2 **Alternatives**

DOE acknowledges the commentor's opposition for siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

ENVIRONMENTAL COALITION ON NUCLEAR POWER
JUDITH JOHNSRUD
PAGE 1 OF 1

United States Department of Energy

Pre-Registration Fax Form

SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT PUBLIC MEETING

When is the Public Meeting in Washington, DC? Pu Disposition may affect all-or many-nuclear reactors, and thus LLRW.

	August 4, 1998 Richland, WA (Hanford)	☐ Afternoon Workshop - 1:00PM - 4:00PM ☐ Evening Workshop - 6:00PM - 9:00PM
	August 11, 1998 Amarillo, TX (Pantex Plant)	☐ Afternoon Workshop - 1:00PM - 4:00PM ☐ Evening Workshop - 6:00PM - 9:00PM
1	August 13, 1998 North Augusta, SC (SRS)	☐ Afternoon Workshop - 1:00PM - 4:00PM ☐ Evening Workshop - 6:00PM - 9:00PM
	August 18, 1998 Portland, OR	☐ Afternoon Workshop - 1:00PM - 4:00PM ☐ Evening Workshop - 6:00PM - 9:00PM
2	August 20, 1998 Idaho Falls, ID (INEEL)	☐ Afternoon Workshop - 1:00PM - 4:00PM ☐ Evening Workshop - 6:00PM - 9:00PM

Please provide the following information to register for the public meetings on the *Surplus Plutonium Disposition Draft Environmental Impact Statement*. Fax your completed form to 1-800-820-5156. If necessary, make copies so there is only one participant per form. If further assistance is required or if you have any questions, please call 1-800-820-5156 and leave a message. A representative will return your call.

☐ Mr. ☐ Mrs. ☐ Ms. ☒ Dr. Judith (first name) Johnsrud (last name)

TITLE: Director [and Sierra Club National Nuclear Waste Task Force]

ORGANIZATION: Environmental Coalition on Nuclear Power

MAIL ADDRESS: 433 Orlando Ave. (street/post office box) (suite/apartment/mailstop)

State College (city) PA (state) 16803 (zip code)

TELEPHONE: (814) 237-3900 FAX: (814) 237-3900

E-MAIL ADDRESS: johnsrud@csrlink.net

For further information contact:
U.S. Department of Energy, Office of Fissile Materials Disposition, MD-4
Forrestal Building, 1000 Independence Ave., SW, Washington, D.C. 20585
1-800-820-5156

MD016

MD016–1 **General SPD EIS and NEPA Process**

DOE held public hearings near the potentially affected DOE sites and Washington, D.C. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Approximately 1,300 copies of the *Supplement to the SPD Draft EIS* were mailed, and an NOA postcard was mailed to an additional 5,800 members of the public. Several means were available for providing comments: mail, a toll-free telephone and fax line, and the MD Web site. All comments, regardless of how they were submitted, were given equal consideration.

MD016–2 **Waste Management**

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. Also, if the MOX approach is selected in the ROD for this SPD EIS, plutonium disposition is proposed to occur in three domestic, commercial nuclear reactors. Commercial nuclear reactors that were not selected would see no changes to their current operations.

LEWIS, MARVIN
PAGE 1 OF 1

Look, this is insane to think you are getting my comment, my comment. Lord help us! That's a hell of a comment. Of course, I understand that the disposing of plutonium is now up to 50 metric tons! Why they call 50 metric I don't know. 50 metric tons is pretty close to 50 long tons. And this is an insane amount and it sure is insane to put it in civilian reactors, commercial reactors. Any terrorist group can get a hold of it they don't have to make it into a bomb. Plutonium is a terrorist weapon just by its very existence. Commercial reactors don't have the kind of where with all to protect something like that. And I'm not even sure the U.S. Government has something to protect, the where with all to protect it. This is very insane. God help us. Respectfully submitted, Marvin Lewis. 1

PD002

PD002–1 **Nonproliferation**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition based on concerns regarding theft and diversion. In order to address security against terrorist-related incidents, all intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications and additional couriers. Further, the DOE disposition facilities proposed in this SPD EIS are all at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Security for the facilities would be implemented commensurate with the usability of the material in a nuclear weapon or improvised nuclear device. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed inside are adequately protected. Closed-circuit television, intrusion detection, motion detection, and other automated materials monitoring methods would be employed. Furthermore, the physical protection, safeguards, and security for the MOX facility and domestic, commercial reactors would be in compliance with NRC regulations.

WOMEN'S INTERNATIONAL LEAGUE FOR PEACE AND FREEDOM
PATRICIA T. BIRNIE
PAGE 1 OF 4

1998-008457 July 15 A 9:49

Women's International League for Peace and Freedom
United States Section
1213 Race Street, Philadelphia, PA 19107-1691
(215) 563-7110 • Fax (215) 563-5527 • E-mail: wilpfnatl@igc.apc.org

July 11, 1998

President Bill Clinton
The White House
Washington, D.C. 20500

cc Federico Peña, Secretary
DOE

FIRST INTERNATIONAL PRESIDENT
Jane Addams
Nobel Peace Prize 1931

FIRST INTERNATIONAL SECRETARY
Emily Greene Balch
Nobel Peace Prize 1946

NATIONAL PRESIDENT
Betty Burkes

EXECUTIVE DIRECTOR/
U.S. SECTION COORDINATOR
Marilyn Clement

International Office
Centre International
1 rue de Varembé
1211 Geneva 20
Switzerland
41-22-733-61-75
41-22-740-38-83 (FAX)

UNITED NATIONS
REPRESENTATIVE
Paula Tanes

SPONSORS
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Dennis Banks
Ellen Redding
Anne Braden
Helen Caldicott
Ramsey Clark
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Rep. Ron V. Dellums
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Rep. Don Edwards
Frances Farenthold
Rev. William H. Gray, III
Coretta Scott King
Yolanda King
Barbara Kingsolver
Elizabeth McAlister
Kate Millett
Molly Ness
Grace Paley
John Randolph
Betty Reardon
Sonia Sanchez
Starhawk
Gloria Steinem
Ethel Taylor
Alice Walker
Joanne Woodward

Re: Oppose MOX option for surplus plutonium disposition from dismantled nuclear weapons

Dear President Clinton:

After studying the DOE's proposed options for surplus plutonium disposition for plutonium from dismantled nuclear weapons, we are convinced it would be a serious mistake to go forward with the MOX (Mixed Oxide fuel for commercial reactors) option.

Our government's official policy correctly has been to oppose nuclear bomb proliferation from the beginning. The MOX option would make access to plutonium much easier for those wanting to make bombs. 1

The government should process the surplus plutonium in a way that: 1. provides the fewest opportunities for theft or diversion by those determined to build nuclear weapons; 2. minimizes the handling and transportation of this deadly material; 3. accomplishes the disposition in the quickest manner; and 4. generates the least additional radioactive waste. MOX does not meet any of these four criteria; only direct immobilization does.

The bonus is that immobilization would also be cheaper, and also make it less likely that our country would embark on a plutonium economy.

An additional factor hidden in the debate over MOX vs immobilization is the necessary additional and substantial government subsidies to private utilities, required to maintain those reactors to be operable during the 30 years' time required to dispose of the surplus plutonium (plus to keep them going the 7 or 8 years prior to when MOX fuel could be ready). All U.S. reactors are aging and needing serious repairs at this date. No reactor has ever achieved its 40 year license period, let alone operate for the longer time MOX use would require. 2

We believe the commercial nuclear industry is at a critical juncture. Utility deregulation now shows that expensive nuclear generation is no longer competitive. We pray that safety systems are not compromised in the present cost-

WAD08

WAD08–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach and support of the immobilization approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors and immobilizing the plutonium are effective ways to accomplish this.

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Both approaches would require the handling and transportation of the surplus plutonium. Transportation of special nuclear materials would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material.

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial

reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington. D.C.

WAD08–2 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

Qualification criteria used to select the domestic, commercial reactors stipulates that the reactors must be able to complete the surplus plutonium disposition program within their operational life as dictated by their licenses. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

cutting initiatives of nuclear utilities. We believe nuclear power should be allowed a respectful closure now, without providing huge public monies to prop it up for utilizing the surplus plutonium disposition (that should be disposed of in a better way, anyway). 2

We are worried that the technology proposed by the MOX-consortium-hopefuls ("Plutonium Oxide Polishing") could result in the resumption of reprocessing, though of course under some euphemistic other name. Our scientists have already tried and rightfully rejected reprocessing. Back in the 1960's reprocessing was shut down because of its great danger, its generation of such huge quantities of radioactive waste, its colossal cost, and proliferation concerns. Nothing has changed. Do not allow reprocessing to be resumed, under any name. 3

We believe the institutional pressures exist that would use MOX as the bridge to the plutonium economy, long envisioned by nuclear promoters. A plutonium economy would provide a field day for proliferation opportunities, and spell doom for our hopes for a healthy environment.

We urge your strong opposition to wasting any further public monies on a technology (MOX) that has as many pitfalls, and which has far more negatives than the immobilization option. Oppose MOX before it gets started.

Thank you for your serious consideration. Please address any correspondence to my address below.

Sincerely,

Patricia Birnie

Patricia T. Birnie, Chair
WILPF Environment Committee
5349 W. Bar X Street
Tucson, AZ 85713

cc: Secretary of Energy
Chairman of the Nuclear Regulatory Commission

Enclosure: Lead Editorial of 6-27-98 LA Times

WAD08

WAD08–3 **DOE Policy**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

LOS ANGELES TIMES SATURDAY, JUNE 27, 1998

LOS ANGELES TIMES EDITORIALS

MARK H. WILLES, *Publisher*
DONALD F. WRIGHT, *President and Chief Executive Officer*
MICHAEL PARKS, *Editor and Senior Vice President*
JANET CLAYTON, *Editor of the Editorial Pages and Vice President*

Keep Rein on Plutonium

U.S. must not let a market develop for this substance

One of the knotty little problems that U.N. Ambassador Bill Richardson will inherit when he becomes secretary of Energy is what to do with some 50 tons of surplus plutonium, the hottest nuclear fuel around, enough to fashion about 10,000 bombs.

Assuming he is confirmed by the Senate, Richardson needs to reassess plans for disposing of this stuff. The nuclear tests in India and Pakistan are fresh in mind, and an energy chief should judge those alarming programs against this nation's long-held opposition to nuclear proliferation.

Bill Richardson's prospective problem: 50 tons of plutonium.

It's true that Washington's nonproliferation policy did not prevent India and Pakistan from developing their own bombs. But if the United States is to officially preach nuclear nonproliferation, it ought to practice that policy in the handling of its own bomb-making materials.

Back in 1996, a special panel of the National Academy of Sciences recommended a two-track approach for disposing of plutonium that was stockpiled during the Cold War. Plutonium oxide would be mixed with uranium oxide to create a fuel known as MOX for sale as fuel to commercial utility companies operating nuclear power plants.

In accepting the plan, former Energy Secretary Hazel O'Leary said that fuel burned in commercial reactors would not be reprocessed to recover plutonium, as is done in some countries. But it could be, and that was enough for a number of scientists to become alarmed over the potential for reprocessing the fuel and creating the infrastructure for a "plutonium economy" in the United States.

Is that time coming? The Energy Department is seeking $28 million in its fiscal 1999 budget to begin work on a MOX factory at its Savannah River plant. The preferable method of disposal is to combine plutonium with highly enriched uranium waste and melt the mix into glass or a ceramic material at extremely high temperatures, a process known as vitrification. The fused material then could be safely stored in sealed canisters until a nuclear depository such as that proposed at Yucca Mountain, Nev., is in operation.

The American strategy is to get the Russians to dispose of their plutonium too. The Russians want both sides to use the MOX process, arguing that it offers the greatest assurance that none of the plutonium will be resurrected to make bombs in some future crisis. But can we count on them? The State Department sharply criticized Moscow earlier this week for consummating the sale of two nuclear reactors to India for $3 billion.

Washington argued that the sale sends the wrong message—continued cooperation with India in nuclear economics—at a time when U.S. policy is to punish the Indians by restricting such deals. Critics of the Energy Department's plutonium disposal plan use the very same argument against this country: that it ill-behooves us to pursue nonproliferation against would-be nuclear nations while engaging in a program that might ultimately result in more plutonium being on the market.

The real problem may be that there is no way of putting the genie back in the bottle, or of ridding the Earth of plutonium. Indeed, if Europe, Japan and Russia are going to use plutonium for cheap reactor fuel—as it appears—shouldn't we? No. To do so would undermine America's moral policy against nuclear proliferation. Perhaps the first thing Richardson should do at the Department of Energy is to reaffirm that policy.

WAD08

DOE Plutonium Disposition Public Meeting
Thursday, 8/13/98
W. Barry Adams

Ladies and gentlemen, my name is Barry Adams. I am a banker, a life long resident of the CSRA, a board member of the Aiken Chamber of Commerce, and a concerned citizen.

Please know that I cannot testify to you today due to my understanding of nuclear technology and, in particular, my knowledge of plutonium disposition. While not beyond my interest these are subjects that I will never even pretend to understand.
I am positive though, that a number of specialists and engineers have and will present to you very qualified testimonies of why SRS is technically the best choice for the complete plutonium disposition mission.

Neither can I testify to you today concerning the economic issues involved in your selection process. The budgets involved are far more complex that the budgets with which I deal. Just as from the technical aspect however, I am positive that you have and will hear compelling arguments as to why the selection of SRS is the best choice for the pit assembly and conversion mission and will save taxpayers billions of dollars.

But I can testify to you today of the confidence that I and my family have in the scientists, engineers, technicians, accountants, and managers that operate SRS. And I will tell you publicly that we believe that there is no finer or better qualified group of men and women in the world to accept and successfully carry out this mission than these proven professionals.

This simple opinion, one that is shared throughout the CSRA, could be the most critical of all of the factors that will influence your decision. While it is true that SRS is the technical and financial leader of any potential site, it is also true that there is no other location in the United States where common citizens, such as me, have such faith and trust in the abilities of the operators of a DOE site. The communities of the CSRA overwhelmingly support SRS and its missions and this unprecedented community support has not, will not, and cannot be duplicated anywhere. 1

I encourage you to give high value to the 40 plus years of support that SRS and DOE have received from the citizens of South Carolina and Georgia and assign to SRS the pit disassembly and conversion mission.

SCD03

SCD03–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN
HONORABLE FRED B. CAVANAUGH ET AL.
PAGE 1 OF 1

AIKEN SOUTH CAROLINA

City of Aiken

South Carolina

Post Office Box 1177
Aiken, S.C. 29802

RESOLUTION
SUPPORTING THE TEMPORARY STORAGE OF
PLUTONIUM FOR THE PURPOSES OF PROCESSING AND VITRIFICATION

WHEREAS, the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States;

WHEREAS, plutonium reprocessing represents one of the most certain future missions of the United States Department of Energy for the next 20 or 30 years;

WHEREAS, the Savannah River Site has produced approximately 40% of all U.S. weapons grade plutonium over the past 45 years and has safely handled plutonium and glove-box processing equipment with little or no adverse impact on workers, the public, or the environment;

WHEREAS, the Department of Energy and its record of decision recognizes the Savannah River Site as "a plutonium competent site with the most modern, state of the art storage and processing facilities...with the only remaining large-scale chemical separation and processing capability in the Department of Energy complex"; 1

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF AIKEN THAT:

The City Council for the City of Aiken does endorse major plutonium missions for the Savannah River Site, and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management, processing, and temporary storage.

ADOPTED this 24th day of February, 1997, at Aiken, South Carolina.

Fred B. Cavanaugh
Mayor

Councilmember — Beverly D. Clyburn, Councilmember
Councilmember — Eric H. Caldwell, Councilmember
Councilmember — Leslie B. Price, Councilmember

City Attorney - (803)642-7654 Finance - (803)642-7600 FAX - (803)642-7646 City Manager - (803)642-7654
Planning - (803)642-7608 Public Safety - (803)642-7600

SCD102

SCD102–1 **Alternatives**

DOE acknowledges the commentors' support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

DOE Hearing-Plutonium Disposition
North Augusta, SC
8/13/98

Good afternoon. Mr./Ms. Chairman and Committee Members, my name is Fred B. Cavanaugh, Jr. and I'm very fortunate to be Mayor of the City of Aiken. As Mayor of Aiken, I'm proud to be representing our city's elected officials, staff and citizens when I tell you that we support the Pit Disassembly and Conversion mission at the Savannah River Site (SRS).

As we know, SRS has been been selected as the preferred site for Mixed Oxide (MOX) Fuel and Immobilization missions because it has the expertise and infrastructure needed to bring the disposition of plutonium to successful completion.

The Savannah River Site, its dedicated employees, and the people in the Central Savannah River Area (CSRA) supported our nation's Cold War efforts for nearly fifty (50) years by helping to create our country's nuclear defenses. We are now prepared to complete the job President Truman entrusted to us so long ago...making our world a safer place to live. 1

When it comes to plutonium handling there is no safer facility than SRS, and as far as community support, there is no other site that enjoys as much support as SRS. Year after year on our CSRA trips (some 45 people strong) to visit our legislative delegations and the DOE in Washington, we hear DOE agree that SRS has the strongest community support.

SCD48

SCD48–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

putting the new production reactor at the Savannah River Site. "I think we are the best location," said Georgia Democrat Sam Nunn, referring to SRS. "We have the best people, we have the most infrastructure to deal with it."

1991 - Another article from the Augusta Herald printed a statement from U.S. Representative Butler Derrick, Dem.-S.C., saying, " This is the friendliest place in the country to further development in nuclear production. The people want it. The people in the area feel comfortable with it. As the DOE consolidates nuclear facilities, I think SRS will become one of those consolidation sites."

During the same time frame then Governor Campbell of S.C. sent a letter to the Chief of Staff of President George Bush stating, "I express my support for locating the NWCRS at SRS. The SRS is the optimum location for several reasons..." "All ingredients for a successful relocation of the NWCRS to SRS are in place. My office is ready and willing to work closely with you to this end." And the S.C. Congressional Delegation unanimously endorsed locating the NWCRS at SRS, stating, "The objective of the National Defense Authorization Act is to create Complex-21, a facility more compact, less diverse, and less expensive to operate than the complex of today. We feel these objectives will best be achieved in a timely and cost efficient manner at the Savannah River Site." 1

These are but a few of the earlier endorsements of the SRS, and it is quite obvious that the support continues to be strong. As a more recent indication I'd like to read the Resolution from the Aiken City

SCD48

Since moving to Aiken in 1953, I've seen the community support grow. To show that we are not a 'Johnny come lately' when we talk about support, I'd like to share just a few examples of support dating as far back as 1980.

1980 - An Oak Ridge National Laboratory and Oak Ridge Associated Universities poll was positive toward SRS.

1987 - A joint resolution passed by the SC General Assembly stated, "Be it resolved by the Senate, the House of Representatives concurring, that the U.S.Department of Energy is hereby requested to designate its Savannah River Plant as the site for the New Production Reactor."

1988 - A University of South Carolina at Aiken Survey Research Services poll was positive toward SRS. 1

1990 - An editorial from the Aiken Standard Newspaper stated, "While Savannah River has not been free from environmental problems, it has handled them expeditiously and has enjoyed friendly relations with the surrounding communities, which actively support its continued operation. As taxpayers and citizens we believe SRS should occupy a key position in the implementation of Complex 21 (this had to do with the Nuclear Weapons Complex Reconfiguration initiative).

1991 - An article from the Augusta Herald stated, "Nunn joins backers of the new reactor at SRS." Georgia's senior U.S.Senator said that he favors

SCD48

Council on August 10th, 1998 (resolution attached for the record).

In closing I'd just like to say that all we want is the best for our country and we think the best place for the Pit Disassembly and Conversion mission to be successful is the SRS. 1

Thank you,

Fred B. Cavanaugh

SCD48

AIKEN SOUTH CAROLINA

City of Aiken

Post Office Box 1177
Aiken, S.C. 29802

Aiken All-America City 1997

RESOLUTION

SUPPORTING THE PIT DISASSEMBLY AND CONVERSION MISSION
BEING LOCATED AT SAVANNAH RIVER SITE

WHEREAS, the Savannah River Site has demonstrated a continued strong leadership role in this nation's national security since the inception of the site; and

WHEREAS, the professional management team and employees of the Savannah River Site have the proven experience for continuing in this leadership role; and

WHEREAS, the Department of Energy has recognized the importance of and demonstrated their faith in the Savannah River Site by its decisions to locate the MOX and immobilization missions there; and

WHEREAS, the location of the third element of the plutonium disposition mission, pit disassembly and conversion, is now being reviewed by the Department of Energy; and

WHEREAS, the Savannah River site is the only site being considered with the on site experience of processing plutonium and with the necessary infrastructure required for this critical mission;

NOW, THEREFORE BE IT RESOLVED by the Mayor and City Council in meeting duly assembled and by the authority thereof, and on behalf of the citizens of the City of Aiken, that the Department of Energy is urged to select the Savannah River Site for its pit disassembly and conversion mission.

BE IT FURTHER RESOLVED that the citizens of Aiken are encouraged to attend the Department of Energy's public meetings scheduled for Thursday, August 13, 1998, at 1:00 P.M. or 6:00 P.M. in the North Augusta Community Center and to voice their support for locating the pit disassembly and conversion mission at the Savannah River Site.

DONE, RATIFIED AND ADOPTED by the Mayor and City Council of the City of Aiken, South Carolina, on this 10th day of August, 1998.

Fred B. Cavanaugh
Mayor

Michael Maclin
Councilmember

Ben H. Tadlock
Councilmember

Ken M. Pierhal
Councilmember

Lessie B. Price
Councilmember

Beverly Clyburn
Councilmember

Robert Shumpert
Councilmember

City Manager - (803)642-7654 • Finance - (803)642-7600 • Legal/City Attorney - (803)642-7654 • Planning - (803)642-7608
Public Safety - (803)642-7620 • Public Works - (803)642-7610 • Recreation - (803)642-7630 • FAX - (803)642-7646
http://www.aiken.net

SCD48

Augusta Herald 8-13-98

Rally for SRS mission

Today on Page 5A, you can read the Amarillo, Texas, newspaper's call for residents to show up at public hearings to support new missions for the Pantex nuclear weapons plant. Despite what the editorial says, these missions are clearly better suited for the Savannah River Site.

The Department of Energy has already chosen SRS as the preferred site to convert waste plutonium into mixed oxide fuel (MOX) to power commercial nuclear reactors or into a form suitable for disposal in high-level waste cannisters.

The plutonium disposition project, which the Amarillo editorial addresses, goes hand-in-glove with missions the DOE is already recommending for SRS. Locating it in Amarillo might be great for the economy there — but a net loss for national taxpayers who would save millions if SRS hosts all three projects.

The expensive basic infrastructure for this work already exists at the Aiken area plantbut would have to be built from scratch at Pantex.

But, as noted before in this space, politics, not common sense or taxpayer savings, will decide where the pit disassembly project goes.

This is why it's important for people on both sides of the Savannah River to rally behind SRS in DOE-sponsored public hearings slated today at 1 and 6 p.m. at the North Augusta Community Center on the corner of East Buena Vista Avenue and Brookside Drive.

SCD48

DOE PLUTONIUM DISPOSITION
PUBLIC MEETING
August 13, 1998
North Augusta, SC Community Center

Statement by: Teresa H. Haas
Chairperson, Aiken, SC Chamber of Commerce
Board of Directors

- My name is Teresa Haas and I am Chairperson of the Aiken Chamber of Commerce Board of Directors.
- During the public meeting at Pantex, We understand that you heard a great deal of SRS bashing.
- We don't do business that way and prefer to take the high road.
- We'll focus our comments on the reasons why this mission should be located at SRS.
- We are here in behalf of 5 Chambers of Commerce from SC & GA.
- Collectively we represent over 3000 businesses and some 1/2 million people.
- This past April, over 50 individuals and elected officials from our Chambers of Commerce traveled to Washington.
- We were pleased to meet w/Secretary Peña, Deputy Secretary Moler, and other DOE officials to discuss several issues pertaining to the Savannah River Site.
- The Plutonium Disposition Mission, and in particular, the Pit Disassembly and Conversion component, was a primary topic of our discussion with the Secretary.

SCD36

AIKEN CHAMBER OF COMMERCE
TERESA H. HAAS
PAGE 2 OF 2

- As we stated then, we strongly support the location of this mission at SRS. The Board of Directors of these Chambers have passed numerous resolutions supporting the Pit Disassembly and Conversion mission at SRS.

- Our support for this particular mission is based upon several reasons:

  1) SRS' unique expertise and experience in handling plutonium;

  2) SRS' unmatched safety record in the DOE Complex; and,

  3) From a business standpoint, we are highly interested in saving dollars for the taxpayers of this country. 1

- We understand there is a cost savings of at least $60 million by locating Pit Disassembly and Conversion at SRS. By our standards, that's a lot of money.

- Simply stated, SRS has demonstrated its technical and human resource leadership. That expertise combined with unequaled regional support from 2 states is a powerful combination which can benefit DOE in addressing critical, non-proliferation, material disposition, clean-up and national security challenges for our nation.

SCD36

SCD36–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. DOE believes that all the candidate sites are suitable from an operational, community support, and safety standpoint. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Aiken Chamber of Commerce

400 Laurens Street, Northwest • P.O. Box 892 • Aiken, South Carolina 29802

(803) 641-1111 • FAX (803) 641-4174

JUNE MURFF
President

RESOLUTION

WHEREAS the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS plutonium disposition represents one of the most certain future missions of the DOE for the next 20 to 30 years; and

WHEREAS the Department of Energy has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and

WHEREAS the Savannah River Site has produced approximately 40 percent of all US weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public or the environment; and

WHEREAS the Department of Energy in its Record of Decision recognizes the Savannah River Site as "a plutonium competent site with the most modern, state-of-the-art storage and processing facilities...with the only remaining large-scale chemical separation and processing capability in the DOE complex", and 1

WHEREAS the regional community in the Central Savannah River Area (CSRA) of South Carolina and Georgia strongly supports continued plutonium missions for the Department of Energy's Savannah River Site;

NOW BE IT RESOLVED that the Aiken Chamber of Commerce strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

APPROVED this 19th day of February 1997 at Aiken, South Carolina, by the Aiken Chamber of Commerce.

Chairman

President

The Partner Every Business Needs!

SCD83

SCD83–1 **Alternatives**

DOE acknowledges the commentors' support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN CHAMBER OF COMMERCE
JEFF SPEARS
PAGE 1 OF 3

Good afternoon, my name is Jeff Spears and I am here representing the Greater Aiken Chamber of Commerce as its Vice Chairman for Economic Development. Additionally, I am a Senior Vice President with NationsBank with responsibilities in Augusta, Aiken, North Augusta, Barnwell, Allendale, Edgefield, and Orangeburg; in essence all the towns and communities that have supported the mission of SRS for now almost 50 years. As a graduate of the Aiken County Public School System and a resident of this community for nearly 25 years, I have grown to respect the Savannah River Site as a dedicated, well managed, and safe DOE facility that has the respect and confidence of the 450,000 citizens that live in this area. As a businessman traveling throughout the areas boarding SRS and with my recent work with Aiken's Chamber of Commerce, I am also respectful of the economic viability that SRS brings to this region.

I must confess that where I know a lot about banking I fall well short when it comes to standing before you and discussing Pit Disassembly and Conversion of Plutonium. But as a business

SCD35

person and a tax paying citizen of the United States I would like to (make or reiterate) a few important point.

1. It is my understanding that Plutonium Disposition Mission at SRS could save tax payers 1.6 billion in avoided cost verses locating this mission at another DOE facility.

2. Additionally I understand that the third element; Pit Disassembly could save at least 60 million dollars if located at SRS.

3. I have also learned that DOE has acknowledged SRS's history and expertise in handling Plutonium verses that of other DOE sights making SRS the site of chose for all elements of Plutonium Disposition. 1

4. By living here so many years I am also knowledgeable of SRS's safety record and DOE's recognition of SRS as one of their safest sites of all DOE complexes.

5. And last I am sure you are impressed with the community support that both SC and GA has given to SRS for nearly 50 years that will continue with new missions in the future.

So, with cost saving to the US government, historical expertise in

SCD35

SCD35–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. DOE believes that all the candidate sites are suitable from an operational, community support, and safety standpoint. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN CHAMBER OF COMMERCE
JEFF SPEARS
PAGE 3 OF 3

handling Plutonium, an unprecedented safety record at SRS, and the overwhelming community support for past and future missions, I feel DOE has a relatively easy chose in selecting SRS as the recipient of the third element of Plutonium Disposition being Pit Disassembly and Conversion. 1

Thank you for your time.

SCD35

AIKEN TECHNICAL COLLEGE
accepts the challenge

Aiken County Commission for Technical Education
Post Office Box 696 Aiken, South Carolina 29802

RESOLUTION IN SUPPORT OF THE PLUTONIUM MISSION AT THE SAVANNAH RIVER SITE

WHEREAS, the Department of Energy has already chosen the Savannah River Site as the site for MOX Fuel Fabrication and Immobilization because of the site's capabilities as the Department Of Energy's only operating plutonium processing site; and,

WHEREAS, plutonium disposition represents one of the most certain future missions of the U.S. Department of Energy for the next 20 to 30 years; and,

WHEREAS, the safe production and handling of plutonium has been a hallmark of the work performed at the Savannah River Site for many years; and,

WHEREAS, consolidating all three of the new plutonium disposition facilities, including the Pit Disassembly and Conversion Facility, at the Savannah River Site would save at least $1.6 billion, compared to establishing and maintaining the required capabilities at other sites; and,

WHEREAS, the Savannah River Site has produced approximately 40 percent of all U.S. weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public, or the environment, and, 1

WHEREAS, no site in the Department of Energy Complex can claim a higher level of productivity or a more outstanding safety record than the Savannah River Site;

THEN BE IT RESOLVED: that the Aiken County Commission for Technical and Comprehensive Education strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in Mixed Oxide Fuel Fabrication, Immobilization, and Pit Disassembly and Conversion; and,

BE IT FURTHER RESOLVED: that the Aiken County Commission for Technical and Comprehensive Education will commit its resources through Aiken Technical College to the successful development of a skilled workforce and a community capable of supporting this important mission for the nation.

APPROVED this 10th day of August 1998 at Aiken, South Carolina, by the Aiken County Commission for Technical and Comprehensive Education.

Joe W. DeVore, Chairman

Rosemary English, Secretary

SCD79

SCD79–1 **Alternatives**

DOE acknowledges the commentors' support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN COUNTY COMMISSION ON HIGHER EDUCATION
GASPER L. TOOLE, III
PAGE 1 OF 1

AIKEN COUNTY COMMISSION ON HIGHER EDUCATION

RESOLUTION WITH REGARD TO PLUTONIUM MISSION AT THE SAVANNAH RIVER SITE

WHEREAS, the Savannah River Site has been an integral part of the nation's nuclear defense mission since it's inception in 1954; and,

WHEREAS, the safe production and handling of plutonium has been a hallmark of the work performed at SRS for many years; and,

WHEREAS, the proven plutonium-handling experience of the professionals at the Savannah River Site is unmatched by any other site under consideration for this mission; and,

WHEREAS, the decision to place the "Pit Disassembly and Conversion" Mission at the Savannah River Site can save the Federal budget as much as $1.6 billion as a result of existing facilities and infrastructure; and, 1

WHEREAS, no site in the Department of Energy Complex can claim a higher level of productivity or a more outstanding safety record than the Savannah River Site;

THEN BE IT RESOLVED: that the Aiken County Commission for Higher Education hereby endorses the addition of the "Pit Disassembly and Conversion" Mission to the MOX Fuel Facility and Plutonium Immobilization Mission approved for the Savannah River Site; and,

BE IT FURTHER RESOLVED: that the Aiken County Commission will commit its resources through the University of South Carolina Aiken campus to the successful development of a skilled workforce and a community capable of supporting this important mission for the nation.

Gasper L. Toole, III
Chairman

August 13, 1998
Date

SCD92

SCD92–1 **Alternatives**

DOE acknowledges the commentors' support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Comments for DOE

I am Ronnie Young, Chairman Aiken County Council. On behalf of the Aiken County Council I would like to offer a few comments. I am here as someone who was born and raised right here in Aiken County. I am also here because so many of my neighbors here in Aiken County work at the Savannnah River site. In fact, more SRS workers live in Aiken County than any where else.

I've watched the developments at the Savannah River Site for my entire life (well, its entire life). I've learned that the people who work at the Site are dedicated to the safe operation of the facility. I guess knowing the people so well has taught me to respect the importance of having the right people taking care of such a vital mission. These people have a long history of handling plutonium and this experience can not be replicated without an immense investment of time and money. 1

Why would the DOE consider another facility when the Savannah River Site is prepared to take on the Pit Disassembly and Conversion mission.This preparation has been taking place for nearly fifty years.

On behalf of the Aiken County Council, I would like to re-enter into the record the resolution passed by our Council on March 5, 1997 in support of the plutonium disposition missions at the Savannah River Site.

Ronnie Young
Chairman
Aiken County Council

SCD12

SCD12–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN COUNTY COUNCIL
HONORABLE RONNIE YOUNG
PAGE 2 OF 2

Sponsor(s) : County Council
Committee Referral : N/A
Committee Consideration Date: N/A
Committee Recommendation : N/A
Effective Date : March 5, 1997

RESOLUTION NO. 97-3-52

COUNCIL ADMINISTRATOR FORM OF GOVERNMENT FOR AIKEN COUNTY

(To Support and Endorse the Designation of the Savannah River Site as the Lead Facility for the Management and Disposition of Plutonium Within the Department of Energy.)

WHEREAS:

1. The handling and processing of excess weapons plutonium is of grave concern to the national security of the United States; and

2. Plutonium disposition represents one of the most certain future missions of the Department of Energy for the future; and

3. The Department of Energy has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and

4. The Department of Energy in its Record of Decision recognizes the Savannah River Site as "a plutonium competent site with the most modern, state-of-the-art storage and processing facilities ... with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and

5. Aiken County has steadfastly supported the Savannah River Site and Department of Energy during its long association.

NOW THEREFORE BE IT RESOLVED BY THE AIKEN COUNTY COUNCIL THAT:

1. The Aiken County Council strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

2. The Aiken County Council strongly encourages the Department of Energy to designate a facility for the permanent disposition for the nuclear waste materials to enhance the security and final disposition of these materials.

Adopted at the regular meeting of Aiken County Council on March 4, 1997.

ATTEST:

Susan Pate, Council Clerk

SIGNED:

Ronnie Young, Chairman

IMPACT STATEMENT:

RES0220/AGNDA

COUNCIL VOTE: Unanimous

SCD12

AIKEN COUNTY, SOUTH CAROLINA LEGISLATIVE DELEGATION
HONORABLE THOMAS BECK ET AL.
PAGE 1 OF 1

A RESOLUTION

Whereas, the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

Whereas, plutonium disposition represents one of the most certain future missions of the Department of Energy for the next twenty to thirty years; and

Whereas, the Department of Energy has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and

Whereas, the Department of Energy's Surplus Fissile Materials Disposition Program will result in the production of qualified disposal forms and the eventual removal of these materials from the State of South Carolina; and

Whereas, the Savannah River Site has produced approximately forty percent of all United States weapons grade plutonium over the last forty-five years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public, or the environment; and 1

Whereas, the Department of Energy in its Record of Decision recognizes the Savannah River Site as "a plutonium competent site with the most modern, state-of-the-art storage and processing facilities...with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and

Whereas, the regional community in the Central Savannah River Area (CSRA) of South Carolina and Georgia strongly supports continued plutonium missions for the Department of Energy's Savannah River Site. Now, therefore,

Be it resolved that the Aiken County, South Carolina Legislative Delegation strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

Representative Thomas Beck

Representative Roland Smith

Representative William Clyburn

Senator Thomas Moore

Representative Rudolph Mason

Senator W. Greg Ryberg

Representative Charles Sharpe

SCD82

SCD82–1 **Alternatives**

DOE acknowledges the Senators' and Representatives' support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN REGIONAL MEDICAL CENTERS
RICHARD H. SATCHER
PAGE 1 OF 1

Aiken Regional
MEDICAL CENTERS
The Health Choice

As Chief Executive Officer of Aiken Regional Medical Centers in Aiken, South Carolina I would like to extend my full support for the Pit Disassembly and Conversion at the Savannah River Site.

Obtaining the third element of the plutonium disposition mission is a winning proposition for both the Department of Energy and the CSRA (Central Savannah River Area). By choosing Savannah River Site DOE could save US Taxpayers approximately $1.6 billion based on avoided costs of new structures and equipment. Savannah River Site has demonstrated competency in processing plutonium and have in place the necessary infrastructure for the processing along with comprehensive medical surveillance programs. 1

As a business person I see the importance of the Savannah River Site to the economic vitality of our area. Job stability along with the creation of new jobs is the backbone of any healthy community. Savannah River Site employees have proven over the years their commitment to safety and to the community at large. I have been a lifelong resident of the area and have no reservations in bringing the Pit Disassembly and Conversion to our region.

RICHARD H. SATCHER
8/13/98

202 University Parkway • P.O. Drawer 1117 • Aiken, South Carolina 29802-1117
Telephone (803) 641-5000 • FAX (803) 641-5179

SCD06

SCD06–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

RESOLUTION

WHEREAS the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS plutonium represents a significant energy source for the United States when used as fuel in nuclear reactors for the production of electricity; and

WHEREAS plutonium disposition represents one of the most certain future missions of the Department of Energy for the next 20 to 30 years; and

WHEREAS the Savannah River Site has produced approximately 40 percent of all U.S. weapons-grade plutonium over the past 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public or the environment, and 1

WHEREAS Allendale County of South Carolina strongly supports continued plutonium missions for the Department of Energy's Savannah River Site;

NOW BE IT RESOLVED that the Allendale County endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

APPROVED this 12th day of February 1997, by the Allendale County Council.

J. W. Wall Jr.
Chairman

SCD86

SCD86–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

ALLENDALE COUNTY CHAMBER OF COMMERCE
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Allendale County Chamber of Commerce
ADDRESS: PO. Box 517 Allendale, SC. 29810
TELEPHONE: (803) 584-0082
E-MAIL:

The Allendale County Chamber of Commerce supports The disposition of Surplus Plutonium being managed By Savannah River Site. We feel this Could have a positive Economic impact on this area. 1

FD202

FD202–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMERICAN NUCLEAR SOCIETY-SAVANNAH RIVER SECTION
JOHN DEWES
PAGE 1 OF 1

AMERICAN NUCLEAR SOCIETY - SAVANNAH RIVER SECTION

STATEMENT REGARDING PLUTONIUM DISPOSITION

ENVIRONMENTAL IMPACT STATEMENT

My name is John Dewes and I am representing the Savannah River Section of the American Nuclear Society. Our local section consists of some 800 scientists and engineers in the Central Savannah River Area. On behalf of the Section, I would like to make a statement concerning Plutonium Disposition Environmental Impact Statement.

We strongly support the selection of the Savannah River Site for the pit disassembly and conversion mission. It is the only operating site in the DOE complex that has the supporting infrastructure in place to deal with this mission, including the safe management of wastes generated by the process. The site has been safely handling and processing plutonium for many years, and locating these missions at the same site will minimize future decommissioning costs. The biggest assets of the site, however, are the capable, experienced personnel who have proven that they can handle these materials in a safe manner. 1

We are encouraged by the progress made by the Department of Energy towards fulfilling the Plutonium Disposition Mission, and would like to see similar progress made on the ultimate disposition of wastes generated by these processes, as well as taking responsibility for commercial spent nuclear fuel. 2

Thank you for the opportunity to provide comment on this important issue.

SCD89

SCD89–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SCD89–2 **Repositories**

After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a potential geologic repository. This SPD EIS, for the purposes of analysis, assumes that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

ANONYMOUS
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional)
ADDRESS:
TELEPHONE: ( )
E-MAIL:

Given the information contained within the Summary Document of the Draft EIS, I cannot understand why DOE would entertain the possibility of selecting any site other than SRS for plutonium disposition alternatives. SRS is clearly the most cost effective, the most protective of the environment and human health and the most safe facility within the DOE complex for performing this work. Pit disassembly and conversion operations should be located at SRS. 1

SCD69

SCD69–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

United States Department of Energy

Comment Form

NAME: (Optional)
ADDRESS:
TELEPHONE: ( )
E-MAIL:

Pantex does not currently handle plutonium pondex. They do not have the facilities, processes, safety procedures, etc to do this safely. EIS does. 1

SCD72

SCD72–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BALSER, RICHARD
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) RICHARD BALSER
ADDRESS: 704-23F, AIKEN, SC
TELEPHONE: (803) 952-4257
E-MAIL: RICHARD.BALSER@SRS.GOV

SUMMARY. PANTEX DOES NOT APPEAR TO HAVE AN ADEQUATE INFRASTRUCTURE FOR CONTAMINATION CONTROL TO PERFORM PIT DISASSEMBLY AND CONVERSION.

I AM CURRENTLY INVOLVED IN OCCURRENCE REPORTING AT SRS. I REVIEWED OCCURRENCE REPORTING STATISTICS FOR THE PANTEX PLANT. THERE WAS A CONSPICUOUS ABSENCE OF REPORTS OF CONTAMINATION CASES AT PANTEX. ONE PANTEX REPORT IN 1993 DID REPORT A CONTAMINATION CASE. ON READING THE REPORT, I FOUND THAT THEY (PANTEX) WERE DISPOSABLE COVERALLS FOR PERSONNEL CONTAMINATION CONTROL. AN ADDITIONAL BURDEN TO DEVELOP RADIOLOGICAL CONTROL PROCEDURES, CONTAMINATED LAUNDRY PROCESS, EXPERIENCED RADIOLOGICAL CONTROLS PERSONNEL, AND ASSOCIATED INFRASTRUCTURE WOULD BE NECESSARY AT PANTEX. THE SAVANNAH RIVER SITE HAS THE EXPERIENCE AND INFRASTRUCTURE TO ADEQUATELY CONTROL CONTAMINATION THAT WILL BE AN INTEGRAL PART OF THE PLUTONIUM PIT DISASSEMBLY AND CONVERSION. ALTHOUGH NOT IMPOSSIBLE, IT WOULD BE DIFFICULT TO ESTABLISH BEACH PHASES FACILITIES AND SUPPORT TO PROVIDE PROTECTION TO THE WORKERS AND ENVIRONMENT COMPARABLE TO WHAT ALREADY EXISTS AT SRS. 1

SCD90

SCD90–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

All of the DOE candidate sites, including Pantex, are considered suitable from a safety and conduct of operations standpoint and all sites would comply with applicable Federal, State, and local laws and regulations governing radiological and hazardous chemical releases. Therefore, Pantex may need to modify or develop appropriate procedures and plans to ensure protection of the workers, public, and environment should a proposed surplus plutonium disposition facility be sited there since the site's current operations do not include plutonium processing. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BAMBERG COUNTY COUNCIL
HONORABLE JASPER VARN
PAGE 1 OF 2

THANK YOU, MR. MODERATOR

MY NAME IS JASPER VARN AND I AM THE CHAIRMAN OF THE BAMBERG COUNTY COUNCIL AND I ALSO SERVE AS VICE-CHAIRMAN OF THE TRI-COUNTY ALLIANCE REPRESENTING THE THREE COUNTY REGION OF ALLENDALE, BARNWELL, AND BAMBERG.

MY PURPOSE TODAY, IS TO SPEAK ON BEHALF OF THE 1500 PEOPLE THAT LIVE IN OUR THREE COUNTY AREA AND WORK AT THE SAVANNAH RIVER SITE. AND TO ALSO SPEAK ON BEHALF OF THE MORE THAN 500 PEOPLE WHO HAVE LOST THEIR JOBS FROM DOWNSIZING AND CHANGING MISSIONS IN WHICH THE SITE HAS UNDERGONE.

THESE PEOPLE ARE SOME OF THE MOST DEDICATED AND LOYAL PEOPLE I HAVE EVER KNOWN. THEY HAVE SERVED THEIR COUNTRY DURING THE COLD WAR AND PLAYED A TREMENDOUSLY IMPORTANT ROLE IN GETTING TO THE POINT WE ARE TODAY. 1

IN AN EVER-CHANGING ATMOSPHERE, THE SITE AND ITS PEOPLE

SCD40

SCD40–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BAMBERG COUNTY COUNCIL
HONORABLE JASPER VARN
PAGE 2 OF 2

HAVE ADJUSTED AND PERFORMED.

THE PROSPECT OF NEW MISSIONS COMING TO THE SITE IS A WELCOME CHANGE FROM HAVING JOBS DRY UP. THE NEW PLUTONIUM OPPORTUNITIES MEAN A BRIGHTER FUTURE FOR THE SRS EMPLOYEES WHO HAVE DONE THIS WORK FOR SO MANY YEARS.

I BELIEVE THE DEPARTMENT OF ENERGY AND THE ADMINISTRATION WILL REWARD THIS SITE AND THESE PEOPLE BY ASSIGNING THIS MOST IMPORTANT MISSION TO SOUTH CAROLINA. 1

THE SAVANNAH RIVER SITE HAS THE INFRASTRUCTURE, IT HAS THE SUPPORT OF THE COMMUNITY, IT HAS THE EXPERIENCE, AND MOST IMPORTANTLY, IT HAS THE PEOPLE.

THANK YOU.

SCD40

BARNWELL COUNTY CHAMBER OF COMMERCE
DENNIS HUTTO
PAGE 1 OF 2

THANK YOU MR. MODERATOR

MY NAME IS DENNIS HUTTO, AND I AM THE PRESIDENT OF THE BARNWELL COUNTY CHAMBER OF COMMERCE.

I, TOO WOULD LIKE TO THANK YOU FOR THIS OPPORTUNITY TO SPEAK ON BEHALF OF THE SAVANNAH RIVER SITE AND THE FINE PEOPLE WHO WORK THERE.

AS HAS BEEN POINTED OUT, THERE IS NO QUESTION AS TO WHERE THE ENTIRE PLUTONIUM DISPOSITION MISSION SHOULD BE AND WHO SHOULD MANAGE IT.

THE QUESTION SEEMS TO BE "WILL THE SECRETARY OF ENERGY MAKE THE DECISION ON PIT CONVERSION LOCATION BASED ON TECHNICAL CRITERIA OR POLITICAL EXPEDIENCY?" 1

WE ALL KNOW, TEXAS HAS A BIGGER CONGRESSIONAL DELEGATION, WE ALL KNOW, TEXAS HAS MORE ELECTORAL VOTES, BUT WE ALSO KNOW, TEXAS DOES NOT HAVE THE INFRASTRUCTURE OR EXPERTISE THAT SOUTH CAROLINA HAS IN HANDLING, STORING, AND PROCESSING PLUTONIUM.

SCD38

SCD38–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BARNWELL COUNTY CHAMBER OF COMMERCE
DENNIS HUTTO
PAGE 2 OF 2

LAST YEAR, YOU SAID THAT THE SAVANNAH RIVER SITE WAS "A PLUTONIUM-COMPETENT SITE WITH THE MOST MODERN, STATE-OF-THE-ART STORAGE AND PROCESSING FACILITIES" IN THE DEPARTMENT'S COMPLEX. IF THAT WAS TRUE THEN,, THEN IT IS TRUE NOW.

BARNWELL COUNTY, ALLENDALE COUNTY, BAMBERG COUNTY, AND THE REST OF THE REGION HAVE SUPPORTED THE SITE FOREVER. AND YOU KNOW THE ECONOMIC IMPACT THE SITE HAS ON OUR REGION. AND YES, YOU KNOW WE WANT THE MISSION BECAUSE IT MEANS MORE JOBS FOR OUR AREA. BUT IT IS MUCH BIGGER THAN THAT.....THIS IS A DECISION THAT SHOULD BE BASED ON EXPERIENCE, ON COST TO TAXPAYERS, ON EFFICIENCY, ON SITE CAPABILITIES, AND ON WHO CAN DO THE JOB SAFELY. 1

IF THE SECRETARY WILL MAKE THE DECISIONS CONCERNING PLUTONIUM BASED ON THESE CRITERIA, AND LEAVE POLITICS TO THE POLITICIANS, THEN THE SRS COMMUNITIES AND THE NATION ARE BETTER OFF.

THANK YOU!!

SCD38

RESOLUTION

WHEREAS the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS plutonium represents a significant energy source for the United States when used as fuel in nuclear reactors for the production of electricity; and

WHEREAS plutonium disposition represents one of the most certain future missions of the Department of Energy for the next 20 to 30 years; and

WHEREAS the Savannah River Site has produced approximately 40 percent of all U.S. weapons-grade plutonium over the past 46 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public or the environment, and 1

WHEREAS Barnwell County of South Carolina strongly supports continued plutonium missions for the Department of Energy's Savannah River Site;

NOW BE IT RESOLVED that the Barnwell County endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

APPROVED this 12th day of February 1997, by the Barnwell County Council.

Harold Buchman
Chairman

SCD85

SCD85–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BARNWELL COUNTY COUNCIL
HONORABLE CLYDE T. REED
PAGE 1 OF 3

(1)

THANK YOU MR. MODERATOR, DOE, ELECTED & APPOINTED OFFICALS
WELL WISHERS

LET ME FIRST THANK YOU FOR THE OPPORTUNITY TO SPEAK ON THIS ISSUE AND EXPRESS THE VIEWS OF THE BARNWELL COUNTY COUNCIL.

IT SEEMS WE COME TO THESE MEETINGS SEVERAL TIMES A YEAR TO ASK THE DEPARTMENT OF ENERGY TO DO SOMETHING, ~~AND HERE WE ARE AGAIN~~!!!

THIS TIME WE ARE TALKING ABOUT LOCATING ALL THE PLUTONIUM DISPOSITION MISSIONS WITHIN THE DOE COMPLEX.

THE DEPARTMENT HAS ALREADY DETERMINED THE SAVANNAH RIVER SITE WILL PERFORM THE VITRIFICATION COMPONENT. THE SECRETARY HAS ALREADY ANNOUNCED THAT IF A MOX FUEL FACILITY IS BUILT, IT WILL BE BUILT AT SAVANNAH RIVER. 1

THE ONLY QUESTION LEFT, IS WHERE WILL THE PIT DISASSEMBLY AND CONVERSION BE DONE?

THE LOCATION CHOICE IS BETWEEN TEXAS AND SOUTH CAROLINA.
IT APPEARS
AND NOW THE DECISION FOR THIS COMPONENT HAS BROKEN

SCD39

SCD39–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

(2)

DOWN TO A POLITICAL ONE.

WHO HAS THE MOST RESOURCES TO PERSUADE CONGRESS? WHO HAS THE MOST INFLUENCE WITH THE DEPARTMENT OF ENERGY?

~~FOR ONCE I WOULD LIKE TO SEE THE DEPARTMENT OF ENERGY MAKE A~~ SO IF DECISION BASED ON TECHNICAL MERIT, AND IN THE BEST INTEREST OF THE NATION AND ITS TAXPAYERS. SRP

AND IF THAT SHOULD HAPPEN, YOU KNOW THE SAVANNAH RIVER SITE IS THE ONLY CHOICE FOR ALL PLUTONIUM RELATED MISSIONS, AS WELL AS, MANY OTHERS.

THERE IS NO SAFER, MORE EFFICIENT, AND KNOWLEDABLE SITE IN THE NATION. THERE IS NO other SITE THAT ENJOYS THE COMMUNITY SUPPORT THAT SRS HAS!

1

~~IF THIS DECISION WAS PURELY A LOGICAL DECISION, WE~~ WOULDN'T HAVE HAD TO ~~BE HERE TODAY~~.

~~ALTHOUGH, I ENJOY SEEING OUR GOOD FRIENDS FROM~~ AIKEN AND AUGUSTA, ~~I CERTAINLY COULD HAVE FOUND~~ SOMETHING ELSE TO ~~DO~~ BESIDES RIDE 60 MILES ~~TO BE HERE.~~

SCD39

(3)

AFTER TODAY THE DECISION IS IN YOUR LAP.

YOU'VE HEARD FROM THE COMMUNITIES, YOU KNOW THE SITE'S CAPABILITIES.

LET'S HAVE AN ANNOUNCEMENT!

1

Again THANK YOU for this opportunity

NAME CLYDE T. REED (Barnwell County Council Chairman)
ADDRESS P.O. BOX 1238
BARNWELL, S.C. 29812
PHONE 803-541-0023

SCD39

BARNWELL SCHOOL DISTRICT 45
JAMES E. BENSON ET AL.
PAGE 1 OF 2

BARNWELL SCHOOL DISTRICT 45
James E. Benson
Superintendent

2008 Hagood Avenue
Barnwell, S.C. 29812
(803) 541-1300 • FAX 541-1348
E-Mail: Barnwell 45@barnwellsc.com

September 14, 1998

Ms. Laura Holgate
Director, Office of Fissile Materials Disposition
U. S. Department of Energy
1000 Independence Avenue
Washington, DC 20585

Dear Ms. Holgate:

The Barnwell School District 45 Board of Trustees unanimously adopted a Resolution on August 27, 1998, supporting the location of the pit assembly and conversion mission at Savannah River Site. We have sent you the Resolution.

During the 1997-98 school year, approximately 20% of our students had a parent or guardian employed at Savannah River Site. These parents and guardians are active in numerous efforts which benefit our students. They are members of the Scarlet Knights Band Booster Club and the Barnwell Warhorse Club, organizations which raise thousands of dollars annually for the district's band and athletic programs. Many members of the Barnwell Elementary School PTO are employees at SRS.

In addition to being dedicated supporters of their local schools in Barnwell District 45, the SRS parents are hard working, loyal employees. Over the years, they have continuously met safety requirements and demands at the Savannah River facility. Today, they stand ready to meet any challenges which come with the selection of SRS as the location of any new missions, including the vital pit dissassembly and conversation mission.

Finally, as stated in the enclosed Resolution, the Barnwell School District 45 Board of Trustees encourages the Department of Energy to select SRS as the facility for the new missions. Hundreds of Barnwell School District 45 graduates have been outstanding employees at SRS for more than four decades. Hopefully, the Department of Energy's decision will assure that students presently being educated in Barnwell School District 45 will be given an opportunity to be a part of the highly skilled work force needed for new missions at SRS. Barnwell School District 45 is working hard to help prepare the next generation of outstanding SRS employees. 1

Sincerely,

James E. Benson,
Superintendent

Valenda D. Black,
SRS Liaison

Encl.

FULLY ACCREDITED BY SOUTHERN ASSOCIATION OF COLLEGES AND SCHOOLS

MD287

MD287–1 **Alternatives**

DOE acknowledges the commentors' support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BARNWELL SCHOOL DISTRICT 45
JAMES E. BENSON ET AL.
PAGE 2 OF 2

RESOLUTION
Board of Trustees
Barnwell School District 45
August 27, 1998

WHEREAS, the Savannah River Site is being considered by the Department of Energy as the location for the vital pit disassembly and conversion mission, and

WHEREAS, the Department of Energy has previously expressed confidence in Savannah River Site by assigning the MOX and immobilization missions to the Site; and

WHEREAS, highly skilled work force and experienced employees are already in place at Savannah River Site and trained to perform duties and responsibilities necessary for the pit disassembly and conversion mission; and

WHEREAS, selection of Savannah River Site for all parts of the plutonium disposition mission, including pit disassembly and conversion, can save taxpayers at least 1.6 billion dollars because structures and equipment required for the mission already exist at Savannah River Site; and 1

WHEREAS, Savannah River Site employees have consistently met strict safety requirements for over four decades, thus establishing a stellar record of safe operations at the Site, and

WHEREAS, location of the pit disassembly and conversion mission at Savannah River Site would create hundreds of employment opportunities for local citizens, including Barnwell High School graduates,

BE IT THEREFORE RESOLVED that we, the Trustees of Barnwell School District 45, do hereby totally and wholeheartedly support the location of the pit disassembly and conversion mission at Savannah River Site.

Donald Kitt, Board Chair

Reed Swann, Member

Sue Black, Vice-Chair

John Young, Member

James McCormack, Clerk

James E. Benson, Superintendent

MD287

BURT, CHARLES
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) CHARLES BURT
ADDRESS: 3047 MAPLEWOOD DR N. AUGUSTA S.C 29841
TELEPHONE: (803) 279/726
E-MAIL: CHARLES.BURT@SRS.GOV

SRS HAS the INFRASTRUCTURE Community + legislative support FOR the ENTIRE PLUTONIUM STABILIZATION MISSION. Sending any piece of this WORK to PANTEX or any other site is a MISTAKE in cost effectiveness and efficiency of operations. 1

SCD26

SCD26–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

CITIZENS FOR NUCLEAR TECHNOLOGY AWARENESS
MICHAEL BUTLER
PAGE 1 OF 14

Citizens for Nuclear Technology Awareness

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Executive Director
Michael Butler

2711 Middleburg Drive
Suite 212
Columbia, SC 29204

1-800-299-CNTA
Fax 803/779-0201

www.know-nukes.org

August 11, 1998

Ms. Laura Holgate
Director, Office of Fissile Materials Disposition
U.S. Department of Energy
1000 Independence Ave
Washington, DC 20585

Dear Ms. Holgate:

Citizens for Nuclear Technology Awareness (CNTA) is an organization dedicated to creating greater public awareness of nuclear technology issues and supporting the vital activities of the Savannah River Site (SRS). Our membership consists of current and former SRS employees as well as interested members of the community at large.

Attached to this letter are questions raised by our general membership about inadequacies of the Draft Surplus Plutonium Disposition EIS. While they deal with a wide range of issues, our primary concern lies with the consideration of locating a plutonium processing capability at Pantex where no such mission exists today.

Plutonium processing is a highly specialized technology with unique skill, safety, material accountability and waste management requirements--none of which are in place at Pantex. In addition, if located at Pantex, such processing places extensive clean-up, decontamination and decommissioning demands on a site where those expensive obligations don't currently exist. These issues are not adequately addressed in your current draft which appears to run counter to the conclusions reached in your similar 1996 EIS is for Stockpile Stewardship & Management which states: 1

"Plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium into sites without current plutonium capabilities." 2

Unlike Pantex, SRS is a site with existing infrastructure and worker skill base to meet those obligations efficiently and effectively. The men and women of SRS have safely met the requirements of this complex processing arena for more than four decades.

SCD24

SCD24–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SCD24–2 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

With its unrivaled history of safe operations, environmental stewardship, technological accomplishment and community support, SRS deserves your fair consideration of the issues and questions CNTA has submitted. If that is done, we are certain that SRS will be your site of choice for all three important missions analyzed in this EIS. 2

Sincerely,

Michael Butler
Executive Director

SCD24

CITIZENS FOR NUCLEAR TECHNOLOGY AWARENESS
MICHAEL BUTLER
PAGE 3 OF 14

Citizens for Nuclear Technology Awareness
Additional Questions the Surplus Plutonium Disposition EIS

Plutonium Missions/Plutonium Sites/Plutonium Infrastructure

1. In 1996 DOE decided that Pantex was not suitable for a plutonium mission because "plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current capabilities." (Stockpile Stewardship EIS). What has changed? Why is DOE considering abandoning this policy? 3

2. DOE explains that its preference for immobilization at SRS "complements existing missions and takes advantage of existing infrastructure and staff expertise." (Page S-9). In the June 23, 1998 MOX announcement, DOE said its preference for MOX at SRS was because this mission "complements existing missions and takes advantage of existing infrastructure and staff expertise," and that Pantex "does not offer a comparable infrastructure including waste management." What is different about the plutonium processing required for the pit disassembly and conversion mission that makes Pantex equally preferred? What existing missions at Pantex are complementary? What existing infrastructure and staff expertise can be applied to pit disassembly and conversion? The Cost Report identifies significant inadequacies in the Pantex infrastructure. 4

3. DOE is certainly very responsive to some of the public. "During the scoping process, the comment was made that Pantex should be considered for the pit conversion facility," and three options were added. The EIS claims such comments were screened against three criteria, one of which was infrastructure cost. Please explain how Pantex, with no plutonium infrastructure, could pass this screen. Please provide evidence of a "public" demand to make Pantex a new plutonium processing site. 5

Pit Storage, Transportation, and Safety

4. In the 1997 PEIS Record of Decision, DOE said that it would store surplus pits awaiting disposition in upgraded facilities at Zone 12 at Pantex by 2004. What is the status of that program? Will it be completed on schedule? Since all the surplus pits will have to be packaged and shipped from their current temporary storage in Zone 4 to these upgraded facilities in Zone 12, then moved back again to a pit disassembly facility located in Zone 4, wouldn't there be less cost and exposure to move them once directly to SRS? 6

SCD24

SCD24–3 **DOE Policy**

The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) (DOE/EIS-0236, September 1996) states that the pit fabrication mission would not be introduced into a site that does not have an existing plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities. The SSM PEIS states further that an important element of the site selection strategy is to maximize the use of existing infrastructure and facilities as the nuclear weapons complex becomes smaller and more efficient in the 21st century; thus, no new facilities were to be built to accommodate stockpile management missions. Accordingly, DOE considered as reasonable only those sites with existing infrastructure capable of supporting a pit fabrication mission. Although Pantex has the infrastructure to carry out its current weapons assembly and disassembly mission and nonintrusive pit reuse program, it was not considered a viable alternative for the pit fabrication mission because it did not possess sufficient capability and infrastructure to meet the SSM PEIS siting assumption stated above. Among the operations that were considered in developing siting alternatives for pit fabrication in the SSM PEIS were plutonium foundry and mechanical processes, including casting, shaping, machining, and bonding; a plutonium-processing capability for extracting and purifying plutonium to a reusable form either from pits or residues; and assembly operations involving seal welding and postassembly processing.

When comparing the site selection strategy for pit disassembly and conversion with that used for the pit fabrication mission, the siting criteria in the SSM PEIS have little or no bearing on siting criteria used in this SPD EIS. Pit disassembly and conversion do not require the foundry and mechanical processes discussed in the SSM PEIS and can be accomplished in a stand-alone facility. Also, the SSM PEIS siting assumptions include a requirement to use existing facilities, whereas, the pit conversion facility would be a new structure no matter where it is located.

SCD24–4 **Alternatives**

The initial preference for Pantex and SRS as sites for the pit conversion facility was based on a determination by DOE that the differences in environmental impacts were modest, and thus did not warrant the preference of one site over the other. Existing infrastructure that supported placement of the pit conversion facility at Pantex included security, staff expertise, and the presence of the pits that need to be dismantled. Costs for all required infrastructure were estimated, and even with the additional waste management infrastructure support needed at Pantex, the cost differences were not considered significant.

As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

SCD24–5 **Alternatives**

Pantex was identified as a candidate site for both the pit conversion and MOX facilities in the NOI. The alternatives that were added after the scoping process to include Pantex as a candidate site for pit conversion were associated with the immobilization-only options; Pantex had already been identified as a candidate site for the pit conversion facility for a number of the hybrid alternatives. As discussed in Section 2.3.1, these options were added after DOE confirmed that they met all the screening criteria.

SCD24–6 **Storage and Disposition PEIS and ROD**

DOE acknowledges the commentor's concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This

document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decisions to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined; e.g., whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

5. Locating pit disassembly and conversion at Pantex could be viewed from a safety perspective in the following way:
   - DOE is proposing to convert sealed plutonium metallic components into a large quantity of dispersible plutonium oxide, then store it directly in the flight path of the Amarillo airport in a facility near bunkers of high explosives and nuclear warheads.
   - Then DOE must ship a dispersible form of plutonium in quantities far larger than has ever been shipped before.

   Please explain the logic of this proposal from a safety perspective. 7

6. The EIS transportation data show a significant transportation safety advantage and essentially no more total shipping by co-locating all three disposition programs at SRS. Since the only explanation given for adding Pantex to the program as a processing site was because the pits were there and that might mean a transportation advantage for this option, isn't there now reason to eliminate Pantex, especially since it has no history of plutonium work? 8

7. DOE's Environmental Management Division has stated that they expect to save over a billion dollars by accelerating shipment of non-pit plutonium from Hanford and Rocky Flats to SRS for disposition. If it is cost effective for EM to expedite the movement of that plutonium, then isn't it cost effective for DOE to accelerate the shipments of pits from Pantex? Particularly considering the major upgrades required at Pantex for safe storage if the pits are not promptly moved. 9

EIS Inadequacies

8. Appendix N. Plutonium Polishing, shows that an aqueous process can purify plutonium and produce plutonium oxide with very little waste. Since dissolving plutonium metal is easier than dissolving plutonium oxide, it stands to reason that direct dissolving of pits is a reasonable alternative. Where is the alternative of dissolving pits compared and assessed versus the proposed dry process of pit conversion? 10

9. The Nuclear Weapons and Material Monitor reported that there was an Appendix B which evaluated an aqueous alternative for pit conversion and concluded that it could be done faster and used proven technology. Where is this alternative in the draft? 11

10. Please provide supporting data for the claim that the proposed dry process for pit conversion produces fewer wastes. This is truly puzzling. There is no data in the EIS to support this claim. 12

11. A recent amendment to the MOX RFP says DOE will pay the delay cost associated with failure to deliver acceptable PuO_2 on schedule. Was this requested by the potential vendors because of DOE's plan to use ARIES – produced oxide, and their concern as to its acceptability? 13

SCD24

SCD24–7 **Human Health Risk**

DOE acknowledges the commentor's concern about the safety of locating and operating a pit conversion facility at Pantex.

In response to public concerns, a number of actions (see Appendix K.1.5.1) have been taken to reduce the risk of an aircraft crash at Pantex. The frequency of a crash into a pit conversion facility vault containing plutonium powder (plutonium dioxide) is less than 1 in 10 million per year. According to conservative calculations (see Table K–12), this "beyond-extremely-unlikely" accident (estimated frequency: lower than 1 in 1 million per year) would induce 4.5 LCFs in the population within 80 km (50 mi) of the site.

The impacts of explosives and the associated release of plutonium powder into the environment have also been evaluated (Appendix K.1.5.2.1). An explosion would be "unlikely" (estimated frequency: 1 in 10,000 to 1 in 100 per year). Conservative calculations (see Table K–12) indicate that this accident would induce only 0.00011 LCF in the population within 80 km (50 mi) of the site. The inadvertent detonation of a nuclear warhead is not considered credible.

Impacts associated with transporting plutonium dioxide from Pantex to offsite facilities are addressed in this SPD EIS; an estimate of the maximum potential impacts of such a shipment is included in Appendix L.6.3. According to conservative calculations, a transportation accident in an urban area would produce 27 LCFs within a radius of 80 km (50 mi) of the accident location. However, given the extremely low frequency of the accident (much lower than 1 in 10 million per year), the actual risk of a fatal cancer is extremely low. A transportation accident in a rural area, the scenario discussed in Section 4.6.2.6, has a frequency of 1 in 10 million per year and a predicted impact of less than 0.1 LCF. The net result is an extremely low risk of a fatal cancer among the population within 80 km (50 mi) of the accident.

In summary, conservative evaluations indicate no significant safety concerns to the public from locating the pit conversion facility at Pantex.

SCD24–8 **Transportation**

The selection of sites for potential surplus plutonium disposition facilities was based on a number of factors. The location of the surplus pits at Pantex was not the only reason for making it a reasonable alternative for siting the proposed surplus plutonium disposition facilities. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Table L–6 shows the transportation risks for all alternatives. Analyses of transportation risks are just one of the factors considered in the decisionmaking regarding facility siting.

SCD24–9 **Storage and Disposition PEIS and ROD**

The potential cost saving that could result from the early movement of nonpit surplus plutonium from RFETS and Hanford is based on the termination of storage operations and the required security at those sites. The same situation does not apply to Pantex, which will continue its storage mission and associated security. Further, major upgrades of storage facilities at Pantex are not required, but DOE is considering some upgrades (e.g., air conditioning, catwalks, standby power) to address plutonium storage requirements. Although SRS is preferred for the proposed surplus plutonium disposition facilities, a decision has not been made. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SCD24–10 **Plutonium Polishing and Aqueous Processing**

DOE analyzed the full range of reasonable alternatives for the disassembly and conversion of the plutonium in pits into a form suitable for disposition using either immobilization or MOX fuel. There are two basic technologies available for the conversion of pit plutonium into plutonium dioxide: wet (aqueous) and dry processing. DOE determined that aqueous processing, a proven technology, was not a reasonable alternative for pit conversion because current aqueous processes using existing facilities would produce significant amounts of waste, and aqueous processing would complicate international safeguard regimes. Dry processing was analyzed in the *Storage and Disposition PEIS* and this SPD EIS. DOE is currently demonstrating the

dry plutonium conversion process as an integrated system at LANL. This activity is described in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), which is available on the MD Web site at http://www.doe-md.com. There is no alternative in the SPD EIS that evaluates dissolving pits.

DOE is not including the plutonium-polishing process (a small-scale aqueous process) as part of the pit conversion facility; that process would be part of the MOX facility. DOE would use only dry processes in the pit conversion facility. For this reason, the thermal process for removing gallium may not be needed in the pit conversion facility (see revised Section 2.4.1.2). Plutonium dioxide is the starting form for the disposition of surplus plutonium for either the immobilization or MOX fuel approach.

On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

SCD24–11 Plutonium Polishing and Aqueous Processing

This comment is addressed in response SCD24–10.

SCD24–12 Waste Management

The *Storage and Disposition PEIS* evaluated an aqueous plutonium conversion process similar to that used in the SRS canyons. A plutonium conversion process is needed to convert plutonium metal to an oxide for use in either the immobilization or MOX facility. Compared with the dry conversion processes evaluated in this SPD EIS for use in the pit conversion and immobilization facilities, the aqueous conversion process evaluated in the PEIS would generate significantly more radioactive waste as shown in the following table.

12. If you used an aqueous process to make pure plutonium oxide, there would be a big savings in the cost and environmental impact of both the MOX and immobilization plants. The plants could be smaller, less automated, and much less R&D would be required. Did your decision to only consider a dry process consider the downstream impact of your conversion process decision? Please provide the details of your evaluation of the differences in the downstream facilities. 14

13. A pit disassembly and conversion plant at Pantex will have to high-fire the plutonium oxide to comply with DOE Standard 3013 for shipment and storage. Is the high-fired oxide usable for either MOX or immobilization without extensive pretreatment? If aqueous polishing is required, the Oak Ridge report says the feed cannot be high-fired. How will you polish plutonium oxide treated to the 3013 Standard? 15

14. There is no analysis of the savings possible by using existing facilities at SRS for converting plutonium to the oxide form for MOX or immobilization. Since the SRS facilities are already operating and have most of the capabilities needed for this activity, wouldn't there be a big savings of time, investment, and future cleanup? 16

Programmatic Questions and Issues

15. Appendix N, Plutonium Polishing, is presented as a "contingency." What is the legal status of a "contingency" or an Appendix? Generally a NEPA issue has to be presented as part of the proposed action, available for public review and comment, to be a legal basis for a decision. 17

16. The MOX Request for Proposal (RFP) has been revised four times since its original issue a little more than two months ago in May. MOX feed is now described as being produced by a "dry process" rather than the original hydride-dehydride process. What is the significance of this change? What process is described in the EIS? Will the EIS be revised to incorporate the evolving process proposed for MOX? 18

17. The ten year MOX disposition program is inconsistent with schedules, capacities and reactor cycles. The elapsed time is more likely the 20-25 years described by many. The EIS uses a ten year basis for estimating exposure. This represents a best—not worst—boundary case. Do you plan to revise the EIS to reflect more realistic schedules? 19

Waste and Waste Management

18. How much waste would be produced by using the existing facilities at SRS to convert plutonium to plutonium oxide? Would this amount significantly impact the waste DOE already has to handle at SRS? If all of the 50 metric tons of surplus plutonium were aqueously processed at SRS, fewer than 20 additional glass logs would be produced by DWPF out of an approximate total of 5200 and would represent less than one month out of 25 years of operation of DWPF. 20

SCD24

SCD24–14 Plutonium Polishing and Aqueous Processing

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. This new report includes the cost associated with plutonium polishing in the estimates for the MOX facility.

The remainder of this comment is addressed in response SCD24–10.

SCD24–15 Plutonium Polishing and Aqueous Processing

It is not certain that plutonium dioxide would have to be high-temperature fired prior to shipment and storage to meet the DOE 3013 standard, *Criteria for Preparing and Packaging Plutonium Metals and Oxides for Long-Term Storage*. High-temperature-fired dioxide can be used for either the immobilization or MOX approach; it just does not dissolve as readily as material that has not been subjected to the higher temperatures. The report to which the commentor may be referring, *Final Data Report Response to the Draft Surplus Plutonium Disposition Environmental Impact Statement Data Call for Generic Site Add-On Facility for Plutonium Polishing* (ORNL/TM-13669, June 1998) indicates that it is better not to subject the plutonium dioxide to the higher-temperature processing, but does not indicate that plutonium dioxide processed at higher temperatures is unacceptable as feed for either immobilization or MOX fuel fabrication.

The remainder of this comment is addressed in response SCD24–10.

SCD24–16 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

SCD24–17 **General SPD EIS and NEPA Process**

CEQ regulations for NEPA in 40 CFR 1502.18 state that an appendix shall: (a) consist of material prepared in connection with an EIS (as distinct from material which is not so prepared and which is incorporated by reference); (b) normally consist of material which substantiates any analysis fundamental to the EIS; (c) normally be analytic and relevant to the decision to be made; and (d) be circulated with the EIS or be readily available on request. In accordance with CEQ regulations, lengthy technical discussions of modeling methodology, baseline studies, or other work are best reserved for an appendix. In other words, if technically trained individuals are the only ones likely to understand a particular discussion, then that discussion should be included as an appendix, and a plain language summary of the analysis and conclusions of that technical discussion should be included in the text of the EIS.

The remainder of this comment is addressed in response SCD24–10.

SCD24–18 **Pit Disassembly and Conversion**

The HYDOX (dry) process described for the pit conversion facility in Section 2.4.1.2 is a process for converting plutonium metal with certain impurities to a plutonium dioxide with a minimum of impurities. In the HYDOX process, the pit hemishells (i.e., nonpit plutonium metal) would be placed into the HYDOX module, where the metal would be exposed to and react with hydrogen, then nitrogen, and finally oxygen at controlled temperatures and pressures to produce plutonium dioxide. This is one variation of the basic hydride-dehydride process; another would produce a metal rather than an

oxide. The process described in this SPD EIS is not only representative of the proposed process, but is bounding for potential impacts, including accidents. However, a pit disassembly and conversion demonstration aimed at optimizing process operations for the pit conversion facility is under way at LANL. Should evidence from that demonstration or other research invalidate the analyses reflected in this EIS, additional NEPA documentation would be prepared.

SCD24–19 **MOX Approach**

DOE's MOX RFP specified a timetable including first insertion of production, not test, fuel no later than the end of calendar year 2007, and a date of last insertion no later than 2019. This timetable was acceptable to DCS, the team that was selected for this effort.

The analyses in this SPD EIS reflect a 10-year schedule of operations for the proposed surplus plutonium disposition facilities. Section 4.30.2 includes a discussion of incremental impacts of variations in that schedule. As explained in that section, certain impacts (e.g., exposure) would occur only or primarily during processing, and the total impacts would not change even if the processing schedule were extended or shortened. For example, if the operating period of the MOX facility were extended by 1 year, the total dose and LCFs for the worker and the public would remain essentially unchanged, though the annual dose would be expected to decrease. If the facility were not operating, or operating at a lower throughput, the dose rate would be lower. Then the only contributors would be small amounts of internal equipment contamination and material in highly shielded storage, and presumably fewer workers would be at the facility. Total impacts from these internal sources, however, would depend on the period of operations; lengthening operations for 1 year would mean continued impacts at the levels described in Chapter 4 of Volume I for 1 year longer.

To support the MOX approach, the proposed reactors would use MOX fuel for up to 3 years after it is placed in the reactor core. Therefore, the reactors could operate with MOX fuel for 3 to 5 years after the MOX facility has ceased operating because that facility includes space for storage of up to 2 years' worth of fresh fuel assemblies.

SCD24–20 **Waste Management**

Use of F-Canyon at SRS to convert plutonium for use in either the immobilization or MOX facility would require reconfiguring the canyon and keeping it in operation for another 10 years or more. DOE has already made a commitment to the public, the U.S. Congress, and DNFSB to shut the canyon down. DOE presented the SRS Chemical Separation Facilities Multi-Year Plan to Congress in 1997. This plan provides the DOE strategy for the expeditious stabilization of SRS nuclear materials in accordance with DNFSB Recommendation 94-1, and provides for the early stabilization of certain limited quantities of plutonium materials from RFETS. Once this stabilization effort was complete, the canyon would be shut down and D&D activities would begin. In addition, this process would make the surplus material considerably more weapons-usable, and as such would not fulfill the purpose and need of the proposed action.

The remainder of this comment is addressed in response SCD24–12.

19. DOE plans to entomb six million cubic feet of TRU waste at WIPP. The pit disassembly and conversion facility will produce less than .1% of this quantity regardless of whether a dry or aqueous process is used. Therefore whether one pit conversion process produces slightly more or less TRU waste than another is irrelevant. The appropriate criteria are: 21
   - Cost, schedule, technical confidence
   - Impacts on downstream processing
   - Potential for using existing facilities

   Where is the comparison of the two process options against these criteria?

EIS Data Inconsistencies

20. Why is the radiation exposure to construction workers at Pantex reported as zero when section 3.4.4.1.2. reports that annual doses of 100 mrem above background are measured in zone 4, the site of the proposed facilities? 22

21. Why is the annual TRU waste volume for pit disassembly and conversion, a very large facility handling 33 metric tons of plutonium oxide, much less than the TRU waste from the much smaller MOX and immobilization facilities which handle equal or less plutonium? 23

SCD24

SCD24–21 **Waste Management**

An aqueous process for conversion of plutonium would need to be placed in a new facility. Existing canyon facilities are not configured for a plutonium disposition mission and are either shut down or planned for shutdown and D&D.

DOE is committed to waste minimization and pollution prevention throughout the complex.

The remainder of this comment is addressed in response SCD24–10.

SCD24–22 **Human Health Risk**

As stated in Section 3.4.4.1.2, the 100-mrem dose is the dose measured at an offsite control location. It is the dose strictly associated with the natural background levels of the area; no part of the dose is attributable to above-background sources. Therefore, there is no discrepancy in the assertion of a zero dose (i.e., the dose level above background) for Pantex construction workers. A statement was added to applicable Chapter 3 (Volume I) sections to further clarify this issue.

SCD24–23 **Waste Management**

The pit conversion facility would convert relatively clean plutonium metal pits to clean plutonium dioxide. In contrast, both the immobilization and MOX facilities mix the plutonium with other materials, increasing the material flow through the facility by a factor of 10 to 20. Additionally, the immobilization facility would handle plutonium in various forms, including fuel rods and plates, impure oxides, and impure metals and alloys. Each form of plutonium requires different processing techniques; some would require significantly more handling than pits require in the pit conversion facility and therefore would generate more TRU waste. Likewise, many steps are needed to fabricate the clean plutonium dioxide into fuel assemblies in the MOX facility. Because the immobilization and MOX approaches are more complicated and process a considerably larger total material throughput, it is estimated that more TRU waste would be produced by the immobilization and MOX facilities than the pit conversion facility.

CITIZENS FOR NUCLEAR TECHNOLOGY AWARENESS
MICHAEL BUTLER
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August 11, 1998

Ms. Laura Holgate
Director, Office of Fissile Materials Disposition
U.S. Department of Energy
1000 Independence Ave
Washington, DC 20585

Dear Ms. Holgate:

Citizens for Nuclear Technology Awareness (CNTA) is an organization dedicated to creating greater public awareness of nuclear technology issues and supporting the vital activities of the Savannah River Site.

Earlier this year a committee of our members with an extensive background in nuclear science, project management and plutonium processing conducted a general analysis of the life-cycle cost of locating all three Plutonium disposition facilities at the Savannah River Site (SRS). That analysis, using the best information available at the time, determined that as much as $1.6 billion could be saved by co-locating all three facilities with other plutonium-related operations and infrastructure at SRS.

Our analysis was never intended to be precise. It was, however, intended to show the magnitude of the cost savings SRS offers. For that reason we were puzzled by the cost report accompanying the draft EIS for Surplus Plutonium Disposition. It lists the cost difference between locating the pit disassembly and conversion operations at Pantex vs SRS to be only about $60 million ($920 million at SRS vs $980 million at Pantex). While your report acknowledges that those estimates could vary as much as 40 percent-- potentially making the SRS option $715 million less expensive than doing it at Pantex --it also could be misconstrued to set the Pantex costs well below those at SRS, something we find incredible. 1

A detailed review of your report by our experts found that it ignored a number of significant project cost factors, including:

SCD01

SCD01–1 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

* the potential synergy and economies of scale gained by locating all three programs at SRS. Co-locating the plutonium disassembly plant with these facilities and other related operations would surely offer significant cost advantages by way of shared facilities and personnel.

* the extremely high programmatic cost and schedule impact of creating, operating and eventually decommissioning a complete plutonium processing infrastructure at Pantex, where no such infrastructure exists today. Significant plutonium-related support capabilities (RadCon programs, waste management, analytical labs, experienced processing workers, nuclear material accountability programs, etc.) would have to be built from scratch at Pantex. That expensive basic infrastructure already exists at SRS. 1

Each of those important cost factors was included in our analysis. Attached to this letter are a number of specific related issues our experts identified. We believed that these inadequacies need to be addressed before a final decision is made that may not be in the best interest of the tax payers and our nation's nonproliferation efforts.

We look forward to your consideration of these concerns and anticipate that your decision on site preference for the vital pit disassembly and conversion mission reflects the obvious: SRS is the logical choice for this important program. 2

Sincerely,

Michael Butler
Executive Director

SCD01

SCD01–2 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and has the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

CITIZENS FOR NUCLEAR TECHNOLOGY AWARENESS
MICHAEL BUTLER
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Citizens for Nuclear Technology Awareness
Questions Concerning Cost Report Inadequacies
Associated with the Surplus Plutonium Disposition EIS

1. The Cost Report (page 1-10) says DOE's estimate for the immobilization facility was determined on a square foot basis based on experience with similar projects. What were those similar projects? Most of the large comparable nuclear facilities built in this country in the last 15 years have been built at SRS (e.g., DWPF, NSR, HB-Line, RTF). All of them were significantly more per square foot than it appears you are using in the cost report ($450M/108,000 sq. ft. = $4200).

2. Both the MOX and Immobilization facilities are estimated at about $4200/sq. ft. Why is the cost per square foot of the pit disassembly and conversion facility so much less, about $2900 per sq. ft. of hardened space? ($440M/~150,000 sq. ft. = $2900).

3. In the Cost Report (Table ES-2) a number of infrastructure deficiencies at Pantex are identified. How much did you incorporate into the cost study for:

   - Creating strategic nuclear material processing capability at Pantex?
   - Creating radioactive waste management capability at Pantex?
   - Constructing a source calibration facility at Pantex? (The new source calibration facility at SRS cost $35M)
   - Constructing a plutonium analytical lab at Pantex?

   These infrastructure improvements would cost hundreds of millions of dollars to construct and operate. The report did not consider the substantial cost to clean up and remove them at the end of the mission. These costs must be considered for a valid cost analysis.

4. The construction of a MOX plant is reported at $510M for both Pantex and SRS, yet the Pantex plant is bigger in the EIS. In addition, the Cost Report identifies the major deficiencies in the infrastructure at Pantex which would have to be added to support a MOX operation. How do you explain this?

5. The storage of pits at Pantex is inadequate. The GAO issued a report in April saying worker's health and safety have been placed at risk. The Defense Board says that DOE's efforts to improve storage "appear confused" and lack technical basis. Since the plutonium will have to come to SRS for MOX or immobilization anyway, doesn't it make sense to pack and ship as soon as possible and avoid a large cost to upgrade pit storage. Pit disassembly and Conversion at Pantex means surplus pits will remain in inadequate storage for nearly 20 more years. How much is in the Cost Report to improve pit storage at Pantex? SRS already has NEPA coverage to transport and store up to 20,000 pits in P-Reactor. (Pantex EIS)

3

SCD01

SCD01–3 **Cost Report**

This comment is addressed in response SCD01–1.

6. Why does a MOX plant (120,000 sq. ft.) require about 50% more construction manpower than the pit disassembly and conversion facility (~150,000 sq. ft.)?

7. The Cost Report says it "does not incorporate possible synergies between co-locating disposition facilities at one site" (page 3.3). What would be the savings if all three missions are located at SRS?

8. Safeguards and Material Control & Accountability requirements are significantly different and more complex for handling plutonium in bulk forms rather than the piece counts employed at Pantex. Where have you evaluated the cost and schedule impacts of major safeguards and MC&A upgrades at Pantex?

9. Where is the cost of facilities required for on-site TRU management and storage for MOX and PDCF facilities at Pantex? Did the assumptions include anything more complex than "pass-through" to WIPP? Have you included the cost of reworking the WIPP EIS to allow shipments from Pantex? Pantex currently cannot ship TRU waste to WIPP, and the EIS says that shipments to WIPP cannot begin until 2016.

10. You have penalized sites other than Pantex with an $80 million dollar charge for packaging and shipping pits to a pit disassembly facility elsewhere (page 3-4). How much did you penalize a facility at Pantex for the higher cost of shipping plutonium oxide to SRS? Plutonium oxide requires more shipments, requires more extensive packaging and uses higher cost shipping and storage containers than shipping pits.

3

SCD01

CITIZENS FOR NUCLEAR TECHNOLOGY AWARENESS
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April 24, 1998

Honorable Federico Pena
Secretary Of Energy
U.S. Department of Energy
1000 Independence Avenue
Washington, D.C. 20585

We understand, Secretary Pena

. . . that within the next month or so the Department of Energy plans to announce its selection of the preferred sites for the three components of the Plutonium Disposition Program (Pit Disassembly and Conversion, MOX and Immobilization). We also understand that the Department is leaning toward selecting the Pantex Plant in Texas as the preferred location for the Pit Disassembly and Conversion facility with the Savannah River Site selected for the Immobilization plant and possibly the MOX plant.

Our organization, Citizens for Nuclear Technology Awareness (CNTA), is deeply concerned about the possibility of not co-locating all three new facilities at Savannah River. Such a decision would ignore significant financial and institutional considerations. As a pro-nuclear educational organization with more than 1000 members, we would hope our views would be considered in your decision. 1

It should be obvious that co-locating all three new facilities at Savannah River will significantly reduce the up-front capital investment in new facilities and we estimate the cost of the overall program could be reduced by in excess of $1 Billion compared to the course that we believe the Department intends to take. Further, for the department to consider creating another plutonium site at Pantex at the same time it is requesting billions to clean up the ones it already has should be a matter of grave concern to all taxpayers in this country. Pantex is not now a plutonium site. They have never processed plutonium and have only handled sealed weapons components containing plutonium and, as a result, there is no plutonium handling infrastructure and competency at Pantex. The Department is proceeding on a path which will require that it duplicate at Pantex the unique plutonium structure now operating at SRS - environmental and personnel

SCD78

SCD78–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for all three proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) (DOE/EIS-0236, September 1996) states that the pit fabrication mission would not be introduced into a site that does not have an existing plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities. The SSM PEIS states further that an important element of the site selection strategy is to maximize the use of existing infrastructure and facilities as the nuclear weapons complex becomes smaller and more efficient in the 21st century; thus, no new facilities were to be built to accommodate stockpile management missions. Accordingly, DOE considered as reasonable only those sites with existing infrastructure capable of supporting a pit fabrication mission. Although Pantex has the infrastructure to carry out its current weapons assembly and disassembly mission and nonintrusive pit reuse program, it was not considered a viable alternative for the pit fabrication mission because it did not possess sufficient capability and infrastructure to meet the SSM PEIS siting assumption stated above. Among the operations that were considered in developing siting alternatives for pit fabrication in the SSM PEIS were plutonium foundry and mechanical processes, including casting, shaping, machining, and bonding; a plutonium-processing capability for extracting and purifying plutonium to a reusable form either from pits or residues; and assembly operations involving seal welding and postassembly processing.

When comparing the site selection strategy for pit disassembly and conversion with that used for the pit fabrication mission, the siting criteria in the SSM PEIS has little or no bearing on siting criteria used in this SPD EIS. Pit disassembly and conversion do not require the foundry and mechanical processes discussed in the SSM PEIS and can be accomplished in a stand-alone facility. Also, the SSM PEIS siting assumptions include a requirement to use existing

protection and monitoring systems, plutonium capable laboratories, new waste management systems, but most importantly, the entire intellectual infrastructure, competency and experience base. In fact, in 1996 the Department said, in its "Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management", in regard to taking Pantex out of consideration for Pit Manufacturing:

> "Plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities"

Considering all of the implications of the decisions involved, we believe it would be appropriate that a completely independent assessment of the total costs of locating these facilities separately at Pantex and SRS compared to co-locating all three facilities at SRS be conducted prior to any decisions by the Department as to the preferred sites. 1

Savannah River has an unequaled history of safe and reliable production, processing, and storage of plutonium. The disposition mission is overwhelmingly supported by the citizenry and officials of the two-state region. SRS is clearly the logical choice for consolidating all three functions.

The CNTA membership includes many experts in large scale plutonium processing. We are prepare to assist the Department in ensuring the success of the Plutonium Disposition Program and we are looking forward to hearing from you in the near future regarding our concerns.

Sincerely,

Fred Davison

Fred C. Davison
Chairman

cc: Sen. Strom Thurmond
Sen. Fritz Hollings
Sen. Pete Domenici
Congressman Lindsey Graham
Elizabeth A. Moler

SCD78

facilities, whereas, the pit conversion facility would be a new structure no matter where it is located.

As discussed in Section 1.6, factors used in site selection for the preferred alternative included site infrastructure, mission, and staff expertise. Although Pantex may not currently have the extensive plutonium processing infrastructure already present at SRS, analyses in Chapter 4 of Volume I indicate that impacts of construction and normal operation of the proposed surplus plutonium disposition facilities on infrastructure, health, safety, and the environment at Pantex would likely be minor (e.g., see Sections 4.6 and 4.26.3).

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

CITIZENS FOR NUCLEAR TECHNOLOGY AWARENESS
WILLIAM C. REINIG
PAGE 1 OF 2

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September 3, 1998

Ms. Laura Holgate
Office of Fissile Materials Disposition
U.S. Department of Energy
1000 Independence Avenue
Washington, D.C. 20585

Dear Ms. Holgate:

We are unable to understand DOE's recent decision that the Savannah River Site and the Pantex site are "equally preferred" for siting the pit disassembly and conversion mission.

In 1996 the Department of Energy announced, in the Stockpile Stewardship and Management EIS, that "plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost and complexity of introducing plutonium operations into sites without current capabilities."

The 1996 position was established during consideration of Pantex (and other sites) as potential locations for a pit manufacturing mission. Pantex was disqualified from consideration on the basis of this 1996 position. We have been told that pit manufacturing and pit disassembly and conversion have similarities: both processes are "dry" and involve handling of the plutonium and associated pit parts. Compared to pit manufacturing, the Disposition Program function of pit disassembly and conversion involves a much larger quantity of plutonium and produces plutonium oxide rather than the much easier to manage metallic form. If it is too expensive and complex to introduce pit manufacturing into Pantex, then surely it must follow that it is considerably less desirable to introduce pit disassembly and conversion. 1

At the public meeting in North Augusta on August 13, your staff was unable to explain why DOE is now considering Pantex. We would very much like to know the following:

MD245

MD245–1 **Alternatives**

DOE believes that the siting alternatives and analyses included in this SPD EIS are not inconsistent with the *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) (DOE/EIS-0236, September 1996). The SSM PEIS states that the pit fabrication mission would not be introduced into a site that does not have an existing plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities. The SSM PEIS states further that an important element of the site selection strategy is to maximize the use of existing infrastructure and facilities as the nuclear weapons complex becomes smaller and more efficient in the 21st century; thus, no new facilities were to be built to accommodate stockpile management missions. Accordingly, DOE considered as reasonable only those sites with existing infrastructure capable of supporting a pit fabrication mission. Although Pantex has the infrastructure to carry out its current weapons assembly and disassembly mission and a nonintrusive pit reuse program, it was not considered a viable alternative for the pit fabrication mission because it did not possess sufficient capability and infrastructure to meet the SSM PEIS siting assumption stated above. Among the operations that were considered in developing siting alternatives for pit fabrication in the SSM PEIS were plutonium foundry and mechanical processes, including casting, shaping, machining, and bonding; a plutonium-processing capability for extracting and purifying plutonium to a reusable form either from pits or residues; and assembly operations involving seal welding and postassembly processing.

When comparing the site selection strategy for pit disassembly and conversion with that used for the pit fabrication mission, the siting criteria in the SSM PEIS have little or no bearing on siting criteria use in this SPD EIS. Pit disassembly and conversion do not require the foundry and mechanical processes discussed in the SSM PEIS and can be accomplished in a stand-alone facility. Also, the SSM PEIS siting assumptions include a requirement to use existing facilities, whereas, the pit conversion facility would be a new structure no matter where it is located. This SPD EIS analyzes the environmental impacts

- Why was this position changed?
- Who in DOE approved this change?
- What new information exists to warrant this change?
- If aqueous processing is required, would Pantex be dropped from consideration?

CNTA is a non-profit, grassroots organization that includes many of this country's experts in large scale plutonium processing. We are prepared to assist the Department in ensuring the success of the fissile material disposition program. But with DOE engaged in a multi-decade program to downsize, consolidate, and remediate existing plutonium sites, we are unable to understand why DOE would propose creating a new plutonium site. The wisdom of establishing the DOE position in 1996 was obvious to us then, and remains today. 1

Sincerely,

William C. Reinig
Vice Chairman

cc: Sen. Strom Thurmond
Sen. Fritz Hollings
Congressman Lindsey Graham
Honorable Bill Richardson
Greg Rudy
David Nulton

MD245

of construction and operation of these facilities at the four candidate sites, including the impact on infrastructure.

Appendix N of the SPD Draft EIS analyzed the plutonium-polishing process (by which impurities could be removed from the plutonium feed for MOX fuel fabrication) as part of either the pit conversion or MOX facility. However, on the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility. Therefore, the polishing process is not a consideration in siting the pit conversion facility. The alternatives that include siting the MOX facility with plutonium polishing at Pantex are reasonable and are therefore included in the SPD Final EIS. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

CORBETT, SUSAN
PAGE 1 OF 3

Author: HOWARD CANTER at md-01
Date: 9/16/1998 7:52 AM
Priority: Normal
TO: DAVID NULTON, BERT STEVENSON
Subject: Savannah River site

I am writing to express my extreme displeasure with the quality of the hearings held in N. Augusta a few weeks ago. Those were not public hearings, they were cheerleading exercises for the SRS employees and local officials elected by those employees. The people of N.Augusta and Aiken do not speak for the whole state of SC. Of course the people who were there were in favor doing "plutonium disposition" in SC. Their employer (SRS) gave them the day off and told them to come down to the hearings in a show of support. Who is going to come and argue against his neighbor in N.Augusta? This was not a fair hearing, and did not represent the opinions of the majority of S.Carolinians. I demand that DOE hold other hearings around the state, at least in Columbia, Charleston, and Savannah. British Nuclear Fuels, who will be running SRS, does not have a great environmental record in Europe. The people of this state deserve to hear the WHOLE STORY about plutonium reprocessing and all of its effects on health and the environment. If the citizens of S.C. are going to be asked to assume the risks inherent in taking all of the weapons grade plutonium, we deserve to have some input into the decision making process. And, we are unequivocally opposed to MOX fuel, and there will be a fight about this, I guarantee it. Plutonium should not be used as an energy source. It should be collected, immobilized, and safely stored away, never to re-enter the environment again. I don't know who came up with this MOX idea, but it is a bad one, and I don't care what the Russians are doing, we need to take the environmental high road and tell them MOX is a bad idea, and we can't support it. Vitrification is the preferred method of disposition, but SHOW US THE PERMANENT SITE, PLEASE, otherwise, we don't want it coming here, because we don't trust you to ever take it away. We believe it will stay here forever, and SC is not a good site for permanent disposal. I am sure you will hear more from me, I am angry that this plutonium reprocessing monster has reared its ugly head again. It was a bad idea when Carter nixed it, and it's still a bad idea. 1 2

Thank you for your time, please consider holding more hearings, especially in Columbia,

Susan Corbett
2701 Heyward St.
Columbia, S.C. 29205

FD333

FD333–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concerns regarding the public hearing. DOE employees and contractors at SRS were neither granted leave nor ordered to present their views at the North Augusta hearing; they attended in an official capacity or took personal leave to attend. DOE believes that the hearing was objective and open; all attendees were given an opportunity to provide comments orally or in writing. It was simply not feasible to hold public hearings in every location, including the locations suggested by the commentor.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites, and thus, with the most directly affected populations. This decision did not preclude relevant comment by State and local government, tribes, individuals, and organizations. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how they were submitted.

FD333–2 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself.

DOE is not considering reprocessing any of the surplus plutonium that is the subject of this SPD EIS. U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed

use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

DOE is not considering disposal of surplus plutonium in South Carolina. The proposed facilities would process the surplus plutonium so that it can be permanently disposed of in a potential geologic repository. Only the immobilized plutonium, in canisters of vitrified waste from DWPF, would be stored at SRS for any length of time, pending availability of the potential geologic repository. DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared.

This SPD EIS, for the purposes of analysis, assumes that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

CORBETT, SUSAN
PAGE 3 OF 3

DOE also appreciates the commentor's concern that surplus plutonium disposition activities not contaminate the environment. This EIS analyzes the potential environmental impacts associated with implementing the proposed activities at the candidate sites. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, demonstrate that the activities would not have major impacts at any of the candidate sites. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

My name is Susan Corbett and I'm calling to make some comments about the DOE hearings in North Augusta regarding the plutonium disposition plans for Savannah River Site. I live in Columbia and I drove down to the hearings hoping to hear some open discussion and debate of the issues. I was very disappointed and very angry at what I saw. It was a completely one sided conversation. It, this is, this is not a public meeting. Basically what I, what I could see, what I could hear was that the SRS had given their employees a day off so that they could come down and have a show of support for, you know, basically lining their own pockets by creating more jobs and, you know, having more money for their own personal little infrastructure there in North Augusta and Aiken and I put forth the idea that North August and Aiken does not speak for the whole State of South Carolina. And we are being asked to assume a number of risks by allowing this plutonium to be brought here. And I believe that there should be other hearings around the State and around Georgia, around that area too, Savannah probably, definitely Columbia, possibly Charleston, other places that stand to be affected by this process, and places where it's a true public cross section of the public. Nobody in North Augusta is going to come and argue against their neighbors employer. It just wouldn't be the right thing to do and so it is not a level playing field. It is not an objective group of people. This is their livelihood. Of 1

PD059

PD059–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concerns regarding the public hearing. DOE employees and contractors at SRS were neither granted leave nor ordered to present their views at the North Augusta hearing; they attended in an official capacity or took personal leave to attend. DOE believes that the hearing was objective and open; all attendees were given an opportunity to provide comments orally or in writing. It was simply not feasible to hold public hearings in every location, including the locations suggested by the commentor.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites, and thus with the most directly affected populations. This decision did not preclude relevant comment by State and local government, tribes, individuals, and organizations. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how they were submitted.

CORBETT, SUSAN
PAGE 2 OF 3

course they want more jobs there. Personally the State of South Carolina is not hurting for jobs so much that we need to bring in jobs and industries that create more pollution. This is already a very contaminated State and Savannah River is already a very contaminated river and I am basically opposed to bringing any more industries that can pollute and contaminate our State. I understand something has to be done with the plutonium and the warheads. At this point I would say that vitrification is definitely the preferred method. 1 2

I am not in favor of MOX. I am absolutely opposed to MOX. I think that there are a lot of people that are going to be opposed to MOX. We do not want to see plutonium used as an energy source and set the very bad precedent to start doing that. And I, I heard some comment about well once they got all this weapons stuff burnt up in the MOX fuel they wouldn't make any more. I don't believe that for a second. I believe that once that facility is built and the capability is set up, that there will be an ongoing push to continue to use plutonium as an energy source. Now that's going to be a fight there I can guarantee it. There are a lot of people who are opposed to that. That's why the breeder reactor program never got off to the start. That's why Carter and his administration nixed it. It was a bad idea then, it's a bad idea now. 3

PD059

PD059–2 **Immobilization**

DOE acknowledges the commentor's support for the immobilization approach to surplus plutonium disposition. DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PD059–3 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose

Vitrification is the preferred method for dealing with this plutonium. I don't want to comment at this point about exactly where or when. I, I think that we need to move a little more slowly in this and look at it carefully and make sure we're doing the right thing. I understand that there are vitrification problems at Savannah River right now with the existing high level waste that they have down there. And I think the DOE is rushing forward with this a little too cavalierly and I would like to see the process slowed down for more public education, more public input, more discussion around this area and definitely no MOX fuel. That is just not going to fly here.

And I was very, like I said, very disturbed by those hearings. I don't think I've ever been to a public hearing where there was a more one-sided discussion. It was just, didn't even have the slightest hint of being an objective, diverse discussion. It was obviously so one-sided. And I think we need to here opposing voices and other points of view. But people are not going to come out in their own neighborhood, against their own neighbors. It just isn't fair to ask people to do that. So I know there are people in North August that have concerns but it would be difficult for them to speak out. And basically, as a person who went down to just listen and be objective, it would have been difficult for me to get up and ask questions because the environment was basically pretty hostile against anybody who wanted to question or, you know, look twice critically at this whole issue. And that, that is not the right way to conduct public hearings. We need to move around the state so we can hear other voices on the whole issue. That's all I have to say and I hope that you will consider these comments seriously. Thank you for listening. Bye-bye.

PD059

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operational life is expected to last beyond the life of the surplus plutonium disposition program. Should additional plutonium be declared surplus in the future, it is likely that MOX fuel fabrication would be a proposed disposition method if it proves successful, and the additional plutonium were amenable to MOX fabrication. However, additional NEPA would be required at that time to evaluate the potential impacts and inform the public.

The remainder of this comment is addressed in response PD059–1.

CORBETT, SUSAN
PAGE 1 OF 1

Author: Martha Crosland at EM-06
Date: 8/26/1998 7:00 PM
Priority: Normal
TO: David Nulton at MD-01, Bert Stevenson at MD-01
CC: Bruce Bornfleth at ES
Subject: Savannah River site

Dave and Bert:

The following stakeholder concern would seem to relate to the public hearings on the MD PEIS. I would assume that your office is the appropriate one to respond and if so please confirm with Bruce Bornfleth.

Thanks,

Martha

Forward Header

Subject: Savannah River site
Author: Bruce Bornfleth at OSE
Date: 8/26/98 2:58 PM

Martha,

Skila Harris asked that I forward this message to you. She suggested you would know the appropriate person to respond to this stakeholder.

Thank you,

Bruce Bornfleth, 586-4040

Forward Header

Subject: Savannah River site
Author: jcorbett@gateway.net at INTERNET at X400PO
Date: 8/26/98 12:08 PM

Hi, I am a concerned citizen of South Carolina, who has just recently found out about the plans DOE has for the Savannah River site. I went to N. Augusta to the hearings and was completely outraged. That was not an objective, fair public hearing. SRS gave their workers the day off to turn out in a show of force. There was no constructive or objective discussion or dialogue. As a citizen of this state, I resent the fact that a few members of a small , self-interested community dare to speak on behalf of the whole state regarding such a high risk venture as pit dissassembly, MOX fabrication and Pu vitirification. I demand that DOE hold hearings in a more neutral venue, to allow for real discussion and the opposing views to be heard by the public. The hearings in N. Augusta were a sham and a white washing. Hearings should be held in Columbia, Savannah, and Charleston, at the very least. Sincerely, Susan Corbett 1

FD172

FD172–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concerns regarding the public hearing. DOE employees and contractors at SRS were neither granted leave nor ordered to present their views at the North Augusta hearing; they attended in an official capacity or took personal leave to attend. DOE believes that the hearing was objective and open; all attendees were given an opportunity to provide comments orally or in writing. It was simply not feasible to hold public hearings in every location, including the locations suggested by the commentor.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites, and thus with the most directly affected populations. This decision did not preclude relevant comment by State and local government, tribes, individuals, and organizations. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how they were submitted.

ECONOMIC DEVELOPMENT PARTNERSHIP
Serving Aiken & Edgefield Counties

Fred E. Humes
Director

September 15, 1998

Ms. Laura S. H. Holgate, Director
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, D.C. 20026-3786

Dear Ms. Holgate:

At your August 13, 1998 public meeting on the Surplus Plutonium Disposition (SPD) Draft Environmental Impact Statement (DEIS) I spoke in favor of siting all three portions of the SPD program at the Savannah River Site. A copy of my comments are attached. At this time I want to highlight my two comments regarding what I consider to be deficiencies in the DEIS, and recommend that the EIS be revised before issuance in final.

1. The Environmental Consequences analyses for the Pantex alternative does not reflect the increased probability and severity of environmental releases and worker safety risk resulting from (1) a lesser level of site plutonium infrastructure and (2) inexperienced workers handling and processing plutonium in metal and oxide forms. If pit disassembly and conversion is assigned to Pantex, there will be a "learning curve" as Pantex workers become familiar with handling a new material in new facilities and that the learning process will result in an increased incidence of operator errors and equipment failures. Such errors and failures will result in increased environmental impacts at Pantex when compared to the experienced personnel and extensive infrastructure which exist at Savannah River. The Draft EIS assumes that the probability and consequence of off-normal conditions are equal for Pantex and Savannah River - and that is not realistic. I suggest that you solicit the input of the Defense Nuclear Facilities Safety Board in quantifying the increased risks and impacts associated with startup of plutonium processing at Pantex. Without this analysis, the SPD-DEIS does not adequately address all environmental impacts. 1

2. The SPD-DEIS states that cost differences between Pantex and Savannah River are "within the uncertainty of cost estimates." That conclusion is not supported by the facts contained in the DEIS. The Draft describes the many facilities and operating capabilities which currently exist at Savannah River and which must be constructed or established at Pantex. In addition, the Draft identifies the many instances of program synergy that would exist at Savannah River and which 2

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FD313

FD313–1 **Human Health Risk**

DOE acknowledges the commentor's concerns regarding potential facility accidents and human health risks. Training would be conducted on mock, nonradiological material before facility processes became operational, so the "learning curve" would be largely completed before operation with radiological material. The probabilities of operational error cannot be meaningfully estimated, particularly for processes and procedures that are not yet fully developed, and for bounding accidents whose frequencies are low to begin with. In any case, the estimates of accident frequency presented in this SPD EIS are sufficiently conservative to bound any hypothetical increase in the probability of environmental releases.

FD313–2 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. The cost report was independently reviewed by an outside architect-engineering firm before being released to the public. Any future updates to this report will also be independently reviewed.

ECONOMIC DEVELOPMENT PARTNERSHIP
FRED E. HUMES
PAGE 2 OF 5

cannot exist at Pantex. Either your conclusion must be changed or it must be supported by analysis. If DOE continues to believe that the comparative costs are "within the uncertainty of cost estimates" then DOE must prove that assertion. Review of the comparative estimates by a authoritative independent third party, such as the General Accounting Office, is one means of addressing this deficiency. 2

Both of these deficiencies are more acute if a plutonium finishing module is included in the pit disassembly or MOX fabrication process.

We fully support the national program to dispose of United States and Former Soviet Union weapons-capable nuclear materials, and look forward to final approval and authorization of the Surplus Plutonium Disposition program.

Thank you for the opportunity to provide comments on this very important national program.

Sincerely,

Fred E. Humes
Director

FD313

ECONOMIC DEVELOPMENT PARTNERSHIP
Serving Aiken & Edgefield Counties

Fred E. Humes
Director

Statement for the Record
Surplus Plutonium Disposition Draft
Environmental Impact Statement
August 13, 1998

Good Afternoon, my name is Fred Humes and I am Director of the Economic Development Partnership, a non-profit organization with responsibility for economic development in both Aiken and Edgefield Counties. The Savannah River Site is an important and treasured part of our manufacturing community because its long history as a safe and environmentally responsible neighbor. We are proud of our role in helping to win the cold war, and we are equally proud of our future role in helping to reduce the nuclear danger by the disposition of excess plutonium from the weapons program.
We are pleased and appreciative the Department has recognized the Site's capabilities for the Mixed Oxide Fuel fabrication and Immobilization portions of the disposition mission. We believe the identification of SRS for these two missions will provide the country the greatest assurance that plutonium will be prepared for fabrication and disposition in the safest, most efficient and most reliable manner. 3

However, we are perplexed and concerned that DOE has not made the same determination regarding site selection for the Pit Disassembly and Conversion Facility. The draft EIS is replete with data which outlines the currently operational plutonium processing and radioactive waste management capabilities existing at SRS, and the document is equally clear that those same capabilities do not exist at the Pantex site. Therefore, in my opinion it is incredulous that the EIS concludes there are only "modest differences" between SRS and Pantex.

The data demonstrates there are significant differences between SRS and Pantex when evaluating the location for the Pit Disassembly and Conversion Facility: 4

First and foremost, Savannah River has a forty-year history in all aspects of the safe handling and storage of plutonium. Savannah River's unparalleled safety record is the result of possessing a complete complement of specialized faciliti and personnel with many years of "hands on" plutonium experience. Neither t facilities nor the expertise exist at Pantex. Several hundreds of millions of dol will be wasted just to build and operate new types of facilities needed for safe operations at Pantex: ranging from waste management to environmental monitoring to laboratory support facilities. But even if you wasted the dollars, you can never make up for the lack of plutonium experience in the Pantex workforce. Operating proficiency at Pantex could only be gained after many years of trial and error - years with inevitable low productivity, operating error... safety incidents and environmental releases. It is irresponsible for DOE to 5

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FD313

FD313–3 **Alternatives**

DOE acknowledges the commentor's support for siting the immobilization and MOX facilities at SRS. As indicated in Section 1.6, the preferred can-in-canister approach at SRS complements existing missions, takes advantage of existing infrastructure and staff expertise, and enables DOE to use an existing facility (DWPF). DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared.

SRS is also preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

FD313–4 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

ECONOMIC DEVELOPMENT PARTNERSHIP
FRED E. HUMES
PAGE 4 OF 5

impose on an inexperienced Pantex workforce these operational, safety and environmental problems, let alone on the citizens of the Texas panhandle.

The second compelling difference between Savannah River and Pantex is economics. The draft EIS describes the many facilities and operating capabilities that currently exist at Savannah River that will have to be duplicated at Pantex. Additionally, the document identifies the many instances of synergy that exist only at Savannah River as the PD&CF shares capabilities with current missions and the Immobilization mission. These differences exist today and cannot be dismissed as "within the uncertainty of cost estimates." Our region is competitive with all areas of the country in regards to construction and operations wage rates. In the private sector, we compete daily on an international basis for industries to locate in our area - and we are very successful. In the last two years, over two billion dollars in new private sector investment were announced in the Aiken-Augusta area - business decisions that were made because of our skilled labor force, competitive wage structure, and favorable business climate. Therefore, I do not agree with your conclusion that Pantex operating costs are less than Savannah River, or that total costs could be within seven percent.

The third significant difference between Savannah River and Pantex is the broad base of community support for SRS activities. This support includes two states, two Congressional Delegations, urban and rural constituents, site workers and people with no connection with SRS. That support is grounded in the knowledge that SRS has a paramount concern for safety, and that the site has a positive impact on the economic, social, cultural and educational base in our area. This relationship is priceless in today's environment, and provides DOE with confidence that programs assigned to the SRS will be carried out as planned. 5

A fourth consideration is the potential need to incorporate a Plutonium Polishing module in the pit conversion facility. Processing facilities, personnel expertise, and infrastructure to meet this need are currently operational at the Savannah River Site; the same capability does not exist at Pantex. Savannah River facilities are sufficiently flexible to accommodate all foreseen polishing requirements, guaranteeing a reliable supply MOX-grade plutonium oxide to the fuel fabrication vendor. Once again, the assignment of the Pit Disassembly and Conversion Facility to Savannah River will assure the safe performance of this critical step, save the taxpayer tens of millions of dollars and provide the highest confidence that the Plutonium Disposition mission is conducted in the most expeditious manner.

Specific comments on the draft EIS are as follows:

1. Revise the Environmental Consequences analyses for the Pantex alternatives to appropriately reflect the increased probability of environmental releases and safety concerns resulting from operational errors as Pantex employees go through the learning curve associated with handling and processing plutonium. Input from 6

FD313

FD313–5 **Other**

All candidate sites have strong community and elected official support. In addition, the candidate sites are equally suitable from a safety and conduct of operations standpoint and all sites must comply with DOE environmental, safety, and health requirements.

Based on public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE decided to propose plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide.

The remainder of this comment is addressed in response FD313–2.

FD313–6 **Facility Accidents**

This comment is addressed in response FD313–1.

the Defense Nuclear Facilities Safety Board could assist in this evaluation. 6

2. Submit your comparative cost estimates to an outside third-party review to assure that the operational and estimating basis for construction and operating costs, and required infrastructure are on a totally comparable basis. The General Accounting Office is one possible source for this review. 7

My final comment is that we not lose sight of the important objective that you are implementing - that being to safely dispose of the excess supply of weapons capable plutonium. This is extremely important - both today and for future generations. Because of that importance and urgency, it must be entrusted to those who have demonstrated the capability to safely perform the mission. Now is not the time to train rookies. Now is the time for the first team to be in the game. The clear choice for the Pit Disassembly and Conversion Facility is the Savannah River Site! 8

Thank you for the opportunity to present these comments.

FD313

FD313–7 **Cost Report**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. The cost report was independently reviewed by an outside architect-engineering firm before being released to the public. Any future updates to this report will also be independently reviewed.

FD313–8 **Alternatives**

This comment is addressed in response FD313–4.

FIDDS, W. GLENN
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) W. Glenn Fidds
ADDRESS: 841 Hickory Ridge Rd Aiken SC 29803
TELEPHONE: (803) 648-6696
E-MAIL:

I was born and raised in Augusta, Ga. and have lived here (area) for all but 3 years of my life:

As a young boy of 12 to 17 years old and since, I have been exposed to the professionalism and safety attitudes of SRP/SRS employees. I have worked at several different industrial sites in the CSRA before going to work at SRP in 1984. The positive influence that I have experienced from people who work at SRS, both before and since my employment, convinces me that SRS would be the safest place to locate all Pu missions. 1

I personally know & experience the dedication to safety and professionalism of SRS employees every day. I am confident that the best place for Pu missions, from all aspects of consideration is SRS.

SCD62

SCD62–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

FIRST BAPTIST CHURCH OF AIKEN
FRED W. ANDREA, III
PAGE 1 OF 1

First Baptist Church
OF AIKEN

Fred W. Andrea III, Ph.D
Pastor

August 13, 1998

Gentlemen and Ladies:

Good afternoon. I am Fred Andrea, Senior Pastor of First Baptist Church in Aiken, South Carolina. I am here to express my support for SRS and its employees. Many of the employees are members of my church family.

SRS and its employees are special to this community. Their contributions to our nation's security are many and significant. Over the last five years, SRS has lost over 10,000 jobs, yet the employees and this community have never lost their faith in the future or their commitment to continue the long history of safe and effective operations at SRS.

We know that the capabilities that exist at SRS are not found at the other DOE sites. We know that the Plutonium Disposition Missions which are so important to our national and international security require these capabilities. The decision should be easy but, for some reason, may become far more complicated than necessary. Of course, there being absolutely no politics in the local church, you would understand that I know nothing whatsoever about such matters. I trust and pray that this decision will not be determined by political considerations.

In fact, I am here today to let you know that, as a minister, I will be going to a higher authority than elected officials to encourage the Department of Energy to make the right decision for this nation and its taxpayers! 1

Seriously, Savannah River Site is the right choice for this mission. Impeccable safety and environmental protection records, cost effective operations, existing operating infrastructure, plutonium experience and expertise, and a second-to-none community support level undergird the soundness of this choice.

Thank you for this opportunity to express my wholehearted support for Savannah River Site. I do pledge my earnest prayers for wisdom and courage as this significant decision is made.

Yours sincerely,

Fred W. Andrea III

FWA:ean

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SCD23

SCD23–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

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August 31, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition
SPD EIS
P. O. Box 23786
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COMMENTS ON SURPLUS PLUTONIUM DISPOSITION ENVIRONMENTAL IMPACT STATEMENT & COST REPORT

I. *EIS Inadequacies*

- Appendix N, Plutonium Polishing, shows that an aqueous process can purify plutonium and produce plutonium oxide with very little waste. Since dissolving plutonium metal is easier than dissolving plutonium oxide, it stands to reason that direct dissolving of pits is a reasonable alternative. The alternative of dissolving pits using a facility and process similar to that described in Appendix N must be included and assessed versus the proposed dry process for pit conversion to have a valid NEPA document. 1

- The frequency, consequence, and risk of airplane crashes into plutonium facilities at Pantex has been changing in each document issued by DOE. It seems that these risks have been declining because DOE has been finding ways to justify less conservative methodologies. DOE should use the standard NRC methodology (NUREG 0800) for calculating the risk associated with an airplane incident. This is the only widely accepted methodology in this country for analysis of nuclear facilities subject to airplane crashes. 2

- The Nuclear Weapons and Material Monitor reported that there was an Appendix B which evaluated an aqueous alternative for pit conversion and concluded that it could be done faster and used proven technology. This option cannot be withheld from the EIS. 3

- The EIS claims that the proposed dry process for pit conversion produces less waste. This is truly puzzling. There is no data in the EIS to support this claim. Appendix N shows aqueous processes can be operated to produce very little waste. 4

- If you used an aqueous process to make pure plutonium oxide, there would be big savings in the cost and environmental impact of both the MOX and immobilization plants. The plants could be smaller, less automated, and much less R&D would be required. The choice of 5

MD131

MD131–1 Plutonium Polishing and Aqueous Processing

DOE determined that aqueous processing was not a reasonable alternative for pit conversion because current aqueous processes using existing facilities would produce significant amounts of waste, and aqueous processing would complicate international safeguard regimes. Dry processing was analyzed in the *Storage and Disposition PEIS* and this SPD EIS. DOE is currently demonstrating the dry plutonium conversion process as an integrated system at LANL. This activity is described in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), which is available on the MD Web site at http://www.doe-md.com. There is no alternative in this SPD EIS that evaluates dissolving pits.

DOE is not including the plutonium-polishing process (a small-scale aqueous process) as part of the pit conversion facility; that process would be part of the MOX facility. DOE would use only dry processes in the pit conversion facility. For this reason, the thermal process for removing gallium may not be needed in the pit conversion facility (see revised Section 2.4.1.2). Plutonium dioxide is the starting form for the disposition of surplus plutonium for either the immobilization or MOX fuel approach.

On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

MD131–2 Facility Accidents

DOE published a standard to address the issue of aircraft crash analysis entitled, *Accident Analysis for Aircraft Crash Into Hazardous Facilities* (DOE-STD-3014-96, October 1996). DOE was cognizant of NRC NUREG-0800 in its development of DOE-STD-3014. The method outlined in DOE-STD-3014 is the one used for this SPD EIS. Estimated frequencies, consequences, and risks of aircraft crashes depend on a number of factors, such as building size

and shape; building robustness; and the quantity, form, and containment characteristics of the hazardous material. As a result, one would not expect to see the same numbers published for differing applications of the same methodology, namely, that of DOE-STD-3014. The frequency of aircraft crashes into a pit conversion or MOX facility is lower than that of crashes into the entirety of Zone 4 or Zone 12 mainly because the facilities are smaller than the zones.

MD131–3 Plutonium Polishing and Aqueous Processing

This comment is addressed in response MD131–1.

MD131–4 Waste Management

The *Storage and Disposition PEIS* evaluated an aqueous plutonium conversion process similar to that used in the SRS canyons. A plutonium conversion process is needed to convert plutonium metal to an oxide for use in either the immobilization or MOX facility. Compared with the dry conversion processes evaluated in this SPD EIS for use in the pit conversion and immobilization facilities, the aqueous conversion process evaluated in the PEIS would generate significantly more radioactive waste as shown below:

Type of Waste (m^3/yr)	PEIS Plutonium Conversion	SPD EIS	
		Pit Conversion	Immobilization
LLW	1,799	60	81
Mixed LLW	191	1	1
TRU	472	18	95

MD131–5 Plutonium Polishing and Aqueous Processing

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as

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SPD EIS AND COST REPORT COMMENTS

aqueous vs. dry for pit conversion must include the impact on downstream processes to be valid.. | 5

- The dry process for pit disassembly and conversion was advertised as smaller and cheaper than traditional (aqueous) processes. This EIS says this facility is 186,000 sq. ft. That's bigger than a canyon building! This doesn't seem to be smaller and cheaper! | 6
- A recent amendment to the MOX RFP says DOE will pay the delay cost associated with failure to deliver acceptable PuO_2 on schedule. This change seems to represent the vendors lack of confidence in DOE's plan to use ARIES–produced oxide. | 7
- A pit disassembly and conversion plant at Pantex will have to high-fire the plutonium oxide to comply with DOE Standard 3013 for shipment and storage. The high-fired oxide is unlikely to be usable for either MOX or immobilization without extensive pretreatment. If aqueous polishing is required, the Oak Ridge reports says the feed cannot be high-fired. At the public meeting DOE said maybe they wouldn't comply with Standard 3013. Has the transportation and storage of non-3013 oxide produced by the pit disassembly plant been reviewed with the DNFSB? They are unlikely to agree with this approach – particularly given Congress's expressed reluctance to proceed beyond pit disassembly and conversion anytime soon, the likelihood of extended storage is very real. Also, was the EIS accident and transportation analysis based on fine dispersible low-fired powder typical of aqueous produced oxides, or the high-fired clinkers likely to be produced by TIGR or direct oxidation methodologies? | 8
- The F-Canyon and New Special Recovery (NSR) facility at SRS capable of doing the conversion of plutonium metal from pits to plutonium oxide (NSR was ready to start up on this program in 1991). There is no analysis of the savings possible by using existing facilities at SRS for converting plutonium to the oxide form for MOX or immobilization. Since the SRS facilities are already operating and have most of the capabilities needed for this activity, there would be a big savings of time, investment, and future cleanup. The EIS must include an analysis of this obviously available and reasonable strategy to be valid and complete. Since all of the commercial MOX plants in Europe use aqueous feed prep techniques, this is certainly a reasonable approach which must be analyzed. | 9
- Appendix N, Plutonium Polishing, is presented as a "contingency". What is the legal status of a "contingency" or an Appendix? Generally a NEPA issue has to be presented as part of the proposed action, available for public review and comment, to be a legal basis for decision. | 10
- The basis for the determination of the split of material to MOX or immobilization has not been presented in the EIS for public review. Some DOE documents report the quantity of "clean" metal and oxide significantly higher than 33MT. The 17 MT planned for immobilization are, in fact, not all low plutonium content and low purity. In fact, a large part is already FFTF MOX fuel. Where are the studies and where are the costs for determining this split need to be presented for public review. | 11

R. L. Geddes

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the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. This new report includes the cost associated with plutonium polishing in the estimates for the MOX facility.

The remainder of this comment is addressed in response MD131–1.

MD131–6 **Pit Disassembly and Conversion**

The space needed for the dry process is expected to be smaller than that needed for the aqueous process. The estimated maximum floor space required for the proposed pit conversion facility using the dry process is approximately 8,055 m^2 (186,700 ft^2) for Pantex. The canyons at SRS are much larger than the proposed pit conversion facility. The footprint alone of F-Canyon is over 23,876 m^2 (257,000 ft^2). If one were to add up all of available floor space throughout the building, it would be over 464,515 m^2 (500,000 ft^2).

MD131–7 **MOX RFP**

The failure or delay of DOE to deliver plutonium dioxide to the contractor according to schedule would require the contractor to supply its mission reactors with replacement LEU fuel at increased costs. This amendment to the RFP is for the protection of the contractor, regardless of the source of the delay in providing the plutonium dioxide.

MD131–8 **Pit Disassembly and Conversion**

It is not certain that plutonium dioxide would have to be high-temperature fired prior to shipment and storage to meet the DOE 3013 standard, *Criteria for Preparing and Packaging Plutonium Metals and Oxides for Long-Term Storage*. High-temperature-fired dioxide can be used for either the immobilization or MOX approach; it just does not dissolve as readily as material that has not been subjected to the higher temperatures. The report to which the commentor may be referring, *Final Data Report Response to*

the Draft Surplus Plutonium Disposition Environmental Impact Statement Data Call for Generic Site Add-On Facility for Plutonium Polishing (ORNL/TM-13669, June 1998) indicates that it is better not to subject the plutonium dioxide to the higher-temperature processing, but does not indicate that plutonium dioxide processed at higher temperatures is unacceptable as feed for either immobilization or MOX fuel fabrication. The transportation analysis assumes the oxides would be in compliance with the DOE 3013 standard.

The remainder of this comment is addressed in response MD131–1.

MD131–9 Plutonium Polishing and Aqueous Processing

Use of F-Canyon at SRS to convert plutonium for use in either the immobilization or MOX facility would require reconfiguring the canyon and keeping it in operation for another 10 years or more. DOE has already made a commitment to the public, the U.S. Congress, and DNFSB to shut the canyon down. DOE presented the SRS Chemical Separation Facilities Multi-Year Plan to Congress in 1997. This plan provides the DOE strategy for the expeditious stabilization of SRS nuclear materials in accordance with DNFSB Recommendation 94-1, and provides for the early stabilization of certain limited quantities of plutonium materials from RFETS. Once this stabilization effort was complete, the canyon would be shut down and D&D activities would begin. In addition, this process would make the surplus material considerably more weapons-usable, and as such would not fulfill the purpose and need of the proposed action.

The remainder of this comment is addressed in response MD131–5.

MD131–10 Plutonium Polishing and Aqueous Processing

CEQ regulations for NEPA in 40 CFR 1502.18 state that an appendix shall: (a) consist of material prepared in connection with an EIS (as distinct from material which is not so prepared and which is incorporated by reference); (b) normally consist of material which substantiates any analysis fundamental to the EIS; (c) normally be analytic and relevant to the decision to be made; and (d) be circulated with the EIS or be readily available on request. In accordance with CEQ regulations, lengthy technical discussions of modeling

methodology, baseline studies, or other work are best reserved for an appendix. In other words, if technically trained individuals are the only ones likely to understand a particular discussion, then that discussion should be included as an appendix, and a plain language summary of the analysis and conclusions of that technical discussion should be included in the text of the EIS.

MD131–11 **DOE Policy**

The quantities and locations of surplus weapons-grade plutonium material are discussed in Chapter 1 of the *Storage and Disposition PEIS*. As shown in Section 2.2.1 of the PEIS, Hanford had 11 t (12.1 tons) of plutonium material, of which only about 4 t (4.4 tons) fell within the scope of weapons-usable plutonium as defined in the document. The *Storage and Disposition PEIS* ROD determined that DOE would immobilize at least 8 t (9 tons) because it was not suitable for MOX fuel fabrication due to the complexity, timing, and cost that would be involved in purifying these materials. As described in this SPD EIS, DOE identified an additional 9 t (10 tons) of plutonium as unsuitable for the same reasons. For analysis purposes, this EIS assesses the environmental impacts of implementing the hybrid approach (immobilizing 17 t [19 tons] of surplus plutonium and using 33 t [36 tons] for MOX fuel) and immobilizing all 50 t (55 tons) of surplus plutonium.

SPD EIS AND COST REPORT COMMENTS

- DOE is preparing to perform a large scale demonstration of the ARIES process at LANL using a separate local EA as the NEPA basis. Since this activity is intimately connected with the pit disassembly and conversion proposal, this LANL activity should be analyzed in the SPD EIS, not a separate document. What is the plan for storing the oxide product of this demonstration and where is the NEPA coverage? The Los Alamos vaults are apparently full since Los Alamos is asking SRS to take some material to prevent shutdown of their development program. 12

- The MOX Request for Proposal (RFP) has been revised five times since its original issue just over three months ago in May. MOX feed is now described as being produced by a "dry process" rather than the original hydride-dehydride process. What is the significance of this change? What process is described in the EIS? Will the EIS be revised to incorporate the evolving process proposed for Pit Disassembly and Conversion? 13

- EM is going to use the SRS FB-Line facilities to declassify a large quantity of plutonium metal from Rocky Flats. These facilities could be used for a similar "Quick Start" approach for pits? It is likely that most of the pits could be demilitarized, declassified, and prepared for safe storage using existing facilities at SRS before the program as currently envisioned could even begin. Since this is obviously a fast, cheap approach using existing facilities, it is also a reasonable approach which must be analyzed in the EIS. 14

- The Cost Report says the pit disassembly and conversion facility will begin operation in 2004. This is a $500 million dollar facility using first-of-a-kind technology. DOE has been unable to bring any facility of this size on-line in less than 10 years, and 15-20 is not unusual, since the early days of the Manhattan project, much less one using undemonstrated technology. This is simply not a reasonable basis for NEPA analysis. 15

- The EIS (page S-27) says the MOX campaign will require 11 years to disposition plutonium. The MOX RFP says 15 plus. Pit disassembly and conversion and immobilization are still in the early R&D stages. And, no SNM processing facilities have ever been built in a three-year timeframe by DOE in recent decades. None of these schedules have any basis in reality, nor or they a realistic basis for NEPA analysis. An overly optimistic schedule is not bounding in NEPA terms. An extended schedule results in greater waste, exposure, risk, and impact. 16

- The dry process for disassembly and conversion will leave residual plutonium contamination on thousands of highly enriched uranium parts making them unsuitable for shipment to Oak Ridge as described in the EIS. The only technology currently used for decontamination of uranium pieces like this is aqueous-based. Where is this described in the EIS. I don't see this process and its wastes in the pit disassembly description. 17

R. L. Geddes

3
MD131

MD131–12 **Pit Demonstration EA**

DOE believes that it took the correct NEPA approach with regard to the action proposed in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), and that this action does not prejudice future action under this SPD EIS. In that EA, DOE proposed a limited-scope demonstration at LANL to test an integrated pit disassembly and conversion process on a relatively small sample of plutonium pits (250) and metals. The information gathered from the demonstration will be used to supplement information developed to support the construction of a full-scale pit conversion facility, if DOE decides to build such a facility based on analysis presented in this SPD EIS. In compliance with DOE's NEPA regulations (10 CFR 1021), that EA discussed the No Action Alternative in addition to the proposed action. Based on the analysis in the EA, DOE concluded that the proposed action did not constitute a major Federal action affecting the environmental quality, and therefore issued a FONSI on August 14, 1998.

The plutonium metal and dioxide that will be produced during the demonstration will be staged in existing special nuclear material storage facilities at LANL until a decision is made on the ultimate disposition strategy. The resulting plutonium metal and dioxide will be suitable for disposition either using immobilization or for use in MOX fuel. No new storage construction will be required, and there will be no need to increase the storage limits of the existing facilities. The demonstration will result in a small net increase in the amount of surplus plutonium at LANL. DOE intends to ship LANL's total surplus plutonium to the disposition site or sites that are chosen as a part of the ROD for this SPD EIS. These demonstration storage activities are part of the ongoing operations discussed in the *Site-Wide Environmental Impact Statement on the Continued Operation of the Los Alamos National Laboratory* (DOE/EIS-0238, January 1999), which is incorporated by reference in the *Pit Disassembly and Conversion Demonstration EA*.

MD131–13 **Pit Disassembly and Conversion**

The HYDOX (dry) process described for the pit conversion facility in Section 2.4.1.2 is a process for converting plutonium metal with certain impurities to a plutonium dioxide with a minimum of impurities. In the HYDOX process, the pit hemishells (i.e., nonpit plutonium metal) would be placed

into the HYDOX module, where the metal would be exposed to and react with hydrogen, then nitrogen, and finally oxygen at controlled temperatures and pressures to produce plutonium dioxide. This is one variation of the basic hydride-dehydride process; another would produce a metal rather than an oxide. The process described in this SPD EIS is not only representative of the proposed process, but is bounding for potential impacts, including accidents. However, a pit disassembly and conversion demonstration aimed at optimizing process operations for the pit conversion facility is under way at LANL. Should evidence from that demonstration or other research invalidate the analyses reflected in this EIS, additional NEPA documentation would be prepared.

MD131–14 Plutonium Polishing and Aqueous Processing

While the SRS FB-Line and associated facilities could be configured to disassemble and declassify pits leaving the plutonium in the metal form, the surplus plutonium disposition program requires that the plutonium metal be converted to oxide for subsequent disposition actions. Therefore, additional processing would be required later to complete the disposition objective. In addition, use of FB-Line for this function would extend its life beyond the timeframe that DOE currently intends to operate this facility.

MD131–15 Pit Disassembly and Conversion

The ability to bring a Government facility on line depends largely on the ability to obtain the required level of congressional funding. Nevertheless, DOE needs to estimate the duration of the construction period in order to assess potential environmental impacts. Based on experience with similar facilities, DOE estimates that it would take 3 years to construct the pit conversion facility. If congressional funding were secured after the ROD was issued, construction could start in 2001, with facility operation beginning in 2004. The 3-year construction period would result in potential impacts more intense than those spread over a longer period.

While it is true that the pit conversion facility is the first consolidated facility for accomplishing this mission on a large scale, the processes that would be used in this facility are not entirely new. Many of these processes are in use at LANL and LLNL. In addition, DOE has recently started a pit disassembly and conversion demonstration project at LANL, where processes will be further developed and tested.

MD131–16 **Alternatives**

DOE acknowledges the commentor's concern about the timeframe for the surplus plutonium disposition program. The schedules presented in Appendix E reflect the design, construction, and operation timeframes DOE has proposed for the surplus plutonium disposition facilities. DOE believes that these schedules can be met and has used them to evaluate the potential impacts of its proposed actions. DOE's MOX RFP specified a timetable including first insertion of production, not test, fuel no later than the end of calendar year 2007, and a date of last insertion no later than 2019. This timetable was acceptable to DCS, the team that was selected for this effort. However, because there could be some delays associated with issues such as negotiations with other countries, Section 4.30.2 includes a discussion of incremental impacts of variations in that schedule. As explained in that section, certain impacts (e.g., exposure) would occur only or primarily during processing, and the total impacts would not change even if the processing schedule were extended or shortened. For example, if the operating period of the MOX facility were extended by 1 year, the total dose and LCFs for the worker and the public would remain essentially unchanged, though the annual dose would be expected to decrease. If the facility were not operating, or operating at a lower throughput, the dose rate would be lower. Then the only contributors would be small amounts of internal equipment contamination and material in highly shielded storage, and presumably fewer workers would be at the facility. Total impacts from these internal sources, however, would depend on the period of operations; lengthening operations for 1 year would mean continued impacts at the levels described in Chapter 4 of Volume I for 1 year or longer.

MD131–17 **Waste Management**

Section 2.4.1.2 of the SPD Draft EIS states that HEU and classified metal shapes would be decontaminated. Waste volumes listed in Chapter 4 of Volume I and Appendix H include wastes generated by the HEU decontamination process.

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II. ***Plutonium Missions/Plutonium Sites/Plutonium Infrastructure***

- In the Cost Report (Table ES-2) a number of infrastructure deficiencies at Pantex needed to support the Disposition Programs are identified, including the following:
  1. SNM processing capability
  2. Radioactive waste management capability
  3. A Source Calibration facility (The new Source Calibration facility at SRS cost about $35M)
  4. A plutonium analytical lab

  These infrastructure improvements would cost hundreds of millions of dollars to construct and operate - in addition, the experience of existing plutonium sites shows that the cost to clean up and remove them at the end of the mission will be even more. It appears that these costs have not been included in the Cost Report. These costs must be developed and considered for a valid cost analysis, including a life cycle cost incorporating ultimate D&D. 18

- In 1996 DOE decided that Pantex was not suitable for a plutonium mission because "plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current capabilities." (Stockpile Stewardship EIS). The 1996 policy was established during consideration of Pantex (and other sites) as potential locations for a pit manufacturing mission. Pantex was disqualified from consideration on the basis of this policy. Pit manufacturing and pit disassembly and conversion have a number of similarities. Both processes are "dry" and involve handling of both the plutonium and associated pit parts. But compared to pit manufacturing, the Disposition Program function of pit disassembly and conversion involves a much larger quantity of plutonium and produces plutonium oxide rather than the much easier to manage metallic form. If it is too expensive and complex to introduce pit manufacturing into a non-plutonium site, then surely it must be dramatically less desirable to introduce pit disassembly and conversion. 19

- DOE explains that its preference for immobilization at SRS "complements existing missions and takes advantage of existing infrastructure and staff expertise". (Page S-9). In the June 23,1998 MOX announcement, DOE said its preference for MOX at SRS was because this mission "complements existing missions and takes advantage of existing infrastructure and staff expertise", and that Pantex "does not offer a comparable infrastructure including waste management." The plutonium processing required for the pit disassembly and conversion mission is essentially the same as that required for MOX. Pantex cannot be "equally preferred" since there are no existing complementary missions at Pantex, there is no existing infrastructure and staff expertise that can be applied to pit disassembly and conversion, and the Cost Report identifies significant inadequacies in the Pantex infrastructure. 20

- DOE is certainly very responsive to some of the public. "During the scoping process, the comment was made that Pantex should be considered for the pit conversion facility", and three options were added. The EIS claims such comments were screened against three 21

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MD131–18 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MD131–19 **Alternatives**

The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) (DOE/EIS-0236, September 1996) states that the pit fabrication mission would not be introduced into a site that does not have an existing plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities. The SSM PEIS states further that an important element of the site selection strategy is maximizing the use of existing infrastructure and facilities as the nuclear weapons complex becomes smaller and more efficient in the 21st century; thus, no new facilities were to be built to accommodate stockpile management missions. Accordingly, DOE considered as reasonable only those sites with existing infrastructure capable of supporting a pit fabrication mission. Although Pantex has the infrastructure to carry out its current weapons assembly and disassembly mission and a nonintrusive pit reuse program, it was not considered a viable alternative for the pit fabrication mission because it did not possess sufficient capability and infrastructure to meet the SSM PEIS siting assumption stated above. Among the operations that were considered in developing siting alternatives for pit fabrication in the SSM PEIS were plutonium foundry and mechanical processes including casting, shaping, machining, and bonding; a plutonium-processing capability for extracting and purifying plutonium to a reusable form either from pits or residues; and assembly operations involving seal welding and postassembly processing.

When comparing the site selection strategy for pit disassembly and conversion mission with that used for the pit fabrication mission, the siting criteria in the SSM PEIS has little or no bearing on siting criteria use in this SPD EIS. Pit disassembly and conversion do not require the foundry and mechanical

processes discussed in the SSM PEIS and can be accomplished in a stand-alone facility. Also, the SSM PEIS siting assumptions include a requirement to use existing facilities, whereas, the pit conversion facility would be a new structure no matter where it is located.

MD131–20 **Alternatives**

The initial preference for Pantex and SRS as sites for the pit conversion facility was based on a determination by DOE that the differences in environmental impacts were modest, and thus did not warrant the preference of one site over the other. Existing infrastructure that supported placement of the pit conversion facility at Pantex included security, staff expertise, and the presence of the pits that need to be dismantled. Costs for all required infrastructure were estimated, and even with the additional waste management and infrastructure support needed at Pantex, the cost differences were not considered significant.

As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

MD131–21 **Alternatives**

Pantex was identified as a candidate site for both the pit conversion and MOX facilities in the NOI. The alternatives that were added after the scoping process to include Pantex as a candidate site for pit conversion were associated with the immobilization-only options; Pantex had already been identified as a candidate site for the pit conversion facility for a number of the hybrid alternatives. As discussed in Section 2.3.1, these options were added after DOE confirmed that they met all the screening criteria.

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criteria, one of which was infrastructure cost. Since Pantex has no plutonium infrastructure, it logically could not pass this screen. | 21

- For both safety and security reasons, it is important that there be a large buffer zone around plutonium facilities. The fact that the distance to the sight boundary at SRS is at least 5X that existing at Pantex should be a significant discriminator. A plutonium release at Pantex would reach the site boundary before an public evacuation notice could be issued. | 22

III. *Program Costs*

- The Cost Report says it "does not incorporate possible synergies between co-locating disposition facilities at one site" (page 3.3). This information is required to make a valid decision. | 23
- The Cost Report shows the answers of MD's analysis of the cost of various options. But since there is no backup/worksheet data publicly available – how is the public supposed to draw any confidence in the veracity and credibility of this analysis. The full analysis needs to be available for review and comment. | 24
- The Cost Report (page 1-10) says DOE's estimate for the immobilization facility was determined on a square foot basis based on experience with similar projects. What were those similar projects? Most of the large comparable nuclear facilities built in this country in the last 15 years have been built at SRS (e.g., DWPF, NSR, HB-Line, RTF) and all of them were significantly more per square foot (even 10-15 years ago!) than the Cost Report estimates for new facilities ($450M/108,000 sq. ft = $4200). | 25
- Both the MOX and Immobilization facilities are estimated at about $4200/sq. ft. The cost per square foot of the pit disassembly and conversion facility is much less, about $2900 per sq. ft. of hardened space? ($440M/~150,000 sq. ft. = $2900). Since the facilities are similar in size and all are plutonium oxide processing facilities it seems logical the cost per square foot would be similar. | 26
- The construction of a MOX plant is estimated at $510M for both Pantex and SRS. Yet the Pantex plant is bigger in the EIS, and the Cost Report has identified the major deficiencies in the infrastructure at Pantex which would have to be added to support a MOX operation. The cost of a MOX operation at Pantex must be much higher than at SRS. | 23
- Some of the construction data is inconsistent. For instance, the MOX plant (120,000 sq. ft.) requires about 50% more construction manpower than the pit disassembly and conversion facility (~150,000 sq. ft.). | 24
- Penalizing sites other than Pantex with an $80 million dollar charge for packaging and shipping pits to a pit disassembly facility elsewhere (page 3-4) is not a valid charge. Shipping plutonium oxide from Pantex to SRS for disposition would cost more than shipping | 25

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MD131–22 **Human Health Risk**

Appendixes K.4 and K.5 present the hypothetical maximum accident impacts on a receptor at each site boundary. Although calculations show that most accidents would yield somewhat higher doses to this receptor at Pantex—given the proximity of the boundary to the release location, the meteorology, and other factors—the differences from the perspective of health risk would, in most cases, likely be minor. This assertion is warranted by the cancer risk values stipulated in Tables K–12, K–13, K–14, and K–25.

MD131–23 **Cost Report**

This comment is addressed in response MD131–18.

MD131–24 **Cost Report**

This comment is addressed in response MD131–18.

MD131–25 **Cost Report**

This comment is addressed in response MD131–18.

MD131–26 **Cost Report**

This comment is addressed in response MD131–18.

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pits. Plutonium oxide requires more shipments, requires a more extensive packaging operation, and uses higher cost shipping and storage containers than shipping pits. 25

- Safeguards and MC&A requirements are significantly different and more complex for handling plutonium in bulk forms rather than the piece counts employed at Pantex. The Cost Report needs to incorporate the cost and schedule impacts of major safeguards and MC&A upgrades at Pantex. 26

IV. ***Pit Storage, Transportation, and Safety***

- The storage of pits at Pantex is inadequate. The GAO issued a report in April saying worker's health and safety have been placed at risk. The Defense Board says that DOE's efforts to improve storage "appear confused" and lack technical basis. Since the plutonium will have to come to SRS for MOX or immobilization anyway, it makes sense to pack and ship as soon as possible and avoid a large cost to upgrade pit storage. Pit disassembly and Conversion at Pantex means surplus pits will remain in inadequate storage for nearly 20 more years. A scenario where pits are retained at Pantex until at least 2015 must include the cost of upgrading pit storage. This cost could easily be more than a hundred million dollars. The EIS should consider alternatives for early shipment of pits to SRS. SRS already has NEPA coverage to transport and store up to 20,000 pits in P-Reactor (Pantex EIS), or could add a module to APSF for pits. 27

- In the 1997 PEIS Record of Decision DOE said that it would store surplus pits awaiting disposition in upgraded facilities at Zone 12 at Pantex by 2004. There does not appear to be any current significant progress in this effort. DOE needs to acknowledge such, and revise the NEPA coverage of pit storage at Pantex. The SPD EIS does not seem to address the exposure, waste, risk, etc. of packaging and shipping all the surplus pits from their current temporary storage in Zone 4 to these upgraded facilities in Zone 12, then moved back again to a pit disassembly facility located in Zone 4. This information needs to be added to the EIS and compared to early transfer to SRS. 28

- Locating pit disassembly and conversion at Pantex could be viewed from a safety perspective in the following way:
  - DOE is proposing to convert sealed plutonium metallic components into a large quantity of dispersible plutonium oxide – then store it directly in the flight path of the Amarillo airport in a facility near bunkers of high explosives and nuclear warheads.
  - Then DOE must ship a dispersible form of plutonium in quantities far larger than has ever been shipped before.

  The Summary of the EIS should explain the logic of this (Option 5A for instance) from a safety perspective. 29

- The EIS transportation data show a significant transportation safety advantage and essentially no more total shipping by co-locating all three disposition programs at SRS. Since the only explanation given for adding Pantex to the program as a processing site was because the pits were there and that might mean a transportation advantage for this option, there now data to eliminate Pantex, especially since it has no history of plutonium work. 30

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MD131–27 **Storage and Disposition PEIS and ROD**

DOE acknowledges the commentor's concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components–AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

MD131–28 **Storage and Disposition PEIS and ROD**

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined; e.g., whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the Storage and Disposition PEIS.

The remainder of this comment is addressed in response MD131–27.

MD131–29 **Human Health Risk**

In response to public concerns, a number of actions (see Appendix K.1.5.1) have been taken to reduce the risk of an aircraft crash at Pantex. The frequency

of a crash into a pit conversion facility vault containing plutonium powder (plutonium dioxide) is less than 1 in 10 million per year. According to conservative calculations (see Table K–12), this "beyond-extremely-unlikely" accident (estimated frequency: lower than 1 in 1 million per year) would induce 4.5 LCFs in the population within 80 km (50 mi) of the site.

The impacts of explosives and the associated release of plutonium powder into the environment have also been evaluated (Appendix K.1.5.2.1). An explosion would be "unlikely" (estimated frequency: 1 in 10,000 to 1 in 100 per year). Conservative calculations (see Table K–12) indicate that this accident would induce only 0.00011 LCF in the population within 80 km (50 mi) of the site. The inadvertent detonation of a nuclear warhead is not considered credible.

Impacts associated with transporting plutonium dioxide from Pantex to offsite facilities are addressed in this SPD EIS; an estimate of the maximum potential impacts of such a shipment is included in Appendix L.6.3. According to conservative calculations, a transportation accident in an urban area would produce 27 LCFs within a radius of 80 km (50 mi) of the accident location. However, given the extremely low frequency of the accident (much lower than 1 in 10 million per year), the actual risk of a fatal cancer is extremely low. A transportation accident in a rural area, the scenario discussed in Section 4.6.2.6, has a frequency of 1 in 10 million per year and a predicted impact of less than 0.1 LCF. The net result is an extremely low risk of a fatal cancer among the population within 80 km (50 mi) of the accident. In summary, conservative evaluations indicate no significant safety concerns to the public from locating the pit conversion facility at Pantex.

MD131–30 **Transportation**

The selection of sites for potential surplus plutonium disposition facilities was based on a number of factors. The location of the surplus pits at Pantex was not the only reason for making it a reasonable alternative for siting the proposed surplus plutonium disposition facilities. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Table L–6 shows the transportation risks for all alternatives. Analyses of transportation risks are just one of the factors considered in the decisionmaking regarding facility siting.

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- DOE's EM Division has stated that they expect to save over a billion dollars by accelerating shipment of non-pit plutonium from Hanford and Rocky Flats to SRS for disposition. If it is cost effective for EM to expedite the movement of that plutonium, then it must also be cost effective for DOE to accelerate the shipments of pits from Pantex. Particularly considering the major upgrades required at Pantex for safe storage if the pits are not promptly moved. 31

V. ***Waste and Waste Management***

- DOE plans to entomb six million cubic feet of TRU waste at WIPP. The pit disassembly and conversion facility will produce less than .1% of this quantity regardless of whether a dry or aqueous process is used. Therefore whether one pit conversion process produces slightly more or less TRU waste than another is irrelevant. The fact that this technology choice impacts 32

  1. Cost and schedule
  2. The size, cost, risk, and environmental impact of downstream processing facilities
  3. The ability to use of existing facilities for aqueous systems versus having to construct new facilities for the proposed dry process

  needs to be considered and analyzed in the EIS.

- If all the 50MT's of surplus plutonium were aqueously processed using existing facilities at SRS, fewer than 20 additional glass logs would be produced by DWPF out of an approximate total of 5200 and would represent less than one month out of 25 years of operation of DWPF. This small environmental impact needs to be included as an EIS option, and together with the resulting smaller, simpler MOX and immobilization facilities, considered as a reasonable alternative compared to the all new facilities and technologies currently analyzed. 33

- The EIS says that shipments of TRU waste resulting from a pit disassembly and conversion operation at Pantex cannot be shipped to WIPP until after 2016. The full cost, risk, and facilities for storing the total accumulation of TRU waste during the life of the program until after 2016 needs to be added to the analysis. In addition, the EIS needs to consider the much larger quantity of TRU waste which will be generated by the future D&D of a 186,000 sq. ft. plutonium processing facility at Pantex. 34

- While it is true that solid waste generation under any scenario would be small compared to DOE's existing stocks, certainly it should be worth noting in the summary, p. S-23 for example, that generation of any TRU waste at Pantex is an issue. Pantex has no TRU waste nor authorization to ship TRU waste to WIPP. TRU waste will have to be stored until at least 2016. 35

- What is the logic for not including waste shipments in Table S-3, "Facility Transportation Requirements"? The inclusion of these shipments is part of the plant's operations and the 36

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MD131–31 **Storage and Disposition PEIS and ROD**

The potential cost saving that could result from the early movement of nonpit surplus plutonium from RFETS and Hanford is based on the termination of storage operations and required security at those sites. Security is a major cost involved with storage. The same situation does not apply to Pantex, which will continue its storage mission and associated security. Further, major upgrades of storage facilities at Pantex are not required, but DOE is considering some upgrades (e.g., air conditioning, catwalks, standby power) to address plutonium storage requirements. Although SRS is preferred for the proposed surplus plutonium disposition facilities, a decision has not been made. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD131–32 **Waste Management**

An aqueous process for conversion of plutonium would need to be placed in a new facility. Existing canyon facilities are not configured for a plutonium disposition mission and are either shut down or planned for shutdown and D&D.

DOE is committed to waste minimization and pollution prevention throughout the complex.

The remainder of this comment is addressed in response MD131–1.

MD131–33 **Waste Management**

This comment is addressed in response MD131–9.

MD131–34 **Waste Management**

Section 4.17.2.2 evaluates the potential impacts of operation of the pit conversion and MOX facilities on the waste management infrastructure at Pantex. This section states that the 640 m^3 (837 yd^3) of TRU waste generated over the 10-year operations period could be stored within the new pit conversion and MOX facilities with minimal impact on existing waste management infrastructure at Pantex. The amount of waste generated by D&D of the facilities would be determined by the future use selected for the buildings and adjacent land areas. As described in Section 4.31, DOE will

evaluate options for D&D or reuse of the proposed facilities at the end of the surplus plutonium disposition program. At that time, DOE will perform engineering evaluations, environmental studies, and further NEPA review to assess the consequences of different courses of action.

MD131–35 **Waste Management**

Pantex's lack of TRU waste capacity is discussed in Section S.7 of the *Summary*, which states that because TRU waste is not routinely generated and stored at Pantex, TRU waste storage space would be designated within the pit conversion and MOX facilities. Also, Section S.8 of the *Summary* states that TRU waste storage at Pantex would be provided within the new surplus plutonium disposition facility. In addition, Section 4.17.2.2 assumes that all TRU waste would be stored on the site before being shipped to WIPP for disposal. Although Pantex is not currently authorized to ship TRU waste to WIPP, wastes produced by the proposed surplus plutonium disposition facilities could be accommodated in WIPP. Section 4.17.2.6 includes an analysis of the transport of TRU waste from Pantex to WIPP. This analysis would provide the NEPA documentation for these shipments if this alternative were selected.

MD131–36 **Waste Management**

DOE acknowledges the commentor's concerns regarding transportation of wastes generated by the proposed surplus plutonium disposition facilities. The impacts of waste transportation are analyzed in detail in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE/EIS-0200-F, May 1997). As described in Appendix L.6.4 of this SPD EIS, waste transportation at the sites would be handled in the same manner as current waste shipments, and would generally not constitute a major increase in the amounts or risks of waste currently being generated at these sites and analyzed in the WM PEIS. Therefore, this small increment of shipments is not analyzed in this SPD EIS. However, wastes could be generated by surplus plutonium disposition activities that are not covered in the WM PEIS: (1) TRU waste generated at Pantex; (2) some of the LLW generated at Pantex; and (3) some of the LLW generated by lead assembly fabrication at LLNL. Shipment of Pantex TRU waste to WIPP, and Pantex and LLNL LLW to NTS disposal facilities are analyzed in this SPD EIS with the

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impact will vary by scenario chosen. They should be included here for impact and not segregated since that tends to confuse. 36

VI. ***EIS Data Inconsistencies***

- The radiation exposure to construction workers at Pantex reported as zero, but section 3.4.4.1.2 reports that annual doses of 100 mrem above background are measured in zone 4, the site of the proposed facilities. This needs to be corrected to show the exposure to construction workers. 37
- The TRU waste volume forecasts do not appear to be accurate. The annual TRU waste volume for pit disassembly and conversion, a very large facility handling 33MT of plutonium oxide is much less than the TRU waste forecasted from the much smaller MOX and immobilization facilities which handle equal or less plutonium. I cannot understand this difference – what is the basis for the forecasts and how do they compare to real data from an operating plutonium processing facility like SRS's FB Line or Hanford's PFP? 38

VII. ***Lead Test Assemblies***

- SRS is the preferred site for MOX and should also be the preferred site for the MOX Lead Test Assembly work. The same plutonium capability and expertise is required for both programs. Given the high costs associated with establishing and maintaining plutonium sites, and, given that the only potential for future plutonium operations that are even being considered are at SRS or Pantex, DOE should not consider supporting plutonium infrastructure at INEEL, LLNL, Hanford or ANL-W for the Lead Test program. The report evaluating all five sites showed that the physical plant SRS is offering is as good as any other option. Surely DOE would not maintain another plutonium site for several years just to support a small test program. 39
- The EIS needs to examine the impact of a larger test assembly program. Typical fuel demo programs in the commercial LEU world would require more. The fuel vendor and utility teams have not yet spoken. And, the NRC has yet to review any license applications. 40
- SRS's HB-Line will be producing purified plutonium oxide for safe storage during the time this kind of material will be needed for the Lead Test Assembly Program. Since HB-Line is immediately adjacent and connected to the facility to be used for the LTA's, this would be a logical source of plutonium feed. The EIS should evaluate this option and consider the reduced environmental and safety impacts of using this immediately available pu feedstock. 41

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results presented in Chapter 4 of Volume I and Appendix L. Transportation requirements for these wastes are not included in Table S–2 since this table provides generic transportation requirements applicable to the listed facilities regardless of site location.

MD131–37 **Human Health Risk**

As stated in Section 3.4.4.1.2, the 100-mrem dose is the dose measured at an offsite control location. It is the dose strictly associated with the natural background levels of the area; no part of the dose is attributable to above-background sources. Therefore, there is no discrepancy in the assertion of a zero dose (i.e., the dose level above background) for Pantex construction workers. A statement was added to applicable Chapter 3 (Volume I) sections to further clarify this issue.

MD131–38 **Waste Management**

The pit conversion facility would convert relatively clean plutonium metal pits to clean plutonium dioxide. In contrast, both the immobilization and MOX facilities mix the plutonium with other materials, increasing the material flow through the facility by a factor of 10 to 20. Additionally, the immobilization facility would handle plutonium in various forms, including fuel rods and plates, impure oxides, and impure metals and alloys. Each form of plutonium requires different processing techniques; some would require significantly more handling than pits require in the pit conversion facility and therefore would generate more TRU waste. Likewise, many steps are needed to fabricate the clean plutonium dioxide into fuel assemblies in the MOX facility. Because the immobilization and MOX approaches are more complicated and process a considerably larger total material throughput, it is estimated that more TRU waste would be produced by the immobilization and MOX facilities than the pit conversion facility.

MD131–39 **Lead Assemblies**

DOE acknowledges the commentor's support for the fabrication of lead assemblies at SRS. As discussed in the revised Section 1.6, based on consideration of capabilities of the candidate sites and input from DCS on the MOX approach, DOE prefers LANL for lead assembly fabrication. LANL is preferred because it already has fuel fabrication facilities that would not

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Thank you for your careful consideration of my comments. I am looking forward to seeing them addressed in the Final EIS and a revised Cost Report.

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require major modifications, and takes advantage of existing infrastructure and staff expertise. Additionally, the surplus plutonium dioxide that would be used to fabricate the lead assemblies would already be in inventory at the site. DOE prefers ORNL for postirradiation examination activities. ORNL has the existing facilities and staff expertise needed to perform postirradiation examination as a matter of its routine activities; no major modifications to facilities or processing capabilities would be required. In addition, ORNL is about 500 km (300 mi) from the reactor site that would irradiate the fuel. Decisions on lead assembly fabrication and postirradiation examination will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD131–40 **Lead Assemblies**

The lead assembly program, including determination of the number of lead assemblies for test irradiation, was the product of close consultation with representatives of the commercial nuclear industry. Since publication of the SPD Draft EIS, the number of lead assemblies has in fact been reduced to two on the basis of information provided by DCS. DCS indicated in its proposal that two lead assemblies should be sufficient for its fuel qualification plan, although it is possible that more than two would be required. The potential impacts of fabricating 10 lead assemblies and irradiating 8 of them were analyzed in the SPD Draft EIS. Should fewer lead assemblies than analyzed be fabricated or irradiated, the potential impacts would be less than those described in this SPD EIS. This SPD EIS analyzes the potential impacts of the fabrication of the lead assemblies. Domestic, commercial reactors operate under NRC license; therefore, the use of MOX fuel lead assemblies would be subject to review and regulation by NRC.

MD131–41 **Lead Assemblies**

The purpose of the lead assembly project is to qualify fuel for the MOX approach to surplus plutonium disposition. In this SPD EIS, it is assumed that the plutonium would come from dismantled pits or existing supplies of surplus metal and oxide at LANL.

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CLAUDE L. GILBERT, JR.
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September 14, 1998

Department of Energy
Office of Fissile Materials Disposition
Howard R. Canter

Dear Mr. Canter,

Throughout the administrations of Presidents Ford, Carter, Reagan, and Bush, the policy of the United States banned the use of plutonium in commercial nuclear power plants due to the risk that the plutonium could be diverted to terrorists and to nations that have not renounced the use of nuclear weapons.

I hope you will reconsider the dangerous, expensive and an irresponsible course you have endorsed that will convert warhead plutonium into civilian nuclear reactor (MOX) fuel. The use of MOX in the U.S. sends precisely the wrong message in the effort to end nuclear proliferation. As you know, MOX equals plutonium, one of the most toxic, carcinogenic, radioactive substances in the world. This means that the federal government will be transporting plutonium into neighborhoods in order to prop up and subsidize a failing nuclear power industry. You also realize that the production of mixed oxide fuel will result in enormous new quantities of radioactive and chemical wastes that will present significant additional disposal problems and unknown costs. The Department of Energy should be developing plutonium immobilization technologies not endangering the public as well as draining our assets to promote a failed foreign business. 1

Companies such as BNFL and Cogema cannot be trusted to handle US plutonium disposition. BNFL, besides being responsible for the radioactive North Sea, is a key partner in Urenco, a uranium enrichment consortium. It was top-secret Urenco uranium enrichment technology that formed the basis of Iraqis clandestine efforts to attain nuclear weapons capability. This is not the kind of company that should be handling the most sensitive nuclear material in the United States. There are no reactors in England interested in MOX fuel. 2

Cogema is undergoing severe criticism and scrutiny in France, where it was revealed in the Spring of 1997 that the area near its La Hague reprocessing plant is highly radioactively-polluted and has caused excess childhood cancers. Continued radiation monitoring in the area has found continued high radiation levels, and local beaches were closed during the summer season.

Here in South Carolina, we already have massive environmental problems from the Savannah River Site. Our ground water is contaminated, the food chain has been contaminated (radioactive fish, turtles and four legged owls). DuPont and Westinghouse both had visions of grandeur and failed miserably in the nuclear waste department, leaving a massive cleanup bill for the taxpayer. Duke power wants to experiment with MOX and have the taxpayer subsidize them and then pay higher rates for electricity in a time when deregulation and energy efficiency makes nuclear power the most expensive fuel there is. Mixing plutonium with taxpayers money is not a sound business decision., the people and the environment deserve better- 3
do the right thing, STOP MOX.

Thank you
Claude Gilbert, Jr.

Claude Gilbert, Jr.

MD184

MD184–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. In keeping with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of U.S. surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. In addition, the MOX facility would be open to international inspections.

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a

fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS. Transportation impacts of the MOX approach are summarized in Chapter 4 of Volume I and Appendix L.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

MD184–2 **Other**

DOE acknowledges the commentor's concerns.

MD184–3 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

Surplus Plutonium Disposition Draft EIS Public Comment

Charles R. Goergen
510 Boardman Road
Aiken, South Carolina 29803

With 23 years of nuclear experience in working with all isotopic classes of plutonium, my areas of expertise include plutonium chemistry, chemical separations processing, and radioanalytical techniques. In 1994 while on loan to DOE-HQ, Office of Nuclear Weapons, I served on the Plutonium ES&H Vulnerability Assessment participating in the Pantex Working Group Assessment Team as the plutonium technology/process safety expert where I spent a total of one month at the Pantex Site. As a result of that experience I have serious concerns for Pantex being the Site chosen for the Surplus Plutonium Disposition pit conversion mission.

That vulnerability assessment took a time slice for current missions. In 1994 direct work with unclad plutonium was not included. All plutonium was encased in sources or pits with the exception of some lab reference solutions. There have only been a few occasions where Pantex has had plutonium exposed to air. In the most recent case, the design agency was called in to actually autopsy the pit and deal with the resultant materials.

During my experience at Pantex I made the following observations:

- There was no workforce experience base of unclad plutonium handling operations. Operations, maintenance, Radcon, and engineering need to be familiar and knowledgeable of possible hazards. Precautions centered on maintaining the integrity of the cladding with emergency responses to reestablish containment. There was no experience with releases of plutonium. Technical assistance by the design labs was available but not easily accessed. 1

- Personnel knowledge of the properties of plutonium focused on penetrating radiation exposure. Appreciation for the form was lacking, for example: α or δ phase metal, particle size distribution of oxide, nitrate or hydroxide solutions, Pu-238 or Pu-239 isotopic distribution. Intimate knowledge of plutonium characteristics and familiarity of operations is vital to success of this defined endeavor.

- Nuclear Criticality had been analyzed to be incredible for pit systems at Pantex. As soon as the pit is deconformed and converted to another geometry, the criticality implications, analyses, controls, alarms, emergency response procedures and facilities must then be addressed. This would involve an extensive control system.

- Radiological contamination controls need to deal with potential contamination levels of millions of dpm alpha. Techniques to work with and handle this level of radioactivity, measurement, and decontamination methodology are learned through experience. Anti-contamination techniques such as radiological clothing/personal protective equipment need to have been mastered. Ventilation systems require

SCD05

SCD05–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the pit conversion facility at Pantex. Experienced workers would be used, and specific training would be provided to all workers involved in the surplus plutonium disposition program. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

GOERGEN, CHARLES R.
PAGE 2 OF 2

maintenance programs for HEPA filters, fans, and ductwork. Handling of ancillary materials such as tools, transuranic waste, low level waste, and laundry are not inconsequential tasks.

- Shielding will need to be added for (α, n) reactions to be encountered and the Am-241 in aged plutonium.

- Use of containments such as work in gloveboxes is difficult and requires extensive practice and experience to gain proficiency.

I urge the Department to give weighted consideration to the experience of the workforce in plutonium handling. This goes for design input/review, facility operability, and knowledge. This is not something that can be learned easily from a book but requires familiarity with the potential hazards of the actinides to be encountered. In day-to-day operations there will be difficulties that require immediate technical engineering input and observation. Currently, design agencies provide long distance support. 1

While the Pantex Site has done an outstanding job in their mission of weapons assembly/disassembly and storage and handling of high explosives, it remains what a DOE official once called it, "a screw and glue factory". Design, construction, and operation of plutonium handling facilities are a different type of work requiring an experience base that is lacking at Pantex.

SCD05

United States Department of Energy

Comment Form

NAME: (Optional) Rudy Goetzman
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TELEPHONE: (803) 649-2349
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All three elements of the Pu disposition program should be located at SRS. Consolidation of the mission makes both technical and business sense. SRS has the trained personnel and the infrastructure to do all the activities in the disposition program. Pantex has never handled Pu solutions. It is essential that experienced operators and managers are involved with each of the proposed processes to ensure the safety of the workers and the public. 1

The cost to develop the infrastructure, train the personnel, and "move up the learning curve" at Pu operations have to be significant for Pantex - some estimates are over $1 Billion. From a pure economics standpoint, SRS represents a much better choice.

SCD91

SCD91–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

GOLDMAN, JAMES
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) JAMES GOLDMAN
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TELEPHONE: (803) 278-2970
E-MAIL: goldmanj@bellsouth.net

I support bringing all Surplus Plutonium Disposition mission to the Savannah River Site where the mission will be completed cheaply & safely. 1

SCD65

SCD65–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

GREATER NORTH AUGUSTA CHAMBER OF COMMERCE
CHUCK SMITH
PAGE 1 OF 1

I am Chuck Smith and I am here on behalf of the Greater North Augusta Chamber of Commerce. I live in North Augusta as do many people that are touched by the Savannah River Site on a daily basis.

The people at SRS and the CSRA contributed to our Nation's nuclear deterrent efforts for over four decades and now these same people are prepared to take on the new, critical mission of plutonium disposition. Why would DOE consider another possible site for this mission? SRS has the experience, the infrastructure, the best safety numbers of the entire DOE complex and can accomplish the pit disassembly mission at a lower cost to taxpayers. DOE has previously acknowledged that SRS is uniquely qualified to handle plutonium when it named SRS as the site of choice for the Mixed Oxide Fuel Fabrication. 1

I believe that these hearings will provide overwhelming arguments as to why DOE will decide that SRS is the preferred site for the Pit Disassembly Mission.

On behalf of the North Augusta Chamber of Commerce, I appreciate the opportunity to express our support for DOE to place this mission at the Savannah River Site.

SCD59

SCD59–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

GREATER NORTH AUGUSTA CHAMBER OF COMMERCE
CHUCK SMITH ET AL.
PAGE 1 OF 1

RESOLUTION

WHEREAS the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS plutonium disposition represents one of the most certain future missions of the DOE for the next 20 to 30 years; and

WHEREAS the Department of Energy has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and

WHEREAS the Savannah River Site has produced approximately 40 percent of all US weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public or the environment; and

WHEREAS the Department of Energy in its Record of Decision recognizes the Savannah River Site as "a plutonium-competent site with the most modern, state-of-the-art storage and processing facilities...with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and 1

WHEREAS the regional community in the Central Savannah River Area (CSRA) of South Carolina and Georgia strongly supports continued plutonium missions for the Department of Energy's Savannah River Site;

NOW BE IT RESOLVED that the Greater North Augusta Chamber of Commerce strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

APPROVED this 26th day of February 1997 at North Augusta, South Carolina, by the Greater North Augusta Chamber of Commerce Board of Directors.

Chuck Smith
Chairman

Leta W. Burnett
Executive Director

235 GEORGIA AVENUE * NORTH AUGUSTA, SOUTH CAROLINA 29841 * 803-279-2323

SCD99

SCD99–1 **Alternatives**

DOE acknowledges the commentors' support for siting the surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

HARDISON, KAREN G.
PAGE 1 OF 3

8-31-98

Laura Holgate
Under Sec'y
Office of Fissile Materials
Department of Energy
Washington, D.C.

Ms. Holgate,

As a Concerned citizen of the state of South Carolina, I am writing to voice opposition to the Department of Energy's plan to manufacture mixed oxide fuel (MOX) at the Savannah River Site (SRS) or elsewhere.

I strongly agree that we must safeguard plutonium from terrorists and others who may wish to build atomic weapons. Also, We, as a Country, must find and agree upon a means of the storage/disposal of plutonium which safeguards the environment and the people in it as well. 1

MD244

MD244–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. However, DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The DOE disposition facilities proposed in this SPD EIS would be at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Security for the SRS facilities would be implemented commensurate with the usability of the material in a nuclear weapon or improvised nuclear device. SRS has sitewide security services. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed inside are adequately protected. Closed-circuit television, intrusion detection, motion detection, and other automated materials monitoring methods would be employed. Furthermore, the physical protection, safeguards, and security for the MOX facility and domestic, commercial reactors would be in compliance with NRC regulations.

HARDISON, KAREN G.
PAGE 2 OF 3

2

MOX is not a viable choice for the safe containment of plutonium. This is because every reactor, commercial or other, produces plutonium as a waste product of its operation. When the combined uranium/plutonium MOX fuel is used in a normal reactor (as opposed to a weakened one), the amount of plutonium that comes out of the reactor, according to the Westinghouse Corporation, is only 1% less than the amount of plutonium that went into the reactor. 2

Plutonium is one of the most toxic, carcinogenic radioactive substances in the world. It stays in the environment and is a health hazard for 240,000 years! We must find a safe and alternate method for its immobilization; a method which does not threaten the health of millions of people. 3

There are too many risks 4

MD244

MD244–2 **MOX Approach**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. The purpose of the MOX approach is to convert surplus plutonium to a form that meets the Spent Fuel Standard, thereby providing evidence of irreversible disarmament and establishing a model for proliferation resistance. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. While it is true that not all the plutonium would be consumed during irradiation in a nuclear reactor, the resulting spent fuel would have a radiation barrier equivalent to LEU spent fuel, and recovery of this plutonium would be extremely dangerous, time consuming, and costly.

MD244–3 **Immobilization**

In the *Immobilization Technology Down-Selection Radiation Barrier Approach* (UCRL-ID-127320, May 1997), LLNL recommended that DOE pursue only the can-in-canister immobilization approach based upon its superiority to the homogenous approaches in terms of timeliness, higher technical viability, lower costs, and to a lesser extent, lower environmental and health risks. Based on further recommendations from a committee of experts representing DOE, the national laboratories, and outside reviewers, DOE subsequently determined that immobilizing surplus plutonium materials would be best accomplished using the ceramic can-in-canister approach. NAS is currently conducting studies to confirm the ability of the ceramic can-in-canister immobilization approach to meet the Spent Fuel Standard. The immobilization process is further discussed in Section 2.4.2.2.2.

MD244–4 **Transportation**

As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special

3

associated with the proposed production and use of Mixed Oxide Fuel. One such risk is that the plutonium, now being guarded in Texas, will be more vulnerable to theft by terrorists or accidental spills while being transported by trucks and rail cars. 4

Also, there are increased health risks inherent with the use of radioactive materials such as increased rates of cancer, leukemia and thyroid problems that result from environmental degredation and contamination. 5

The people have a right to be a part of this important decision! Extensive discussion of the alternatives for plutonium containment needs to happen before the DOE begins a project that will detrimentally affect millions for life. 6

Yours truly,
Karen G. Hardison
Karen G. Hardison

MD244

nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material, and no material has been diverted by terrorists. Section 2.4.4 and Appendix L describe DOE's transportation and material protection activities.

MD244–5 **Human Health Risk**

This SPD EIS identifies and analyzes potential human health impacts that might result from construction and operation of the proposed surplus plutonium disposition facilities. The Human Health Risk and Facility Accidents sections in Chapter 4 of Volume I discuss the effects on the public of potential radiological releases. DOE policy places public safety above other program goals, and requirements have been established to protect the safety and health of the public. DOE considers the protection of the public against accidents in the design, location, construction, and operation of its facilities.

MD244–6 **General SPD EIS and NEPA Process**

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of public dialogue on the program. Hearings on this SPD EIS were held in Washington, Texas, South Carolina, Oregon, Idaho, and Washington, D.C. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. Additionally, various means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue. It is DOE policy to encourage public input into these matters of national and international importance.

HELMS, LOIS
PAGE 1 OF 1

I wanted to register an opinion. My name is Lois Helms. I live in Winnsboro, South Carolina. I'm opposed to the plans for a MOX plant at the Savannah River Site. I think it's a hazardous program and has many short comings and is being rushed through without efficiency. 1

PD043

PD043–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the MOX facility at SRS. This SPD EIS analyzes the potential environmental impacts associated with implementing the proposed surplus plutonium disposition activities at the candidate sites. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, demonstrate that the activities would not have major impacts at any of those sites including SRS.

As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

JOHNSON, STEPHEN A.
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) STEPHEN A. JOHNSON
ADDRESS: 213 CUO VISA DRIVE AIKEN, SC 29803
TELEPHONE: (803) 643-0623
E-MAIL: stevenonjohnson@scescape.net

If you exclude political pandering, SRS is the only possible choice for the consolidation of all Plutonium disposition mission. 1

SCD63

SCD63–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

JORDAL, JIM
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) JIM JORDAL
ADDRESS:
TELEPHONE: ( )
E-MAIL:

SURPLUS STATES — IT MAKES A WHOLE LOT MORE SENSE TO HAVE PLUTONIUM DISPOSITION AT THE SRS (IMMOBILIZATION AND MOX) THAN TO DO ONE OF THE TWO AT PANTEX AND RISK TRANSPORT OF PLUTONIUM ACROSS THE SOUTHEAST FOR MOX AT SRS.

CONSIDER THE FACTS, NOT RHETORIC
, NOT POLITICS
, NOT LOBBIES

USE GOOD AMERICAN COMMON SENSE.

1

SCD57

SCD57–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

League of Women Voters of South Carolina
P.O. Box 8453
Columbia, SC 29202
(803) 695-1112

Date: September 11, 1998

To: U.S. Dept. of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

From: Mary T. Kelly, Ph.D., Natural Resources Specialist, LWVSC
4018 Sandwood Drive, Columbia, SC 29206
(803) 782-8410

Re: Surplus Plutonium Disposition Draft EIS

The League of Women Voters of South Carolina has been following Savannah River Site activities, its various missions, and its environmental problems for some twenty-five years. We agree that solutions must be found for eliminating the risk posed by surplus plutonium. We appreciate the opportunity to make these comments:

We commend DOE for holding forums on the Surplus Plutonium Disposition Draft EIS in various parts of the country. However, the session on the afternoon of August 13, 1998 in N. Augusta, SC, made a mockery of the public participation process. It was supposed to be informational with time for discussion groups. Instead it was a highly organized and structured lobbying effort on the part of the many supporters in the area who view all proposals as one big jobs/economic development opportunity for the Aiken/Barnwell/Augusta, Georgia area. I believe that the main contractor, Westinghouse, is also part of the lobbying effort. One is reminded of President Eisenhower's caution about the military/ industrial complex. 1

Supporters cheered after every speaker. It was intimidating for many with reservations about the proposals and not an atmosphere for sharing valid objections counter to the mood of the 600-member crowd. The few who did speak at the mic and should be commended for their courage. One speaker questioned why anyone not from the area should care. The fact that many millions of taxpayer dollars are at stake and that we all share in the risk SRS poses did not seem to occur to him.

We heard numerous references to the SRS safety record, one that belongs not to the current contractor, Westinghouse, but to the previous contractor, DuPont. Westinghouse in fact has little or no production record at this site, and there is some doubt as to whether Westinghouse will be the contractor when the proposed facilities are built and operated. And does the large pool of experienced workers so often mentioned exist? Many are too old and others have dispersed away from this site. There has been no production since 1988 when the last tritium-producing reactor was shut down for safety reasons. 2

The fact that nuclear technology is very, very dangerous seems to have escaped the majority of speakers. A nuclear accident has the potential of contaminating a multi state area. We live in a dangerous world. On the one hand, the proposals being offered are intended to keep fissile materials out of the hands of terrorists. On the other, we seem willing to consolidate almost all of the nation's fissile materials in one place, making South Carolina and the SRS site perhaps the world's prime one shot- target for a massive military strike. Is it really smart to concentrate so much at one site? 3

To comment on the exact proposals:

*How will the burning of MOX in commercial reactors affect foreign policy and our non-proliferation stance? Turning the excess plutonium and highly enriched uranium into fuel for *commercial* reactors is in contradiction with our carefully thought out strategy of many years standing - do not mix military and civilian nuclear efforts. We have maintained this posture through thick and thin. It was the 4

MD169

MD169–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concerns about the public hearings for discussion of the surplus plutonium disposition program. DOE believes that the hearing in question was objective and open; everyone who attended was provided an opportunity to comment orally or in writing. Moreover, all comments submitted were given equal consideration relative to the preparation of this SPD EIS.

MD169–2 **Other**

The management and operations contractor for SRS is required to operate the site in compliance with applicable laws and regulations, including DOE environmental, safety, and health directives. If DOE implements alternatives for the disposition of surplus plutonium that result in the construction and operation of facilities at SRS, compliance with applicable laws and regulations would apply to the management and operations contractor regardless of the contractor's previous experience.

As discussed in Section 3.5, operational reactors at SRS have been shut down. Active missions at the site are summarized in Table 3–38. Workers in safety-sensitive positions at SRS must satisfy DOE's qualifications for such positions. As discussed throughout Chapter 4 of Volume I, implementation of alternatives that would result in construction of new facilities at SRS would have no major impact on the regional workforce.

MD169–3 **DOE Policy**

The scope of this SPD EIS is focused on analysis of alternatives on weapons-usable plutonium that has been declared surplus to national security needs. It does not address nonsurplus plutonium (e.g., strategic reserves) or other fissile materials such as HEU, which would continue to be stored at sites other than SRS. Therefore, all material would not be concentrated at SRS.

The Facility Accidents sections in Chapter 4 of Volume I summarize accident analyses for SRS. Details are provided in Appendix K.

The proposed DOE surplus plutonium disposition facilities are all at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Security for the SRS facilities would be implemented commensurate with the usability of the material in a nuclear weapon or improvised nuclear device. SRS has sitewide security services. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed inside are adequately protected. Closed-circuit television, intrusion detection, motion detection, and other automated materials monitoring methods would be employed. Furthermore, the physical protection, safeguards, and security for the MOX facility and domestic, commercial reactors would be in compliance with NRC regulations. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical cost reports, national policy and nonproliferation considerations, and public input.

MD169–4 **Nonproliferation**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation

justification in the atoms for peace days for allowing American companies, including Westinghouse, to sell nuclear technology abroad.

We have criticized other countries for using commercial reactors to produce weapons grade material. Witness our condemnation of Pakistan and India for their bomb making activities. 4

*Will commercial reactors really be available to burn this fuel? The nation's commercial reactors are aging and in the process of, or planning for, decommissioning. We are now hearing that the forty-year license period was chosen to coincide with the terms of the financing lenders would extend. However, the fact of the matter is that these aging reactors are becoming increasingly unsafe and very expensive to operate. Essential parts are too highly irradiated to be safe to operate or to approach to replace. Given the past difficulties in restarting reactors at SRS this problem shouldn't be minimized. 5

*Will the public accept the use of this type of fuel in commercial reactors located relatively close to significant populations? 6

*If a commercial reactor is chosen and retrofitted to burn MOX what will be the licensing process? Will it be similar to that now used to license commercial plants? Who will regulate? 7

*What will be the nature of the waste and how will it be handled if the permanent repository is not ready? This is a big problem for commercial reactors now. 8

*With the coming of deregulation, states and stock holders are being faced with the problem of stranded costs for commercial reactors, mainly unpaid debt. This is very high for nuclear utilities and will no longer be recoverable through regulated rates. Some entity - the federal government, each state, taxpayers, stockholders - will have to assume this burden. How will this affect that problem? Or will the federal government assume the obligation? 9

We continue to be concerned about how new initiatives at SRS will affect the environmental clean up now going on and still far from complete, especially as the new initiatives will produce additional waste. Although we are strong advocates of objective decision making we have to have a degree of skepticism towards any and all planning, based on the lack of stability in the political leadership at the highest levels of DOE, and the arbitrary changes that Congress may make. We have seen three different DOE Secretaries in the last few years. Nevertheless, we wish you well as you make these decisions, so important for the peace of the world. 10

MD169

would be a once-through cycle with no reprocessing. The decision on disposition of surplus HEU calls for blending down this material to LEU that is suitable for reactor use. Therefore, this uranium fuel for commercial reactors would no longer be weapons grade and would be the same as other commercial uranium fuel.

MD169–5 **MOX Approach**

DOE acknowledges the commentor's concerns regarding the use of MOX fuel in commercial reactors. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel. Commercial reactors in the United States are capable of safely using MOX fuel. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. The SRS reactors are much older and predate most of the regulatory requirements to which commercial reactors are designed.

MD169–6 **NRC Licensing**

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

MD169–7 **NRC Licensing**

The regulatory process will be the same as for any request to amend a 10 CFR 50 operating license. The reactor licensee will initiate the process by submitting an amendment request to NRC in accordance with 10 CFR 50.90. Safety and environmental analyses commensurate with the level of potential impact are submitted in support of, and as part of, the amendment request. NRC reviews the submitted information and denies or approves the request. The review process may involve submittal of additional information and face-to-face meetings between the licensee and NRC, and may result in modified license amendment requests. NRC would continue to regulate the commercial reactors.

MD169–8 **Waste Management**

The characteristics of MOX spent fuel would be similar to those of LEU spent fuel. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. The additional spent fuel assemblies from the use of MOX fuel would not require different spent fuel storage at the reactor sites. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

MD169–9 **Cost**

DOE would not assume any obligation for stranded costs under the alternatives for the surplus plutonium disposition program.

MD169–10 **DOE Policy**

DOE acknowledges the commentor's concern that environmental cleanup at SRS would be affected by new initiatives, especially those that would produce additional waste, DOE's changing leadership, and changes imposed by the U.S. Congress. Cleanup at SRS is still a priority, will remain a priority, and can coexist with other DOE initiatives. The surplus plutonium disposition program would be conducted in a way which ensures that cleanup remains a priority at SRS and that the production of any additional waste is processed and disposed of in a timely and environmentally acceptable manner.

LOWER SAVANNAH PRIVATE INDUSTRY COUNCIL
LEO CARDIN
PAGE 1 OF 1

RESOLUTION

WHEREAS the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS plutonium disposition represents one of the most certain future missions of the Department of Energy (DOE) for the next 20 to 30 years, and

WHEREAS the DOE has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and

WHEREAS the DOE's Surplus Fissile Materials Disposition Program will result in the production of qualified disposal forms and the eventual removal of these materials from the State of South Carolina; and

WHEREAS the Savannah River Site has produced approximately 40 percent of all U.S. weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public or the environment; and

WHEREAS the DOE in its Record of Decision recognizes the Savannah River Site as "a plutonium competent site with the most modern, state-of-the-art storage and processing facilities . . . with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and

WHEREAS the regional community in the Central Savannah River Area (CSRA) of South Carolina and Georgia strongly supports continued plutonium missions for the DOE Savannah River Site;

NOW BE IT RESOLVED that the Lower Savannah Private Industry Council (LSPIC), representing the six Lower Savannah counties of Aiken, Allendale, Bamberg, Barnwell, Calhoun, and Orangeburg, strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

APPROVED this 8 th day of April, 1997 at Aiken, South Carolina, by the Lower Savannah P.I.C.

1

SCD101

SCD101–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MARTIN, WILLIAM H.
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) WILLIAM H. MARTIN
ADDRESS: 6 BROOKLANE DR. AIKEN, SC
TELEPHONE: (803) 648-0891 (H) (803) 557-7280 (W)
E-MAIL: WHMARTIN@SCESCAPE.COM

1. IS THIS A POLITICAL OR TECHNICAL AND ECONOMIC DECISION?

2. RECOGNITION MUST BE GIVEN TO POLITICAL AND ECONOMIC IMPACTS; BUT FOR THE TAXPAYER, THE DECISION MUST BE MADE ON A HIGHER PLANE AND CORRECT DECISION MADE.

3. I CONCUR WITH THE GENTLEMAN WHO MADE THE STATEMENT THAT THE "DOES" MUST LOOK AT THE LONG RANGE ASPECTS AND MAKE FORWARD DECISIONS LOOKING INSTEAD OF LOOKING AT THE SHORT TERM POLITICAL CONCERNS AND PREJUDICES OF ONE PARTY. 1

4. I QUESTION THE MOTIVES OF SOME OF THE DOE MANAGEMENT IN WASHINGTON IN LOOKING AT THE IMMEDIATE WORLD AND NATIONAL POLITICS WITH SUCH A SHORT RANGE OF VISION AND NOT PAYING ATTENTION TO THE TECHNICAL AND ECONOMIC LOGIC THAT WOULD CALL FOR DIFFERENT DECISIONS. (POLITICAL IMPORTANCES)

SCD67

SCD67–1 **DOE Policy**

As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MASON, CORRY E.
PAGE 1 OF 1

1998-009683 Aug 20 P 4:32

Dear Federico Pena,

from what i've come to understand about MOX (the plutonium uranium fuel blend for commercial reactors. It is NOT an option! Stop propping up uneconomical reactors that can't make ends meet. Particularly with my tax dollars! It is an insult to injury. There is No truly safe option, but there are safer options. Go for them! and stop this insanity!

Thank you

Sincerely,

Corry E Mason

1

FD205

FD205–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MATTHEWS, R. S.
PAGE 1 OF 2

United States Department of Energy

Comment Form

NAME: (Optional) R. S. MATTHEWS
ADDRESS: 152 DUPREE PL, AIKEN, S.C. 29801
TELEPHONE: (806) 649 7145
E-MAIL: N/A

The single copy of the cost report on the back table has a table (ES-2) indicating a number of deficiencies in Pantex infrastructure.

How much was into the cost study for?
(a) building a plutonium analytical lab at Pantex
(b) providing for waste disposal (from the plutonium operation) at Pantex
(c) building a Source Calibration Facility at Pantex (Savannah River's cost was about 35 million)
(d) creating a Special Nuclear Materials handling capability at Pantex
(e) how much for detailed, start-from-zero training for plutonium handling (as opposed to sealed pits)

Please provide detailed answers to each part of this question and consider modifying and reissuing the cost report.

R S Matthews
8/13/98

1

SCD96

SCD96–1 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MATTHEWS, R. S.
PAGE 2 OF 2

United States Department of Energy

Comment Form

NAME: (Optional) R. S. MATTHEWS
ADDRESS: 152 DUPREE PLACE AIKEN, S.C. 29801
TELEPHONE: (803) 649 7145
E-MAIL: ~~N/A~~ N/A

The "Nuclear Weapons and Material Monitor" said the EIS had an "Appendix B" which evaluated aqueous processing for pit conversion (& concluded that it could be done faster and it used proven technology. Where is this alternative in the EIS? I couldn't find it!

R S Matthews
8/13/98

2

SCD96

SCD96–2 Plutonium Polishing and Aqueous Processing

At the time DOE issued the SPD Draft EIS, it believed the gallium content in the plutonium dioxide feed specifications for MOX fuel could be reached using the dry, thermal gallium removal method included in the pit conversion process. However, in response to public interest on this topic and to ensure adequate NEPA review in the event that the gallium specification could not be met with the thermal process, an evaluation of the potential environmental impacts of including a small-scale aqueous process (referred to as plutonium polishing) as part of either the pit conversion or MOX facility was presented in Appendix N of the SPD Draft EIS. On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

United States Department of Energy

Comment Form

August 13, 1998

NAME: (Optional) Mrs. Suzanne Matthews
ADDRESS: 152 Dupree St., Aiken, SC 29801
TELEPHONE: (803) 649-9145
E-MAIL:

1. We all know that MOX is manufactured commercially in Europe. How many commercial operations use a dry process to produce their plutonium oxide fuel? 1

2. I read in the Cost Report where the pit disassembly and conversion facility will begin operation in 2004. Will you give me an example — for the last 20 years — where DOE has been able to bring a $500 million project from laboratory scale to operation in 5 years! 2

SCD58

SCD58–1 **Feedstock**

None of the commercial MOX fuel plants in Europe currently use a dry process to produce plutonium dioxide.

SCD58–2 **Pit Disassembly and Conversion**

DOE believes that beginning operations of the pit conversion facility in 2004 is a reasonable schedule. While it is true that the pit conversion facility is the first consolidated facility for accomplishing this mission on a large scale, the processes that would be used in this facility are not entirely new. Many of these processes are in use at LANL and LLNL, and each specific operation in the dry pit conversion process has been successfully demonstrated. However, to ensure successful and timely transition to full-scale operation, DOE is testing these components as an integrated system at LANL. This pit disassembly and conversion demonstration is focusing on equipment design and process development and will provide information for fine-tuning the process and operational parameters prior to pit conversion facility operation. The information from the demonstration would be generated, gathered, and be available on a continuous basis throughout the facility design phase. A copy of the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998) is available on the MD Web site at http://www.doe-md.com. In addition, because the information from this demonstration would be used to supplement other information developed to support the design of a full-scale pit conversion facility, it would not be necessary for the demonstration to be completed before beginning pit conversion facility design and construction.

McWhorter, Don
Page 1 of 1

United States Department of Energy

Comment Form

NAME: (Optional) Don McWhorter
ADDRESS: 804 Greenwood Drive North Augusta, SC 29841-2009
TELEPHONE: (803) 278-0097
E-MAIL:

I strongly support the pit disassembly mission at SRS. 1

SCD95

SCD95–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

9/16/98
Mr. Howard R. Canter, Director
Office of Fissile Materials Disposition
U.S. Dept. of Energy
P.O. Box 23786
Washington D.C. 20026-3786

Dear Mr. Canter,

I feel that the comment period on the SPD EIS was so short for a reason. It seems that the Dept. of Energy, along with other government people, have this plan on a very fast track and don't really want to hear what the rest of the country thinks about it. 1

Turning warhead plutonium into fuel pellets to be used in aging reactors is being presented as a way to recycle and disarm at the same time. The truth is that this process will also create nuclear waste. I agree that disarming is a good idea, but there has to be other options besides the two being presented, plutonium fuel pellets and glassification. 2

It would be prudent for the Dept. of Energy to spend some more time discovering safer ways to safeguard our surplus nuclear weapons.

Sincerely,
Leslie Minerd

2716 Blossom St
Columbia SC 29205

MD285

MD285–1 **General SPD EIS and NEPA Process**

A period of 60 days was allowed for public comment on the SPD Draft EIS, and DOE accepted comments submitted by various means: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Although it did not extend the comment period, DOE did consider, to the extent possible, comments received after the close of that period.

MD285–2 **Alternatives**

DOE acknowledges the commentor's support for reducing the nuclear weapons stockpile, and opposition to using either immobilization or the MOX approach to surplus plutonium disposition. DOE has extensively studied technologies for this purpose, and in the *Storage and Disposition PEIS* identified and evaluated a number of potentially acceptable technologies. However, many of these technologies were determined to be unacceptable for reasons of complexity, the cost or time for implementation, and the degree to which the resulting form met the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. Based on these analyses and other available information, the ROD for the *Storage and Disposition PEIS* reduced the number of technologies that would continue to be considered to those evaluated in this SPD EIS: immobilization in either a ceramic or glass form, and MOX fuel fabrication and irradiation. This SPD EIS evaluates the potential impacts of waste generation for each of the proposed alternatives. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel and other wastes would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel and waste management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

MURRAY, ALICE M.
PAGE 1 OF 2

United States Department of Energy

Comment Form

NAME: (Optional) Alice M. Murray
ADDRESS 40 Hemlock Court, Aiken, S. Carolina 29803
TELEPHONE: (803) 502-0230
E-MAIL:

1. Among the many issues that favor the location of the Disassembly/Conversion Plant at Savannah River Site is the issue of transportation of plutonium. Conversion of pit material prior to its transportation, would be SRS for further disposition. Inside transportation poses the most more serious nuclear safety issue compared to pit transportation. In the interests of transportation safety, the conversion of the pit material should be done at SRS. 1

2. Construction and operation of a pit disassembly/conversion facility at Pantex unnecessarily increases the plutonium legacy cleanup that the Department of Energy will have to contend with in the future. The decommissioning and decontamination of these facilities will be expensive and time consuming. Location of the facility at SRS will not significantly add to legacy issues that will need to be addressed at SRS. Future commitments of resources need for the location of the pit disassembly/conversion at SRS. 2

3. There seems to be a conflict in DOE management of plutonium. DOE is allowing RFETS to dispose of residues at 10 weight% plutonium at the Waste Isolation Pilot Plant. Yet DOE is going to great lengths to immobilize ~10 wt% plutonium ceramic pucks in high-level waste glass to meet the Spent Nuclear Fuel Standard. Why is some 10 weight% plutonium material allowed to be sent to WIPP but other 10 weight% plutonium material will require expensive processing and reprocessing? [redacted] 3

SCD93

SCD93–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS based on transportation concerns. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SCD93–2 **Waste Management**

Regardless of the site chosen, D&D would have to occur for the pit conversion facility at some time in the future and the process would be similar wherever the facility was located.

SCD93–3 **Waste Management**

The plutonium that is the subject of this SPD EIS is surplus weapons-usable plutonium that could be relatively easily used to build a nuclear weapon and must therefore be converted into a form that meets the Spent Fuel Standard. This weapons-usable plutonium is typically greater than 50 percent weight plutonium. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The plutonium in the impure residues and scrub alloy (all of which contain less than 50 percent plutonium by weight) that are the subject of the *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site* (DOE/EIS-0277F, August 1998) are not in the same form and present a lower proliferation risk.

DOE has determined that the waste management controls required for WIPP will provide adequate resistance to theft and diversion by unauthorized parties for the limited quantities of plutonium in RFETS residues (or any plutonium disposed with waste to WIPP). The waste management controls for the residues were evaluated to be consistent with international standards for physical protection of nuclear material within nations. In addition, the disposal of the residues avoids any processing that would increase material attractiveness.

DOE evaluated WIPP disposal during the screening of options for disposition of surplus weapons-usable plutonium. This is not a reasonable alternative because WIPP does not have sufficient capacity for the entire 50 t (55 ton) of material, and the option would not meet the Spent Fuel Standard for disposition of weapons-usable plutonium. The NAS report on plutonium disposition, *Management and Disposition of Excess Weapons Plutonium* (March 1994), concluded that direct geologic disposal of plutonium from weapons would not meet the Spent Fuel Standard.

NATIONAL ASSOCIATION FOR THE ADVANCEMENT OF COLORED PEOPLE
JAMES GALLMAN, SR.
PAGE 1 OF 2

My name is James Gallman, Sr.. I am President of the State of South Carolina Conference of Branches of the National Association for the Advancement of Colored People, more affectionately known as the State NAACP.

On behalf of the NAACP, allow me to express my support for the Pit Disassembly and Conversion mission at the Savannah River Site. The NAACP believes the existing infrastructure, experience, expertise, and previous plutonium accomplishments should be a major consideration in the Department of Energy locating the mission at SRS.

Also, it is my understanding that the DOE acknowledges that at least $60 million can be saved if the mission is co-located with the Mixed Oxide Fuel Fabrication Plant and Immobilization at SRS. In fact, I understand that this is a conservative figure, which could be as high as $75 million.

A year ago I served as the President of the Aiken Branch NAACP. The Branch passed a resolution regarding its support of SRS as the lead facility in plutonium management and disposition. Let me share that resolution with you. **READ RESOLUTION.** 1

As you can see by those present here today, the NAACP and the surrounding community fully supports the Savannah River Site and all the Plutonium Disposition Missions. This community support is unparalleled within the DOE complex.

Selecting SRS to receive the Pit Disassembly and Conversion is the right decision for SRS and our nation.

Thank you for allowing me this opportunity to speak to you for us and the many dedicated people of this community.

SCD47

SCD47–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN BRANCH
National Association For The Advancement Of Colored People
P.O. Box 1516
Aiken, South Carolina 29802

RESOLUTION

WHEREAS the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS plutonium disposition represents one of the most certain future missions of the Department of Energy for the next 20 to 30 years; and

WHEREAS the Department of Energy has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and

WHEREAS the Savannah River Site has produced approximately 40 percent of all United States weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public, or the environment; and

WHEREAS the Department of Energy in its Record of Decision recognizes the Savannah River Site as "a plutonium competent site with the modern, state-of-the-art storage and processing facilities ... with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and 1

WHEREAS the regional community in the Central Savannah River Area (CSRA) of South Carolina and Georgia strongly supports continued plutonium missions for the Department of Energy's Savannah River Site;

NOW BE IT RESOLVED that the Aiken Branch of the National Association for the Advancement of Colored People (NAACP) strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

APPROVED this 27th day of March 1997 at Aiken, South Carolina by the Executive Board of the Aiken Branch NAACP.

President

Secretary

SCD47

NORTH AUGUSTA
HONORABLE THOMAS W. GREENE
PAGE 1 OF 1

RESOLUTION NO. 97-06
ENDORSING MAJOR PLUTONIUM MISSIONS
FOR THE SAVANNAH RIVER SITE

WHEREAS, the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS, plutonium disposition represents one of the most certain future missions of the U. S. Department of Energy for the next 20 to 30 years; and

WHEREAS, the Department of Energy has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and

WHEREAS, the Savannah River Site has produced approximately 40 percent of all U. S. weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public, or the environment; and

WHEREAS, the Department of Energy, in its Record of Decision, recognizes the Savannah River Site as "a plutonium competent site with the most modern, state-of-the-art storage and processing facilities...with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and

WHEREAS, the City of North Augusta strongly supports continued plutonium missions for the Department of Energy's Savannah River Site.

NOW THEREFORE, BE IT RESOLVED by the Mayor and City Council in meeting duly assembled and by the authority thereof that the City of North Augusta strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

DONE, RATIFIED AND ADOPTED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF NORTH AUGUSTA, SOUTH CAROLINA, ON THIS 3rd DAY OF March, 1997.

Thomas W. Greene, Mayor

ATTEST:

Leona J. Lewis, City Clerk

1

SCD98

SCD98–1 **Alternatives**

DOE acknowledges the commentors' support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

REMARKS OF MAYOR LARK JONES AT THE PUBLIC HEARING
Concerning SRS New Missions/ Pit disassembly and conversion

On behalf of the City of North Augusta, I would like to make a few brief comments concerning the upcoming decision by the Dept. of Energy in locating the plutonium pit disassembly and conversion missions.

The City of North Augusta publicly supports and endorses the Savannah River Site as the logical choice for this endeavor. I would like to place in the record and make a part of my comments, Resolution 98-16 which was adopted by the Mayor and City Council on August 3, 1998.

(Resolution read into the record)

SRS is the logical choice for many reasons:

1. The site, its size, facilities and location is excellent. While, I am a lay person not involved with the site, I'm sure that its continued safe operation for over 40 years means there is a great deal of infrastructure already in place that may not need to be duplicated for these new missions. Environmentally and security wise, I believe the site to be in good order. I can only speculate that the use of the current site at SRS would result in a cost savings of millions of taxpayer dollars. 1

2. The workforce is highly skilled and ready to do the job. Aiken County probably has one of the highest numbers of engineers per capita of any county in the United States….many of whom are skilled in the nuclear industry. Even if new training is required, we have the base from which to start, as well as the educational facilities with which to assist in any such needed training.

3. Past Record. The past record of the Savannah River site as to both performance and safety are excellent. As Mayor of a city of over 16,000 persons, I'm called upon daily to make judgments that affect the lives of our citizens. Examining the record of persons and entities that our city deals with is one of the major criteria we use in decision making. I urge DOE to follow that same philosophy. If you do, I'm sure you'll like what you find.

SCD15

SCD15–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. DOE is appreciative of the public support it has received from the local communities at all of the candidate sites for the surplus plutonium disposition program.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

4. Community Support. To be sure, SRS has been an integral part of our community for 45 years now. Yes, it does have a very important economic impact as well, but nowhere, I dare say will you find anymore community acceptance and support for any nuclear type industry than here in Aiken County.

As someone who is charged with being the guardian of the dollars of taxpayers, I am concerned with budgets and costs. This weekend, I will have two kids in private colleges, so costs will be even more important to me on a personal level. I understand the need for costs savings and cost effectiveness in the areas before us. It would then follow that the most cost effective method to accomplish those goals would be to consolidate all plutonium operations at the Savannah River Site including Mox fuels as well as Pit disassembly and conversion. 1

In summary, SRS has the facilities, the workforce, the track record and the necessary community support to do the job for this country! Finally, I do want to stress that we want to do the job for not North Augusta, not the CSRA, not South Carolina or Georgia but for our entire country.

This decision should be one based on merit, considering the factors of cost, workforce and facilities. It does not need to be a decision based upon politics, favors for one group or one sector or punishing of another.

Thank you.

SCD15

RESOLUTION NO. 98-16
SUPPORTING THE PIT DISASSEMBLY AND CONVERSION MISSION
BEING LOCATED AT SAVANNAH RIVER SITE

WHEREAS, the Savannah River Site has demonstrated a continued strong leadership role in this nation's national security since the inception of the site; and

WHEREAS, the professional management team and employees of the Savannah River Site have the proven experience for continuing in this leadership role; and

WHEREAS, the Department of Energy has recognized the importance of and demonstrated their faith in the Savannah River Site by its decisions to locate the MOX and immobilization missions there; and

WHEREAS, the location of the third element of the plutonium disposition mission, pit disassembly and conversion, is now being reviewed by the Department of Energy; and

WHEREAS, the Savannah River Site is the only site being considered with the on site experience of processing plutonium and with the necessary infrastructure required for this critical mission. 1

NOW, THEREFORE BE IT RESOLVED by the Mayor and City Council in meeting duly assembled and by the authority thereof, and on behalf of the citizens of the City of North Augusta, that the Department of Energy is urged to select the Savannah River Site for its pit disassembly and conversion mission.

BE IT FURTHER RESOLVED that the citizens of North Augusta are encouraged to attend the Department of Energy's public meetings scheduled for Thursday, August 13, 1998 at 1:00 P.M. or 6:00 P.M. in the North Augusta Community Center and to voice their support for locating the pit disassembly and conversion mission at the Savannah River Site.

DONE, RATIFIED AND ADOPTED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF NORTH AUGUSTA, SOUTH CAROLINA, ON THIS 3rd DAY OF August, 1998.

Lark W. Jones, Mayor

ATTEST:
Leona J. Lewis, City Clerk

SCD15

NUCLEAR INFORMATION & RESOURCE SERVICE ET AL.
PAGE 1 OF 5

Nuclear Information & Resource Service
Nuclear Control Institute
Public Citizen's Critical Mass Energy Project
Safe Energy Communication Council
Physicians for Social Responsibility
Global Resource Action Center for the Environment

FOR IMMEDIATE RELEASE
August 12, 1998
Contact: Michael Mariotte, Mary Olson (202)328-0002

ENVIRONMENTAL, ARMS CONTROL, PEACE AND JUSTICE AND ENERGY GROUPS SAY "NIX MOX!"

NIRS to Comment at DOE Hearing in North Augusta, August 13, 1998

Non-Governmental Organizations representing taxpayers, the environmental community, energy consumers and those working to prevent nuclear proliferation stand in support of citizens in the Southeast who oppose the new proposals to make mixed oxide (MOX) plutonium fuel at the U.S. Department of Energy's (DOE) Savannah River Site (SRS). These organization support the dismantlement of nuclear warheads and efforts to insure the plutonium from these weapons of mass destruction are secure and unavailable for use in future warheads.

This experimental conversion of nuclear warhead pits (plutonium-239) for use as fuel in nuclear power reactors fuel does not make sense. When compared to the one alternative that DOE has identified-the immobilization of the plutonium-MOX would:

- cost more taxpayer money
- involve more steps where plutonium will be vulnerable to diversion or theft
- involve more steps where waste will be generated
- require a greater level of purity of the plutonium, and therefore more processing
- result in more waste from processing, more worker exposures and would cost more
- require a redesign of power reactors that were not designed for plutonium fuel
- lower the already thin margin of safety in aging power reactors
- significantly increase potential radiological consequences of a major reactor accident
- establish plutonium as a commodity
- remove any credible basis for the US to criticize hybrid military/energy programs in other countries, leading to situations like India and Pakistan
- take longer to accomplish the original goal of making the plutonium from nuclear weapons dismantlement unavailable for use in another nuclear weapon.

1

"MOX does NOT get rid of plutonium," said Mary Olson of the Nuclear Information & Resource Service, "Reactors do not burn anything, they split atoms. As plutonium atoms

2

SCD27

SCD27–1 **MOX Approach**

DOE acknowledges the commentors' opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. The fabrication of MOX fuel and its use in commercial reactors has been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

Safeguards would be in place to ensure that neither approach would be vulnerable to diversion or theft.

The hybrid approach would result in slightly more waste being generated and greater worker exposure than the immobilization-only approach, but potential impacts to the public during normal operations are not expected to be major at any of the DOE candidate sites. Furthermore, DOE continues to prefer the hybrid approach for the reasons of practicality and leadership discussed above.

Although the MOX approach would require a greater level of purity than the immobilization approach, impacts including exposures, were considered in the analyses. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

Commercial reactors in the United States are capable of safely using MOX fuel. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. In addition, NRC would evaluate license applications and monitor operations of domestic, commercial reactors selected to use MOX fuel to ensure adequate margins of safety. Section 4.28.2.5 was added to include an analysis of the increased risks associated with accidents involving MOX fuel at the proposed reactors.

Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core from routine operations and reactor accidents.

DOE's *RFP for MOX Fuel Fabrication and Reactor Irradiation Services* (May 1998) is constructed to ensure that plutonium is not a marketed commodity.

The disposition of surplus plutonium is not a military action. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner.

Under either the immobilization-only approach or the hybrid approach, all 50 t (55 tons) of surplus plutonium would be processed out of the proposed plutonium disposition facilities over a 10- to 15-year period.

Operation of the proposed surplus plutonium disposition facilities is expected to take approximately the same amount of time for either approach. The difference in timing for the hybrid approach is associated with the amount of time that MOX fuel would be irradiated in domestic, commercial reactors. However, none of the proposed reactors are expected to operate longer under the hybrid approach than they would if they continued to use LEU fuel.

SCD27–2 **MOX Approach**

It is true that in the MOX approach only a fraction of the plutonium would actually be consumed in the reactor; but the remainder would be an integral part of massive spent fuel assemblies. The spent fuel assemblies would be so large and radioactive that any attempted theft of the material would require a dedicated team willing to suffer large doses of radiation, along with substantial equipment for accessing and removing the spent fuel from the storage facility and carrying it away.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. The purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

are split in MOX fuel, new plutonium is being formed. The uranium present absorbs neutrons and creates new plutonium." She continued, "I think DOE's hidden agenda is to give nuclear utilities a direct taxpayer subsidy to keep their aging, uncompetitive nuclear reactors operating in the face of electric market deregulation. MOX is nothing more than nuclear welfare." Olson will be commenting for Nuclear Information and Resource Service at the DOE's public comment meeting in North Augusta on August 13, 1998. 2

Paul Leventhal, president of the Nuclear Control Institute, commented that "DOE's own studies show that direct disposal of warhead plutonium as waste would be cheaper, faster and safer than turning it into MOX fuel. Therefore we should not reverse 20 years of U.S. policy against the proliferation risks of plutonium fuel. A U.S. MOX program only encourages other nations, like Japan and Germany, to continue their dangerous efforts to commercialize plutonium. 3

"Burning 200 tons of plutonium in reactors adds about $1.7 billion to the costs of safeguarding it by other methods", said economist William Weida of the Global Resource Action Center for the Environment. "There is currently no way to economically use plutonium as reactor fuel and to proceed with the MOX program would be an abuse of taxpayer funds." 4

"Commercial reactors do not need to burn MOX fuel, they need to be shut down or phased out," said Linda Pentz, Communications Director of the Safe Energy Communication Council. "Nuclear power has proven to be economically and environmentally hazardous. Burning MOX fuel is misleadingly promoted as a method of "disposing" of surplus plutonium from nuclear weapons. In fact it does nothing of the kind, but instead creates greater volumes of radioactive waste with no solution yet found for safe and perpetual storage." 5

"Joining the commercial and weapons arms of nuclear industry will hasten the demise of commercial nuclear power in the United States," said James Riccio of the Public Citizen Critical Mass Energy Project. "The MOX program reveals the true nature of commercial nuclear power. It was linked to the nuclear weapons project from the cradle and this will be its grave."

CONTACTS

Nuclear Information & Resource Service
Mary Olson (202) 328-0002

Safe Energy Communication Council
Linda Pentz (202) 483-8491

Nuclear Control Institute
Edwin Lyman (202) 822-8444

Physicians for Social Responsibility
Lisa Ledwidge (202) 898-0150 ex 222

Global Resource Action Center
for the Environment
Alice Slater (212) 726-9161

Public Citizen's Critical Mass Energy Project
James Riccio (202) 546-4996

SCD27

SCD27–3 **MOX Approach**

By fabricating MOX fuel from surplus plutonium, the United States is not encouraging either domestic or foreign commercial use of plutonium. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

SCD27–4 **MOX Approach**

The goal of the surplus plutonium disposition program is not simply safeguarding the plutonium indefinitely, but also dispositioning the plutonium in an environmentally safe, cost-effective, and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. As explained in response SCD27–1, the cost report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

SCD27–5 **MOX Approach**

This comment is addressed in responses SCD27–1 and SCD27–2.

R&H MAXXON, INC.
TIM DANGERFIELD
PAGE 1 OF 1

R & H MAXXON, INC.

August 13, 1998

Mr. Howard R. Canter, Acting Director
Office of Fissile Materials Disposition
US Department of Energy
100 Independence Avenue
Washington, DC 20585

Dear Mr. Canter:

I am the co-owner of a local business with 52 retail outlets in South Carolina and Georgia. I am writing to express my support for the assignment of all three portions of the Surplus Plutonium Disposition mission to the Savannah River Site.

Former Secretary Pena stated and your Draft Environmental Impact Statement correctly concludes that Savannah River is the preferred alternative for the MOX fuel fabrication and immobilization portions of this important non-proliferation mission because of its staff expertise, plutonium infrastructure and exemplary safety performance. These same considerations hold true for the Pit Disassembly and Conversion Facility, and your decision should be to similarly assign this portion of the Surplus Plutonium Mission to Savannah River.

As a taxpayer, I expect this work to be performed in the safest, most reliable and cost-efficient manner. Savannah River has a record of performance and its safety record sets the standard for the rest of DOE. Savannah River also offers the assurance that the total program can be accomplished for the fewest taxpayer dollars. All of the plutonium infrastructure and staff expertise currently exist at Savannah River, and several hundreds of millions of dollars can be saved if they are not unnecessarily duplicated elsewhere. 1

The two state Central Savannah River Area has a long and supportive relationship with DOE. We welcome and support the Surplus Plutonium Disposition program because of its importance to international non-proliferation goals. Our support is also based on the knowledge that Savannah River can conduct this program to the highest levels of safety. The active support of the local communities will help assure that this important program can be conducted in the most expeditious manner.

Thank you for the opportunity to comment on this important matter.

Sincerely,

Tim Dangerfield
Vice-President

1307 E. Pine Log Road ▼ P. O. Box 1077 ▼ Aiken, SC 29802 ▼ (803) 648-0458 ▼ *Fax* (803) 648-4038

SCD45

SCD45–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

RADCHEMCO
H. PERRY HOLCOMB
PAGE 1 OF 4

RadChemCo

Environmental Radiochemistry, Radiochemical Characterization of Waste Sites and Solid Waste, Actinide Processing Chemistry

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North Augusta, SC 29841-2157
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August 13, 1998

Ms. Laura Holgate
Director, Office of Fissile Materials Disposition
U. S. Department of Energy
P. O. Box 23786
Washington, DC 20026-3786

Re: Comment on the Surplus Plutonium Disposition (SPD) Draft Environmental Impact Statement (EIS)

Dear Ms. Holgate:

I attended the afternoon session of the public meeting that the DOE held in North Augusta, SC today regarding the SPD Draft EIS. Near the end of the afternoon session I made a presentation regarding the intrinsic worth of the plutonium being dispositioned by the DOE via this EIS. This letter to you serves to put these comments into a formal submission to the DOE.

I retired from the SRS two years ago after 36 years of service to du Pont and to Westinghouse, the prime contractors there. Twenty of those years were in analytical and separations chemistry support and development at SRTC; eleven and one-half were in F Area in technical support of separations activities, including programs involving the recovery of plutonium from CISMO scrap and scrub alloy from Rocky Flats; and the final four and one-half years were spent in support of environmental restoration activities primarily involving the radiochemical characterization of SRS waste sites and wastes therefrom.

Since retiring from WSRC, I have continued to serve as a radiochemical consultant for environmental restoration matters to SAIC, to Rust Environmental, and to Duke Engineering and Services, all SRS subcontractors.

My comments regarding the draft SPD EIS are twofold:

- I wholeheartedly support the SRS as the site to locate the pit disassembly and conversion mission. SRS has the infrastructure, the personnel, and the overwhelming support of the local public to make such a mission a success there. Needless to say, it would be most cost effective to locate the pit disassembly and conversion mission at SRS rather than at Pantex. And then DOE must ask itself the question, "Why contaminate another site in the complex with the plutonium waste that will result?" That is already a *fait accompli* at SRS. 1

- The DOE is charged with managing a national treasure in the 50 metric tons of surplus plutonium addressed by the draft EIS. I asked a question in today's 2

MD022

MD022–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD022–2 **DOE Policy**

DOE acknowledges the commentor's concern regarding the market value of surplus plutonium and agrees that there is an intrinsic worth to plutonium from its energy content. However, it is not valid to compare the fuel prices for plutonium versus fossil fuels because the costs to use the two fuels are very different. The real measure of the worth of plutonium as a fuel is its ability to generate electricity in the open market. These values are estimated in three reports, *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), and the *Technical Summary Report for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0003, October 1996), all of which are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

All of the surplus plutonium would not be made into MOX fuel because some of it is not suitable for fabrication due to the complexity, timing, and cost that would be involved in purifying the material. Also, pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest

public meeting that no one present could answer, "Just how much is that 50 metric tons of plutonium worth?" I am somewhat appalled that DOE is even considering immobilizing part (17 metric tons) or all of this very valuable energy source. I would urge the DOE to not immobilize a single gram of the surplus plutonium that could eventually be used for MOX, even if pretreatment of the scrap might be necessary. My reasons follow.

The intrinsic value, energywise, of the 50 metric tons of plutonium should be made known to the public by DOE and should be included in the final EIS as public record. Nowhere have I seen this mentioned or brought forth in any analysis. So, please allow me to develop for you my very simple approach to placing a value on the surplus 50 metric tons of plutonium covered by the draft EIS.

The following data come from the web site of the Amarillo National Resource Center for Plutonium (the Center), http://www.pu.org:

- The energy in one metric ton (1000 kg, or 1000 g/kg X 1000 kg = 1E+06 grams of plutonium) is equivalent to that in:
  - 4 million metric tons of coal (or 1 gram Pu = 4 metric tons of coal), or
  - 15 million barrels of oil (or 1 gram Pu = 15 barrels of oil)
- The energy in one metric ton of plutonium can supply a year's worth of electricity to a population center of 790,000.

2

Now, developing from the foregoing facts as given by the Center:

- The energy in 50 metric tons of plutonium is therefore equivalent to:
  - 200 million metric tons of coal (50 X 4 million), or
  - 750 million barrels of oil (50 X 15 million).

Developing further:

- So, the intrinsic energy value of 50 metric tons of plutonium can be either:
  - **$29.7 billion** (as derived from: 200 million metric tons of coal is 220 million short tons. The price of bituminous coal is $135 per short ton, as quoted to me today by the Dixie Ice and Coal Company in Augusta, GA; or (220E+06 short tons X $135/short ton = $2.97E+10), or
  - **$9.0 billion** (as derived from: 750 million barrels of oil X $12/barrel = $9.0E+09).

And:

- The energy equivalent of 50 metric tons of plutonium can supply the electric needs for **50 years** to a city with the combined population (approximately 790,000) located in the South Carolina counties of Aiken, Charleston, and Greenville, according to the 1990 census.

MD022

possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

RADCHEMCO
H. PERRY HOLCOMB
PAGE 3 OF 4

Ms. Laura Holgate
Director, Office of Fissile Materials Disposition, USDOE

Page 3

The DOE is charged with managing an extremely valuable energy resource in the surplus plutonium. The draft EIS states that 17 metric tons of plutonium is destined for immediate immobilization because of its waste form and/or quantity and nature of contaminants. I submit to you that SRS currently has most of the facilities and the personnel to possibly recover several metric tons of plutonium from these "scrap" forms and convert it into a useful energy source, MOX. 2

Each metric ton, so saved from permanent disposal and converted to MOX, is worth, at a minimum, the equivalent of 15 million barrels of oil. At a very conservative price of $12/barrel for oil, each metric ton of plutonium so saved is worth $180 million! Its worth, in terms of four million metric tons of bituminous coal, is $594 million!!

I have not done any analysis regarding the environmental effects that would be caused by the burning of the 200 million metric tons of coal or the 750 million barrels of oil represented by the energy in the 50 metric tons of surplus plutonium. That is really outside my expertise. However, I would request that the DOE perform this evaluation and include the results in the final SPD EIS. Such additional information may overwhelmingly support converting as much of the surplus plutonium as possible into MOX. 3

I urge you to implement measures to save, and use for MOX, every possible gram of surplus plutonium. As a start, a technical task force should be established to evaluate such scrap recovery operations, which could take place at the SRS in F-Canyon and FB-Line and the other special processing operations associated with these SRS separations facilities. By reclaiming every metric ton of plutonium possible from the 17 metric tons of "scrap" plutonium, the DOE could not only save the American Taxpayers more than $100 million but also could be very, very proud of such an extremely important recycling effort. 4

Thank you for the courtesy, attention, and interest shown by you and the other DOE staff to the attendees at the North Augusta meeting this afternoon.

Sincerely,

H. Perry Holcomb

H. Perry Holcomb, Ph. D.

MD022

MD022–3 **General SPD EIS and NEPA Process**

An analysis of the potential energy value of surplus plutonium was done as part of the *Storage and Disposition PEIS* (see Section 4.9). According to that analysis, MOX fuel use would likely have minor impacts on the environment and the nuclear fuel cycle industries.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

Obtaining energy from the surplus plutonium is a secondary consideration. It is not expected that the energy value of the surplus plutonium will be a consideration in the decision on the location of disposition facilities or the amount of plutonium (0 to 33 t [0 to 36 tons]) to be dispositioned as MOX fuel.

MD022–4 **Alternatives**

DOE has identified as its preferred alternative a hybrid approach of using both immobilization and MOX fuel fabrication to disposition up to 50 t (55 tons) of surplus plutonium. Under this alternative, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. The remaining 17 t (19 tons) of surplus, low-purity, nonpit plutonium is not suitable for fabrication into MOX fuel because of the complexity, timing, and cost that would be involved in purifying those plutonium materials. Finally, use of the

F-Canyon or FB-Line for conducting plutonium recovery operations in support of the plutonium disposition program as suggested by the commentor would extend their life beyond the timeframe that DOE currently intends to operate these facilities.

RANDALL, BILL
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Bill Randall
ADDRESS: 17 White Oak Dr. N. Augusta, SC 29860
TELEPHONE: ( )
E-MAIL:

Isn't the environmental impact to the local community minimized @ SRS due to 310 square mile plant size versus the 25 sq. mile plant at Pantex? 1

SCD70

SCD70–1 **Facility Accidents**

Appendixes K.4 and K.5 describe the potential accident impacts to a hypothetical maximum receptor at each respective site boundary. Although most accidents (and normal operations) were calculated to yield somewhat higher doses to this receptor at Pantex (due to the site boundary being closer to the release location, meteorology, etc.), the differences from a health risk standpoint were found to be quite minor in most cases. This assertion is illustrated when comparing cancer risk values given in Tables K–12, K–3, K–14, and K–25. DOE facilities are sited and designed in such a manner that significant protection is provided for the health and safety of the public.

As discussed in DOE Orders 420.1 and 6430.1a, there are a number of factors that are considered in the decisionmaking process for siting a facility within the DOE complex. These factors include topography, seismology, geology, hydrology, and radiological dose limiting criteria. No matter where a given facility is built, it must satisfactorily comply with all applicable guidance for the protection of worker and public health and safety.

United States Department of Energy

Comment Form

NAME: (Optional) R. E. RAPY
ADDRESS: 1639 HUCKLEBERRY DR., AIKEN SC
TELEPHONE: (803) 649-3678
E-MAIL: THE FUTURE ENERGY REQUIREMENTS OF THE COUNTRY MAKE THE CONVERSION OF EXCESS PLUTONIUM TO ENERGY PRODUCTION THE MOST SENSIBLE MEANS OF DISPOSAL. 1

AS MUCH AS ECONOMICALLY POSSIBLE OF THE EXCESS PU SHOULD BE CONVERTED TO MOX IMMOBILIZATION SHOULD BE A LAST RESORT.

SRS IS VERY SUITED TO PERFORM THIS MISSION. 2

SCD68

SCD68–1 **MOX Approach**

DOE acknowledges the commentor's support for the MOX approach. DOE has identified as its preferred alternative a hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Under this approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. The remaining 17 t (19 tons) of surplus, low-purity, nonpit plutonium is not suitable for fabrication into MOX fuel because of the complexity, timing, and cost that would be involved in purifying those plutonium materials.

SCD68–2 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at SRS. As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

RIDGEWAY, ROBERT G.
PAGE 1 OF 2

Author: HOWARD CANTER at md-01
Date: 9/16/1998 5:52 PM
Priority: Normal
TO: DAVID NULTON, BERT STEVENSON
Subject: Opposed to SC receiving Plutonium - Request Hearings

Dear Director Canter and Under Secretary Holgate,

As a former employee of the South Carolina Department of Health & Environmental Control's Nuclear Emergency Planning Section, I can tell you from experiencing the problem from the INSIDE, we as citizens of the beautiful state of South Carolina do not need nor want to be the repository of any more Plutonium or other nuclear substance. I would like to request that hearings be held in Columbia, SC. 1

The citizens of South Carolina deserve equal opportunity to understand and discuss and vote on this question, which has up-to-now been largely monopolized by the few with special interest (read: $$$). 2

We do not need to be the dumping ground of the nation - no permanent site has been settled upon, so we'll probably wind up keeping it. We do not need to live under the multiple threats to our health and safety. We do not need to hold GENERATIONS of South Carolinians' lives - our descendants! - hostage. 1

Thank you for your help in this serious issue.

Sincerely,
Robert G. Ridgeway

1408 Cedar Terrace St.
Columbia, SC 29209

FD331

FD331–1 **Alternatives**

DOE acknowledges the commentor's opposition for siting the proposed surplus plutonium disposition facilities at SRS, and request to have public hearings in Columbia, South Carolina. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Each of these facilities would process some fraction of the surplus plutonium so that it could be permanently disposed of in a potential geologic repository. Only the immobilized plutonium, in canisters of vitrified waste from DWPF, would be stored at SRS for any length of time, pending availability of the potential geologic repository. DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared.

This SPD EIS, for the purposes of analysis, assumes that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites, and thus with the most directly affected populations. Approximately 1,700 copies of the SPD EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. The proposed actions do not involve disposal of surplus plutonium in South Carolina. Hearings for SRS were held in North Augusta, South Carolina. DOE provided appropriate opportunities and means for public comment on the program, and gave equal consideration to all comments, regardless of how they were submitted: public hearings, mail, a toll-free telephone, and fax line. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

FD331–2 **General SPD EIS and NEPA Process**

During the comment period for this SPD EIS, July 17 through September 16, 1998, DOE hosted five public hearings that provided opportunities for oral and written comments from the public. These hearings, which were open to all individuals and organizations, included afternoon and evening hearings in the North Augusta Community Center in North Augusta, South Carolina.

RODRIGUES, GEORGE C.
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) George C. (Chris) Rodrigues
ADDRESS: 1703 Highland Park Avenue, Aiken SC 29801
TELEPHONE: (803) 648-3776
E-MAIL: chrisrodr@aol.com

While the work force at Pantex is very capable at their current mission, I know from my personal experience that they have no capability or infrastructure to handle or process plutonium outside finished, fabricated Pu metal components (pits). This includes both operations as well as facility design and construction. Pantex would have to start from square one to build such a knowledge, skill, and experience base, as well as build facilities based on a "green" or "brownfield" site. Savannah River Site has a highly refined knowledge, experience, and specific skill base to perform plutonium processing work such as this. We have been doing this for forty-five years. We have facilities with all required infrastructure and capability. It would be very cost effective to convert these facilities to disassemble pits and process all plutonium in them for disposition. It makes no sense from any viewpoint to locate this mission anywhere except SRS. I make these comments having twenty years of hands-on plutonium experience in R&D, manufacturing, and facility design, construction, and startup as an engineer.

1

SCD61

SCD61–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SAVANNAH RIVER REGIONAL DIVERSIFICATION INITIATIVE
Aiken, South Carolina 29802, (803) 593-9954 ext. 1409 FAX (803) 593-4296

RESOLUTION

Whereas the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

WHEREAS plutonium disposition represents one of the most certain future missions of The U.S. Department of Energy for the next 20 to 30 years; and

WHEREAS The Department of Energy has already chosen the Savannah River Site as the site for MOX Fuel Fabrication and Immobilization because of the Site's capabilities as DOE's only operating plutonium processing site; and

WHEREAS consolidating all three of the new plutonium disposition facilities, including the Pit Disassembly and Conversion Facility, at the Savannah River Site would save at least $1.6 billion, compared to establishing and maintaining the required capabilities at other sites; and

WHEREAS the Savannah River Site has produced approximately 40 percent of all U.S. weapons grade plutonium over the last 45 years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public or the environment, and 1

WHEREAS the Department of Energy in its Record of Decision recognizes the Savannah River Site as "a plutonium competent site with the most modern, state-of-the art storage and processing facilities…with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and

WHEREAS the regional community in the Central Savannah River Area (CSRA) of South Carolina and Georgia strongly supports continued plutonium missions for the Department of Energy's Savannah River Site;

NOW BE IT RESOLVED that the Savannah River Regional Diversification Initiative (SRRDI) strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in Mixed Oxide Fuel Fabrication, Immobilization, and Pit Disassembly and Conversion.

APPROVED this 13th day of August 1998 at Aiken, South Carolina, by the Savannah River Regional Diversification Initiative Board of Directors.

Thomas J. Stone
Chairman

Robert M. Reich
Secretary

SCD25

SCD25–1 **Alternatives**

DOE acknowledges the commentors' support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SAVANNAH RIVER SITE RETIREE ASSOCIATION
TOM GREENE
PAGE 1 OF 1

August 13, 1998

PUBLIC HEARING – PIT DISASSEMBLY & CONVERSION

Mr. Chairman:

I am Tom Greene, Chairman of the Savannah River Site Retiree Association. The Association is less than a year old and has already achieved a membership of over 500 retirees. We are growing at a very steady rate and we expect we will eventually represent the 2000 WSRC & BSRI retirees.

At our Board meeting on August 4, 1998 the Board voted unanimously to support the critical third element of the Department of Energy Plutonium Disposition Mission – The Pit Disassembly and Conversion. The reasons for this strong support are:

1. **First of all, it makes sense that all three missions be placed at one location such as Savannah River Site because SRS has the infrastructure and the expertise to effectively handle the mission.**
2. **Secondly, use of SRS for all three parts of the plutonium disposition mission would result in a cost savings of approximately $1.6 Billion based on avoided costs of new structure and equipment that would be required at other DOE sites.** 1
3. **Third, the DOE has already expressed confidence in the SRS team by assigning two of the three missions to SRS – the MOX and immobilization missions.**
4. **Fourth, SRS is better equipped and better experienced than Pantex to effectively handle all three missions.**
5. **Last and most importantly, I speak not only as chairman of the retiree organization but also as former Mayor of the City of North Augusta - the citizens of our area continue to strongly support the Savannah River Site and its missions. We have worked hard in the past and are working hard now, to insure that in the future the SRS continues to be a strong economic engine in our area and continues to play a leadership role in the security of our Nation.**

Thank You,

Tom Greene,
Chairman,
Savannah River Site Retiree Association(SRSRA)

SCD22

SCD22–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SNELLING
HONORABLE TIM MOORE
PAGE 1 OF 2

THANK YOU, MR. MODERATOR

MY NAME IS Tim Moore AND I AM THE MAYOR OF SNELLING.

IN THIS CAPACITY AND FROM A PROFESSIONAL VIEW, I AM EXTREMELY INTERESTED IN WHAT HAPPENS WITH THE SAVANNAH RIVER SITE AND THE THOUSANDS OF FINE EMPLOYEES THAT WORK THERE.

I AM NOT A NUCLEAR ENGINEER AND NOT AN EXPERT ON PLUTONIUM, BUT I DO UNDERSTAND FINANCES. AND WHAT I HAVE LEARNED OVER THE PAST FEW MONTHS IS THAT THE COST OF LOCATING THIS MISSION ANYWHERE OTHER THAN THE SAVANNAH RIVER SITE WOULD BE A DISSERVICE TO THE TAXPAYERS OF THIS GREAT COUNTRY. YOUR OWN REPORTS AND STUDIES SHOW THE CONSOLIDATION OF THE PLUTONIUM MISSION AT ONE SITE SAVES MILLIONS AND MILLIONS OF DOLLARS. 1

AND TO TRAIN ANOTHER WORKFORCE FROM ANOTHER LOCATION TO DO WHAT THE SAVANNAH RIVER FOLKS ALREADY KNOW HOW TO DO

SCD41

SCD41–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SNELLING
HONORABLE TIM MOORE
PAGE 2 OF 2

IS NOT VERY RESPONSIBLE.

I URGE YOU TO TAKE THE MESSAGE BACK TO THE DEPARTMENT OF ENERGY IN WASHINGTON, THAT OUR COMMUNITIES SUPPORT THE PLUTONIUM DISPOSITION MISSION BEING LOCATED AT THE SAVANNAH RIVER SITE. 1

AND AS YOUR OWN RESEARCH SHOWS YOU, IT IS THE FINANCIALLY RIGHT THING TO DO!!

THANK YOU.

SCD41

SOUTH CAROLINA, OFFICE OF THE GOVERNOR
HONORABLE DAVID M. BEASLEY
PAGE 1 OF 2

State of South Carolina

Office of the Governor

DAVID M. BEASLEY
GOVERNOR

POST OFFICE BOX 11369
COLUMBIA 29211

May 5, 1998

The Honorable Federico Peña
Secretary of Energy
United States Department of Energy
1000 Independence Avenue
Washington, D.C. 20585

Dear Secretary Peña,

The State of South Carolina has long been a primary supporter of the Department of Energy's National Defense and Environmental Clean-Up Missions. It is my understanding that the Department is taking an "integrated" approach to addressing clean-up issues, and this will again require significant involvement from the State of South Carolina due to the extensive expertise, capabilities, and infrastructure available at the Savannah River Site (SRS).

While the dialogue on clean-up continues, I understand that the Department of Energy plans to announce the selection of preferred sites for the three components of the Plutonium Disposition Program and the nation's new source of tritium in the near future. In the midst of this decision making process, I feel it is very important that the Savannah River Site be strongly considered for all three components of the Plutonium Disposition Program (Pit Disassembly and Conversion, Mixed Oxide Fuel and Immobilization), and for the Accelerator to be selected as the nation's source of tritium. 1

I believe it is unwise to overlook the inherent savings that arise from integration of the plutonium missions at the Savannah River Site. No other Department of Energy facility has the experience and infrastructure needed to complete the disposition program in a timely and cost effective manner. It is my understanding that consolidation of this mission will significantly reduce the up-front capital investment in new facilities, and will reduce the overall cost of the program by over $1 billion dollars. Therefore, I strongly support consolidating all three of the plutonium disposition facilities at the Savannah River Site.

Further, I feel that the selection and commitment to build the linear accelerator represents the Department's best option for supplying the nation's tritium demands. It is a clean technology that is the right choice for the environment. Also, the Accelerator Production of Tritium (APT) does 2

SCD74

SCD74–1 — Alternatives

DOE acknowledges the Governor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SCD74–2 — DOE Policy

Accelerator production of tritium is beyond the scope of this SPD EIS. It was analyzed in the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE/EIS-0161, October 1995). The Secretary of Energy announced in December 1998 that he selected TVA's Watts Bar and Sequoyah reactors as the preferred facilities for producing a future supply of tritium. Consistent with DOE's dual-track strategy for tritium production, the linear accelerator option was designated as a backup technology. DOE would complete key research and development milestones for the accelerator but would not complete construction.

SOUTH CAROLINA, OFFICE OF THE GOVERNOR
HONORABLE DAVID M. BEASLEY
PAGE 2 OF 2

Secretary Peña
May 5, 1998

Page 2

not have the policy concerns that have been raised regarding the Commercial Light Water Reactor. With the APT, the clear historic separation of civilian and defense missions will be preserved. Further, it holds the promise of exciting new technology and with the new modular design, the cost is more than competitive with the cost of the proposed completion of a Tennessee Valley Authority reactor. 2

The Savannah River Site is clearly the logical choice for these missions. I ask you to fully consider the consolidation of all the plutonium disposition activities at SRS and the selection of the APT as the nation's new tritium source. The awarding of these missions to SRS will clear the way for the State of South Carolina to continue its long-standing role as an active and supportive partner of the Department's national goals. 3

Sincerely,

David M. Beasley

cc: Senator Strom Thurmond
Senator Fritz Hollings
Representative Floyd Spence
Representative Lindsey Graham
Representative Mark Sanford
Representative Bob Inglis
Representative Jim Clyburn
Representative John Spratt

SCD74

SCD74–3 **Alternatives**

This comment has been forwarded to the Office of Commercial Light Water Reactor Production.

SOUTH CAROLINA, OFFICE OF THE GOVERNOR
HONORABLE DAVID M. BEASLEY
PAGE 1 OF 1

State of South Carolina

Office of the Governor

DAVID M. BEASLEY
GOVERNOR

POST OFFICE BOX 11369
COLUMBIA 29211

June 18, 1997

To the Department of Energy and concerned citizens of the SRS Community:

Thank you for affording me the opportunity to comment on the proposed scope of the Surplus Plutonium Disposition Environmental Impact Study.

As most of you may already know, I had the opportunity to meet with the South Carolina Congressional Delegation in Washington several weeks ago. At that meeting, your elected representatives pledged to work towards securing new missions for the Savannah River Site (SRS), while ensuring a viable long term disposal plan. I have pledged to support this effort and stand ready to follow their leadership in protecting this federal reservation.

I regret that my schedule does not allow me to be with you in person, but if Congress and the Department of Energy decide to pursue this dual pathway for disposition, then I would request that SRS be fairly considered. With an online vitrification process, plutonium processing facilities, and over 40 years of experience and expertise in the field, plutonium disposition appears to be a mission that the Savannah River Site is uniquely qualified to perform. 1

Thank you for your time and attention.

Sincerely,

David M. Beasley

David M. Beasley

SCD75

SCD75–1 **Alternatives**

DOE acknowledges the Governor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SOUTH CAROLINA, OFFICE OF THE GOVERNOR
HONORABLE DAVID M. BEASLEY
PAGE 1 OF 1

State of South Carolina

Office of the Governor

DAVID M. BEASLEY
GOVERNOR

August 13, 1998

Ms. Laura Holgate
United States Department of Energy
Office of Fissile Materials Disposition
MD-4 Forestall Building
1000 Independence Avenue, SW
Washington, DC 20588

Dear Ms. Holgate,

I regret that my schedule does not allow me to be with you in person, but I appreciate the opportunity to comment on the Surplus Plutonium Disposition Draft Environmental Impact Statement.

I strongly endorse the Savannah River Site (SRS) for the entire surplus plutonium disposition mission. As you are well aware, the State of South Carolina has long been a patriotic partner of the department's national defense and environmental clean-up missions. This historical service to the nation has been exemplified by the site's commitment to excellence. It is this trademark quality that is so explicitly displayed in the Savannah River Site's selection as the preferred site for both the immobilization facility and the mixed-oxide fuel fabrication facility.

Given this acknowledgment by the department, the overall integrity of the mission should not be sacrificed by splintering the disposition of surplus plutonium. Consolidation of this mission at SRS will reduce the up-front capital investment in new facilities and life cycle costs by over one billion dollars. Further, there is no other site within the Department of Energy complex that can claim the expertise, infrastructure and citizenry support of over 40 years that are the hallmarks of the Savannah River Site Complex and community. 1

The Savannah River Site is the logical, financial and technical choice for the department's entire surplus plutonium disposition mission. It is the right choice for the Department of Energy and the nation. I am confident your analysis will compel the same conclusion.

Sincerely,

David M. Beasley

David M. Beasley

SCD14

SCD14–1 **Alternatives**

DOE acknowledges the Governor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Remarks by State Treasurer Richard Eckstrom
August 13, 1998 Environmental Impact Public Statement Hearing
North Augusta Community Center

My name is Richard Eckstrom, and I'm the treasurer of the State of South Carolina. ---- I'm here today to voice my support for the Savannah River Site. ----- I also want to talk about taxpayer issues ---- regarding DOE's Plutonium Disposition Program.

SRS is the largest industrial employer in the State of South Carolina. ---- It employs more than 14,000 people. ---- Seventy percent of its workforce lives in South Carolina. ---- The total economic impact of SRS to this area ---- is approximately 2 billion dollars annually. 1

We're proud of the contribution that SRS has made to our national security through the years. ---- Since the site began operating in the 1950s, it has been a major participant in our defense industry. ---- From its inception, SRS has developed and maintained the highest levels of safety and consideration for its workforce, the public and our natural resources in this area.

SCD50

SCD50–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at SRS. DOE considers all the candidate sites suitable for disposition activities from a public acceptance, safety, and conduct of operations viewpoint. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

We're proud that SRS is the only "truly operational site" remaining in the DOE Complex. ---- Hanford and Rocky Flats are strictly in clean-up modes, as they have been for several years. ---- The Pantex plant in Texas has never been anything but an assembly-and-dismantlement site.

We agree with DOE's assessment ---- just last year---- when it said that SRS is (quote) ----- "a plutonium competent site with the most state-of-the-art storage and processing facilities, and .... a site with the only remaining large-scale chemical separation and processing capability in the DOE complex." (end quote) 1

Pantex, which is now competing with SRS for the Pit Disassembly and Conversion mission, ---- has never processed plutonium ---- it has only stored it. I would remind you that Pantex has neither the experience ---- nor the necessary infrastructure ---- to do this work.

Consider the following financial facts that emphatically support the selection of SRS for this mission:

First, unless SRS is chosen for the Pit Disassembly and Conversion work, the infrastructure that exists at SRS would have to be constructed at an alternate site ---- at a cost of hundreds of millions of dollars to the taxpayers of this country, ---- The failure to use the extensive human resources and experience at SRS ---- would only run up those costs. ---- Did we not **promise** the taxpayers a "peace dividend?" 1

It makes no sense to **not use** what already exists at SRS.

Secondly, because the alternate site has never processed plutonium, ---- a plutonium clean-up legacy doesn't exist at that site. ---- If plutonium processing is introduced at the alternate site, ---- another legacy will be created which will require significant taxpayer dollars to remediate. ---- Because SRS has a history of plutonium processing, ---- we would expect incremental remediation costs to be minimal.

From the taxpayers' perspective, ---- the collocation of the nation's Plutonium Disposition missions at SRS will save the taxpayers hundreds of millions ---- and possibly as much as a billion dollars. ---- Again, did we not **promise** the taxpayers a "peace dividend?"

But there are more than financial considerations. ---- A qualified workforce currently exists here at SRS. ---- This qualified workforce is a community of people. ---- These people have families.

1

Through the years, this community and the state have invested in infrastructure ---- to support these families. ---- This community and the state have invested in law enforcement and fire services ---- to protect these families. --- This community and the state have invested in hospitals, clinics, and emergency medical services ---- to provide for their health needs. ---- This community and the state have invested in elementary schools, middle schools, high schools, technical colleges, and university campuses ---- to educate the children of these families.

And why did this community and the state choose to make these permanent investments for the workforce of SRS? ---- Because back in the 50s, this community, and the state, and SRS joined together as strategic partners. ---- And through the years, we have always viewed the well-being of the site's workforce, ----- and the well-being of the thousands-upon-thousands of their family members, ----- as our primary responsibility.

1

This community and the state have always enthusiastically supported SRS and its vital national security missions. ---- And we have given SRS our consistent, unwavering support for the past five decades. ---- No one else can come close to matching that. ---- Thank you for your serious consideration ------ and for the opportunity to speak here today. ---- We stand ready, willing, and able ---- to continue to support the vital missions of SRS.

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SCD50

SOUTH CAROLINA DEPARTMENT OF COMMERCE
ROBERT V. ROYALL
PAGE 1 OF 1

SOUTH CAROLINA
DEPARTMENT OF COMMERCE

David M. Beasley
Governor

August 10, 1998

Robert V. Royall
Secretary

Ms. Laura Holgate
United States Department of Energy
Office of Fissile Materials Disposition
MD-4 Forestall Building
1000 Independence Avenue, SW
Washington, DC 20580

Dear Ms. Holgate:

Thank you for this opportunity to comment on the Proposed Environmental Impact Statement for the Disposition of Surplus Weapons Grade Plutonium. I concur with Governor Beasley's endorsement of the Savannah River Site as the best site for the entire Surplus Plutonium Mission.

The workforce of the State and of the Savannah River Site Region has a demonstrated history of supporting the missions of the United States Department of Energy. As a result, over its more than forty year history, the SRS has become an important factor in both State and Regional economies. 1

Your Department should be proud of the workforce which you have assembled at SRS. These workers and their skills have been an enrichment for the region. With the assistance of your Department's Worker and Community Transition Program we have been successful in attracting private sector firms to the Region to re-employ many of the skills displaced by downsizing. The Plutonium Mission, coupled with these private sector initiatives, will help maintain this workforce and the body of science which it represents, an objective which I believe will be in the best interest of both the Nation and South Carolina.

Sincerely,

Robert V. Royall

mh

Post Office Box 927 ● Columbia, South Carolina 29202
(803) 737-0400 ● Fax (803) 737-0418

SCD08

SCD08–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SOUTH CAROLINA PROGRESSIVE NETWORK
BRET BERSIE
PAGE 1 OF 1

This is Bret Bersie. I'm the Director of the South Carolina Progressive Network. It's a coalition of nearly 50 organizations across the state with a membership base of 63,000 people. We voted on Saturday, September 12, to request that the Department of Energy have additional public hearings in South Carolina on the plutonium disposition plan. The only hearing that's been held is one that held in North Augusta and the attendees at that hearing were 98 percent paid employees of the Savannah River Site who were given a paid, paid leave to attend the meeting and, and promote the option. There are many citizens in South Carolina that feel that they haven't been heard. Many citizens don't even know the questions going on and so we would, would request the additional hearings in at least Columbia, which is the capital of the state, and be given a month's notice before the hearing. My address is P.O. Box 8325, Columbia, South Carolina 29202. My phone number is (803) 808-3384. 1

I have an additional comment and that is that I recall when the Allied General Nuclear Services Plant was built at this, outside the Savannah River Plant to reprocess plutonium to make mixed oxide fuels twenty years ago. Jimmy Carter, when he was President, issued an executive order saying that mixed oxide fuels could not be used. Did that executive order wear out or has it been supplanted by something that I'm not aware of? See if you can answer that question for me. Thank you very much. 2

PD067

PD067–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concerns regarding the public hearing. DOE employees and contractors at SRS were neither granted leave nor ordered to present their views at the North Augusta hearing; they attended in an official capacity or took personal leave to attend. DOE believes that the hearing was objective and open; all attendees were given an opportunity to provide comments orally or in writing. It was simply not feasible to hold public hearings in every location, including the locations suggested by the commentor.

To provide for public comment on the SPD Draft EIS, DOE conducted public hearings near the potentially affected DOE sites, and thus with the most directly affected populations. This decision did not preclude relevant comment by State and local government, tribes, individuals, and organizations. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Several means were available for providing comments: public hearings, mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how they were submitted.

PD067–2 **Nonproliferation**

The Allied General Nuclear Services Plant was constructed to recover plutonium and uranium from spent nuclear fuel. President Carter issued an Executive Order terminating the plant's reprocessing capability before construction was completed. Under the MOX approach, the use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

SOUTH CAROLINA HOUSE OF REPRESENTATIVES
HONORABLE T. SCOTT BECK
PAGE 1 OF 4

Comments by T. Scott Beck
Member of the House of Representatives
State of South Carolina

DOE Draft EIS for Surplus Plutonium Disposition

August 13, 1998

SCD13

Thank you for providing me this chance to address an issue … that's so important … not only to our community … but to our nation as well.

Let me also take this opportunity … to formally welcome you … to the 83rd legislative district of South Carolina.

We're a district comprised of many current … and former site workers … who have a keen understanding of the unique technical challenges … involved in plutonium processing.

As one of those former employees myself … who's worked at the site's primary plutonium processing facility … I know this **isn't** work … that can be done … by **just** anyone … or **just** anywhere.

Plutonium processing is highly specialized … with unique contamination protection … safety … material accountability … and waste management requirements ...

1

… much of it an infrastructure … that already exists at Savannah River …

… much of it requiring skills … that already exist there as well.

It's a capability … that you'd have to totally re-created somewhere else.

SCD13

SCD13–1 **Alternatives**

DOE acknowledges the Representative's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SOUTH CAROLINA HOUSE OF REPRESENTATIVES
HONORABLE T. SCOTT BECK
PAGE 3 OF 4

Beck -- Page 2

On top of that … SRS is already listed as the preferred site for two thirds of the plutonium disposition mission.

Doesn't it make sense … to locate all three plutonium plants together … to take advantage of the cost benefits … that are sure to be realized with shared facilities and staff ?

Furthermore … because plutonium processing carries with it … extensive … **and** expensive … clean-up obligations … why even consider placing it at a site – unlike Savannah River – where those obligations don't already exist?

In recent years … I've been a student of the vagaries imperfections of the NEPA process.

I know … that all too often … final conclusions can be … just about anything you want them to be.

In this case … I hope you'll at least be consistent …

And consider what I … and many others here have said … in light of your own findings … in a similar EIS in 1996 … for Stockpile Stewardship & Management.

1

SCD13

In it … you state:

> "Plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium into sites without current plutonium capabilities."

Many of my constituents … and their co-workers at SRS … have safely and responsibly … met the plutonium processing needs of this nation … for most of the last half of this century. 1

They've demonstrated their worthiness to take that mission … into the next century as well.

Give them that chance.

Thank you.

SCD13

SOUTH CAROLINA HOUSE OF REPRESENTATIVES
HONORABLE RUDY MASON
PAGE 1 OF 2

House Dist 81

I am Rudy Mason, South Carolina State Representative. I am here representing the Aiken County, South Carolina Delegation. This group of legislators has members from both parties and we may disagree on various issues; however, we are in unanimous agreement in our support of the Pit Disassembly and Conversion mission at the Savannah River Site.

As legislators we are aware that citizens expect their government to make wise fiscal decisions. Citizens demand that we evaluate the alternatives and then choose the one option that serves their best interest while spending the least amount of taxpayers dollars. This EIS hearing is about finding the best location for this critical plutonium disposition mission.

The Savannah River Site has a proven history of handling plutonium. In fact, DOE has previously acknowledged SRS's expertise; therefore, we must consider the financial aspect of this decision. DOE also has acknowledged that the intergration of the plutonium missions at Savannah River Site will save taxpayers millions. Therefore, the decision that should come out these hearings is that the entire Plutonium Disposition, including Pit Disassembly and Conversion, should take place at SRS. 1

Once again, I would like to reintroduce into the record the resolution passed by our delegation in support of Plutonium Disposition Missions at SRS.

SCD97

SCD97–1 **Alternatives**

DOE acknowledges the Representative's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

A RESOLUTION

Whereas, the handling and disposition of excess weapons plutonium is of grave concern to the national security of the United States; and

Whereas, plutonium disposition represents one of the most certain future missions of the Department of Energy for the next twenty to thirty years; and

Whereas, the Department of Energy has decided to pursue a dual path for plutonium disposition and has named the Savannah River Site as a candidate site for both options; and

Whereas, the Department of Energy's Surplus Fissile Materials Disposition Program will result in the production of qualified disposal forms and the eventual removal of these materials from the State of South Carolina; and

Whereas, the Savannah River Site has produced approximately forty percent of all United States weapons grade plutonium over the last forty-five years and has safely handled plutonium in glovebox processing equipment with no adverse impact on workers, the public, or the environment; and 1

Whereas, the Department of Energy in its Record of Decision recognizes the Savannah River Site as "a plutonium competent site with the most modern, state-of-the-art storage and processing facilities...with the only remaining large-scale chemical separation and processing capability in the DOE complex"; and

Whereas, the regional community in the Central Savannah River Area (CSRA) of South Carolina and Georgia strongly supports continued plutonium missions for the Department of Energy's Savannah River Site. Now, therefore,

Be it resolved that the Aiken County, South Carolina Legislative Delegation strongly endorses major plutonium missions for the Savannah River Site and urges the Department of Energy to designate the Savannah River Site as its lead facility in plutonium management and disposition.

Representative Thomas Beck

Representative Roland Smith

Representative William Clyburn

Senator Thomas Moore

Representative Rudolph Mason

Senator W. Greg Ryberg

Representative Charles Sharpe

SCD97

SOUTH CAROLINA SENATE
HONORABLE BRAD HUTTO
PAGE 1 OF 4

LAURA HODGATE

DOE EIS HEARING

GOOD AFTERNOON AND WELCOME TO SOUTH CAROLINA. I AM BRAD HUTTO, STATE SENATOR, REPRESENTING TWO OF THE HOST COUNTIES FOR THE SAVANNAH RIVER SITE - BARNWELL AND ALLENDALE COUNTIES. I ALSO REPRESENT ORANGEBURG AND HAMPTON COUNTIES. MANY OF MY CONSTITUENTS FROM ALL FOUR COUNTIES WORK AT THE SITE. MANY DRIVE AN HOUR EACH DAY EACH WAY.

SRS FAMILY GEORGIA AIKEN-N. AUGUSTA

BAMBERG

WE ARE PROUD OF OUR LONGSTANDING RELATIONSHIP WITH THE DEPARTMENT OF ENERGY. WE ARE PLEASED TO HAVE BEEN DESIGNATED AS THE PREFERRED SITE FOR 1

MOX FUEL FABRICATION AND FOR IMMOBILIZATION

AND WE ACTIVELY SEEK THE DESIGNATION AS THE PREFERRED SITE FOR

SCD42

SCD42–1 **Alternatives**

DOE acknowledges the Senator's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PIT DISASSEMBLY AND CONVERSION.

THE WORKERS AND COMMUNITIES OF THE
CENTRAL SAVANNAH RIVER AREA ARE READY AND ABLE TO ACCEPT THE CHALLENGES AND RESPONSIBILITIES THAT WOULD ACCOMPANY [redacted]
CONSOLIDATION OF
A FULL PLUTONIUM DISPOSITION MISSION. AT SRS.

AS YOU SEEK TO MAKE A DECISION ABOUT THE 1
LOCATION OF THE PIT DISASSEMBLY AND CONVERSION FACILITY [redacted], WE KNOW THAT YOU WILL RECOGNIZE THAT THE SAVANNAH RIVER SITE

HAS MUCH [redacted] OF THE NEEDED SUPPORT INFRASTRUCTURE FOR SUCH A MISSION IN PLACE

WE HAVE AN EXPERIENCED AND DEDICATED WORKFORCE. WHO HAVE THE EDUCATION, TRAINING AND ABILITY TO MAN A [redacted] PIT DISASSEMBLY AND CONVERSION FACILITY.

SCD42

SOUTH CAROLINA SENATE
HONORABLE BRAD HUTTO
PAGE 3 OF 4

WE BELIEVE THAT THE LOCATION OF THE PIT DISASSEMBLY AND CONVERSION PROJECT HERE WILL GENERATE VAST SAVINGS TO THE COUNTRY.

SRS HAS ~~WE HAVE~~ THE TRADITION AND TRAINING ~~[illegible]~~ NECESSARY TO SAFELY AND EFFICIENTLY HANDLE THIS NEW MISSION. OUR TRACK RECORD OF SAFETY IS 2nd TO NONE ~~[illegible]~~ PROTECT THE PUBLIC, ENVIRONMENT AND WORKERS.

1

OUR SOUTH CAROLINA CONGRESSIONAL DELEGATION HAS PROVIDED US WITH STEADFAST AND UNWAVERING SUPPORT IN WASHINGTON OVER THE MANY YEARS OF OPERATIONS ~~[illegible]~~ AT THE SAVANNAH RIVER SITE. THEIR CONTINUED UNYIELDING COMMITMENT TO THE PEOPLE AND COMMUNITIES OF THIS AREA SHOULD FURTHER DEMONSTRATE TO YOU THE WARM RECEPTION AND HOSPITALITY THAT YOU CAN EXPECT FOR THE SITING OF NEW MISSIONS HERE AND THE FULL COOPERATION THAT YOU WILL RECEIVE IN MAKING

SCD42

THE DECISION TO CONSOLIDATE ALL PLUTONIUM DISPOSITION MISSIONS AT SRS.

FURTHERMORE, THE CITIZENS AND COMMUNITIES THAT I REPRESENT ARE AS COMMITTED AS WE ALWAYS HAVE BEEN TO DOING OUR SHARE TO PROVIDE FOR OUR NATIONAL SECURITY. WE ARE PROUD OF THE ROLE THAT SAVANNAH RIVER SITE HAS PLAYED OVER THE LAST HALF CENTURY ~~YEARS~~ IN THE DEFENSE OF OUR NATION AND 1

WE ARE READY TO CONTINUE THIS TRADITION OF SERVICE TO OUR COUNTRY. AS WE APPROACH THE NEW MILLENIum.

SCD42

SOUTH CAROLINA SENATE
HONORABLE W. GREG RYBERG
PAGE 1 OF 2

W. GREG RYBERG
SENATOR, AIKEN AND LEXINGTON COUNTIES
SENATORIAL DISTRICT 24

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STATE HOUSE COMMITTEE

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COLUMBIA, SC 29201
(803) 212-6116
FAX: (803) 212-6299

June 19, 1997

Mr. Howard Canter
U.S. Department of Energy
Office of Fissile Materials Disposition
MD-4 Forrestal Building
1000 Independence Avenue, SW
Washington, D.C. 20588

Dear Mr. Canter:

I appreciate the opportunity to express my support of the Savannah River Site (SRS) as the best and singular choice for the Department of Energy's Plutonium Disposition Mission. According to my understanding, currently, there are two options being considered for the handling and disposition of excess plutonium - mixed-oxide (MOX) fuel production and vitrification. Furthermore, I have been informed that SRS is the only location under consideration which has the capability to contribute in both methods of disposition.

Consolidation of all of the contemplated plutonium operations at one site appears to be not only the most cost-effective approach but also to be in the best interest of our Country. DOE's adopted strategy to consolidate operations as the complex was downsized is a good one. SRS currently has the infrastructure, layout, and specialized skills necessary to effectuate consolidation of and a smooth, cost-effective transition to DOE's new mission. It is also the only location that would not require extensive capital outlay to implement DOE's plans. Additionally, SRS's existing operation features numerous facilities which would enhance and complement these new missions. 1

SRS is the only site with the level of current expertise, experience and proven ability to safely handle these new missions. It is the only large-scale operating plutonium processing facility in the country. Its facilities have been extensively renovated and modernized and stand ready for duty. The proven people assets needed for plutonium missions already exist at SRS and need not be moved or developed elsewhere. Having lived within the community for 20 years, I would unequivocally say that the SRS employees are second to none. Through the ups and downs of the SRS employment cycle, the core competency of the Site has been integral to its success and to the vast community support. Bricks and mortar, canisters and glass logs, are only a portion of the SRS success equation. Our people and our community involvement are, I believe, the key to DOE's success. It is a fact that employees perform to their highest potential when they enjoy the support of their community.

SCD103

SCD103–1 **Alternatives**

DOE acknowledges the Senator's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

June 19, 1997

Mr. Howard Canter
Page 2

Aiken County and its surrounding communities wholeheartedly support SRS in its bid for new compatible missions and we believe we offer the lowest cost alternative to DOE while protecting the environment. The community's commitment to SRS has been actively demonstrated since it was first built in the early 1950's. I believe the level, breadth, and depth of support for this facility continues to be unprecedented. I regard this support as unparalleled by any other DOE facility within the complex.

In spite of the tremendous cut backs at SRS over the past four years, our community has stood steadfast behind the site and actively assisted SRS in its pursuit of new missions. This site, and its countless contractors and economic off shoots, is not only the largest employer in our area, it is also an integral part of our community through the involvement of its operator, Westinghouse, in charitable and civic organizations and endeavors. Their commitment to getting involved and to giving back to our community has resulted in increased support for the site. 1

With concern for fiscal responsibility and accountability at all levels of government being the national outcry, along with competent people and community support being integral to the success of the Plutonium Mission, I steadfastly feel that SRS is the most logical choice for DOE's mission for Plutonium Disposition.

Sincerely,

W. Greg Ryberg
District 24

SCD103

SOUTH CAROLINA SENATE
HONORABLE W. GREG RYBERG
PAGE 1 OF 2

W. GREG RYBERG
SENATOR, AIKEN AND LEXINGTON COUNTIES
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August 13, 1998

Mr. Howard Canter
U.S. Department of Energy
Office of Fissile Materials Disposition
MD-4 Forrestal Building
1000 Independence Avenue, SW
Washington, D.C. 20588

Dear Mr. Canter:

I appreciate the opportunity to express my support of the Savannah River Site (SRS) as the best and singular choice for the Department of Energy's Surplus Plutonium Disposition Mission. As former Secretary Pena stated and your Draft Environmental Impact Statement correctly concludes, Savannah River is the preferred alternative for the MOX fuel fabrication and immobilization portions of this important non-proliferation mission because of its staff expertise, plutonium infrastructure and exemplary safety performance. These same considerations hold true for the Pit Disassembly and Conversion Facility, and your decision should be to similarly assign this portion of the Surplus Plutonium Mission to Savannah River.

Consolidation of all of the contemplated plutonium operations at one site appears to be not only the most cost-effective approach but also to be in the best interest of our Country. DOE's adopted strategy to consolidate operations as the complex was downsized is a good one. SRS currently has the infrastructure, layout, and specialized skills necessary to effectuate consolidation of and a smooth, cost-effective transition to DOE's new mission. It is also the only location that would not require extensive capital outlay to implement DOE's plans. Additionally, SRS's existing operation features numerous facilities which would enhance and complement these new missions. 1

SRS is the only site with the level of current expertise, experience and proven ability to safely handle these new missions. It is the only large-scale operating plutonium processing facility in the country. Its facilities have been extensively renovated and modernized and stand ready for duty. The proven people assets needed for plutonium missions already exist at SRS and need not be moved or developed elsewhere. Having lived within the community for 21 years, I would unequivocally say that the SRS employees are second to none. Through the ups and downs of the SRS employment cycle, the core competency of the Site has been integral to its success and to the vast community support. Bricks and mortar, canisters and glass logs, are only a portion of the SRS success equation. Our people and our community involvement are, I believe, the key to DOE's success. It is a fact that employees perform to their highest potential when they enjoy the support of their community.

SCD43

SCD43–1 **Alternatives**

DOE acknowledges the Senator's support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

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August 13, 1998

Mr. Howard Canter
Page 2

Aiken County and its surrounding communities wholeheartedly support SRS in its bid for new compatible missions and we believe we offer the lowest cost alternative to DOE while protecting the environment. The community's commitment to SRS has been actively demonstrated since it was first built in the early 1950's. I believe the level, breadth, and depth of support for this facility continues to be unprecedented. I regard this support as unparalleled by any other DOE facility within the complex.

In spite of the tremendous cut backs at SRS over the past few years, our community has stood steadfast behind the site and actively assisted SRS in its pursuit of new missions. This site, and its countless contractors and economic off shoots, is not only the largest employer in our area, it is also an integral part of our community through the involvement of its operator, Westinghouse, in charitable and civic organizations and endeavors. Their commitment to getting involved and to giving back to our community has resulted in increased support for the site. 1

With concern for fiscal responsibility and accountability at all levels of government being the national outcry, along with competent people and community support being integral to the success of the Plutonium Mission, I steadfastly feel that SRS is the most logical choice for the Pit Disassembly and Conversion Facility.

Sincerely,

W. Greg Ryberg
District 24

SCD43

SOUTH CAROLINA UNIVERSITIES RESEARCH AND EDUCATION FOUNDATION
CONSTANTINE CURRIS ET AL.
PAGE 1 OF 2

ERDA
EDUCATION, RESEARCH AND DEVELOPMENT
ASSOCIATION OF GEORGIA UNIVERSITIES
900 Atlantic Drive
Atlanta, Georgia 30332-0425
(404)-894-3800 FAX (404)-894-9325

SCUREF
SOUTH CAROLINA UNIVERSITIES
RESEARCH AND EDUCATION FOUNDATION
Strom Thurmond Institute
Clemson, South Carolina 29634-5701
(864)-656-1564 FAX (864)-656-0958

June 24, 1997

The Honorable Newt Gingrich
2428 Rayburn House Office Building
United States House of Representatives
Washington, DC 20515

Dear Mr. Speaker:

Since 1992, regional universities in South Carolina and Georgia have partnered with Westinghouse Savannah River Company and the Department of Energy at the Savannah River Site to expand the technical expertise and resources of the site to accomplish missions to solve problems, train employees and educate the public. We want these efforts to continue and to expand in the future. Your active support is needed now as new missions for SRS are being considered.

The two new mission areas are:

- Tritium Production for National Defense
- Surplus Nuclear Materials Disposition for National and International Security

SRS has existing experience and expertise as well as the required infrastructure to execute both of these missions in a safe and environmentally acceptable manner. These projects complement the successful environmental cleanup and remediation program at the site to which we are already contributing. 1

The Savannah River Site has been previously selected to be the site for future production of Tritium for our national defense program if required. Our institutions can assist by contributing to the basic science and technology research that would be needed to design and operate such a facility. Our institutions will also provide educational opportunities to create a cadre of operational and design engineers, scientists, environmental specialists and safety experts.

The material disposition mission would process and ultimately dispose of excess plutonium and highly enriched uranium, significantly reducing the risk of proliferation. Our universities fully support and are ready to partner with SRS to achieve this mission. Your support is essential. The leading research universities of South Carolina and Georgia are solidly behind the new missions, without which this region of Georgia and South Carolina will continue losing

ERDA Member Institutions: Clark-Atlanta University; Emory University; Georgia Institute of Technology; Georgia State University; Medical College of Georgia; University of Georgia
SCUREF Member Institutions: Clemson University; Medical University of South Carolina; South Carolina State University; University of South Carolina

SCD80

SCD80–1 **Alternatives**

DOE acknowledges the commentors' support for tritium production and surplus plutonium disposition at SRS. Tritium production is beyond the scope of this SPD EIS, but is analyzed in the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE/EIS–0161, October 1995). As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

jobs and expertise at SRS. It is critical that we stabilize funding and employment at the SRS through Congressional support for the new missions. 1

Sincerely,

SCUREF

Dr. Constantine Curris, President
Clemson University

Dr. James Edwards, President
Medical University of South Carolina

Dr. Leroy Davis, President
SC State University

Dr. John Palms, President
University of South Carolina

ERDA

Dr. Thomas Cole, President
Clark Atlanta University

Dr. William Chace, President
Emory University

Dr. Wayne Clough, President
Georgia Institute of Technology

Dr. Carl Patton, President
Georgia State University

Dr. Francis Tedesco, President
Medical College of Georgia

Dr. William F. Prokasy, Acting President
University of Georgia

Distribution List:

The Honorable Newt Gingrich
The Honorable Paul Coverdell
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The Honorable Jack Kingston
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The Honorable Bob Inglis
The Honorable John Spratt
The Honorable James Clyburn

The Honorable David Beasley
The Honorable Zell Miller
Mr. Federico Pena

ERDA Member Institutions: Clark-Atlanta University; Emory University; Georgia Institute of Technology; Georgia State University; Medical College of Georgia; University of Georgia
SCUREF Member Institutions: Clemson University; Medical University of South Carolina; South Carolina State University; University of South Carolina

SCD80

SOUTHEAST ENVIRONMENTAL MANAGEMENT ASSOCIATION
CARL A. MAZZOLA
PAGE 1 OF 2

Southeast EMA
SOUTHEAST ENVIRONMENTAL MANAGEMENT ASSOCIATION
P.O. Box 5446 • Aiken, South Carolina • 29804
Phone and Fax (803) 648-9545

September 9, 1998
SEMA-98-009

US Department of Energy
Office of Fissile Materials Disposition
P. O. Box 23786
Washington, DC 20026-3786

Gentlemen:

The Southeast Environmental Management Association (SEMA) is a non-profit organization of environmental management professionals. We were formed in 1994 for the purpose of providing a forum for the exchange of technical and programmatic information pertaining to environmental restoration, waste management and minimization, and environmental compliance issues, as they pertain to public and private sector enterprises in the southeast United States.

SEMA offers public comment in response to the Surplus Plutonium Disposition (SPD) Draft Environmental Impact Statement (DEIS):

Having reviewed the alternatives presented in the SPD DEIS for the Pit Disassembly and Conversion Facility, the Mixed Oxide (MOX) Fuel Facility, and the Plutonium Immobilization Facility (PIF), it is apparent that the preferred site for each of these facilities should be the Savannah River Site (SRS) in Aiken, South Carolina. This preference is based on many compelling arguments presented in the EIS itself, such as:

- SRS experience for almost 50 years in the safe handling, safe processing, and secure management of a full spectrum of plutonium products, 1
- A highly developed and well-maintained infrastructure especially suited for each of these facilities,
- Synergistic advantages to the co-location of the Pit Disassembly and Conversion Facility with the PIF and MOX facilities next to the Actinide Packaging and Storage Facility,
- The large size of the SRS reservation (300 square miles) provides an additional buffer unavailable at other candidate sites (these facilities will be more than 6 miles from the nearest offsite individual),
- A highly trained and effective workforce with many years of experience with plutonium materials and processes inclusive of the only DOE Plutonium Training Facility, and
- A competitive cost advantage estimated as high as $120 million which would demonstrate the DOE commitment to be responsible stewards of taxpayer dollars.

MD167

MD167–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS and appreciates the community support. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

US Department of Energy - Office of Fissile Materials Disposition
September 9, 1998
Page 2

Notwithstanding the aforementioned advantages, the greatest argument that can be made is the unswerving commitment of the CSRA people, governments, industries, and organizations, like SEMA, in support of existing and new DOE missions. This commitment should not be taken lightly, for it is based on years of working closely with DOE-SR in shouldering the heavy responsibility of safe, environmentally benign, and strategically important missions of providing nuclear materials for our nation's defense and in remediating the legacy of the nuclear weapons complex. 1

Based on the decades of experience that the CSRA has had with SRS, we have full confidence that these new missions will be carried out safely and in an environmentally sound manner.

Sincerely,

Carl A. Mazzola

Carl A. Mazzola
SEMA President, 1998

cc: The Honorable Lindsey Graham, US House of Representatives
The Honorable Greg Ryberg, South Carolina State Senate
Mr. Greg Rudy, Manager, US Department of Energy-Savannah River Site
Mr. Ambrose Schwallie, President, Westinghouse Savannah River Company
Mr. Mike Butler, Citizens for Nuclear Technology Awareness
Citizens Advisory Board, Savannah River Site

MD167

SRS Citizens Advisory Board
Page 1 of 1

Savannah River Site

CITIZENS ADVISORY BOARD

Recommendation 61
July 28, 1998

Recommendation on the
Draft Surplus Plutonium Disposition
Environmental Impact Statement

Background

The Draft Surplus Plutonium Disposition (SPD) Environmental Impact Statement (EIS) identifies reasonable alternatives and potential environmental impacts for the proposed siting, construction, and operation of three facilities for plutonium disposition. After the Storage and Disposition of Weapons-Usable Fissile Materials programmatic EIS was completed, former Secretary of Energy Hazel O'Leary announced in January 1997 that DOE would pursue a dual track for plutonium disposition—immobilization and mixed oxide. The draft SPD EIS tiers from the Storage and Disposition programmatic EIS.

The alternatives in the draft SPD EIS include three disposition facilities designed to collectively disposition up to 50 metric tons of surplus plutonium. A facility to disassemble and convert pits into plutonium oxide is proposed with SRS and Pantex designated as equally preferred sites. DOE also has announced that SRS is the preferred site for both the immobilization and MOX fuel fabrication facilities. The immobilization facility includes a collocated capability to convert non-pit plutonium materials into a form suitable for immobilization. The MOX facility will fabricate plutonium oxide into MOX fuel. The fuel would be used in existing commercial reactors in the United States.

Recommendation

The SRS CAB has reviewed the Draft SPD EIS in which DOE states SRS is the preferred location for immobilization and MOX and one of two locations for pit disassembly operations. Based on this information just released, the SRS CAB initially concurs with the DOE statement that SRS is a reasonable site for some or all of the proposed missions for the following reasons: 1

1. We support site integration activities when the selected sites are best able to perform those activities that are part of their core function.

2. Incremental risks presented in the draft summary appear to be minimal and acceptable.

Concerning pit disassembly activities, the SRS CAB asks DOE to consider that, should Pantex be chosen to conduct the pit conversion mission, this decision would create a new plutonium processing site within a system endeavoring to consolidate operations for cost effectiveness, but most importantly, would increase the amount of environmental cleanup that ultimately will be required. We also acknowledge that the missions would add economic benefit to the local community. 2

SRS CAB Recommendation #61
Adopted July 28, 1998

FD206

FD206–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses (including risk analyses), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

FD206–2 **Alternatives**

The existing infrastructure at Pantex is described in Section 3.4.11, and the impact of the proposed surplus plutonium disposition facilities on the infrastructure at Pantex is discussed in Section 4.26.3.6. This SPD EIS analyzes impacts to the environment due to construction and normal operation of the pit conversion facility. This facility would be located in a new building at either Pantex or SRS. The new building should have the same level of contamination regardless of the site and require the same amount of D&D work.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

COMMENTS FOR THE DOE PLUTONIUM DISPOSITION PUBLIC MEETING

Prepared by Dr. Constance J. Pritchard
President, The Pritchard Group
North Augusta, SC 29861
803-279-4175 (v)

business owner!

My interest in speaking today is as a member of the North Augusta community. I am a small business owner who works with area businesses in a variety of training and consultative ways. I also serve on a number of Boards of Directors including Chambers of Commerce and Workforce Development. These roles, professionally and personally, have given me a chance to be knowledgeable about the Savannah River Site and its mission.

I speak for myself today, and I think that my comments also reflect those of a number of others in the community. As are many others here today, we are well acquainted with the quality, dedication, and professionalism of workers at the Savannah River Site. ~~This~~ individuals live near us, work in the community beside us, attend church with us, and share in ~~the~~ raising their families here in the CSRA. We are proud of the safety record that SRS has, and support its ability to remain a productive facility.

We view the Savannah River Site as a provider with a long record of safety and efficiency in the production and disposal of nuclear materials and products. The workers at SRS have repeated demonstrated their competency and commitment to the safe production and disposal of nuclear products. Not only are ~~is~~ the necessary levels of expertise available at SRS for plutonium disposition, the existing infrastructure will be a tax savings for us. As an employer and a tax payer, that consideration is a primarily one for me. 1

Not only does SRS have the expertise of its employees, its leadership - world class partnerships -- businesses that are best in class -- have formed ~~that~~ to unite global technology. They bring the management, nuclear experience and knowledge, and technology to effect safe plutonium disposition. This partnership is working well, is cost effective, and serves to illustrate SRS's ability to adapt ~~and seek~~ to learn and improve.

I offer my support that the Savannah River Site be chosen for the entire DOE plutonium disposition mission.

email: fulvalue@aol.com

SCD21

SCD21–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TRI-COUNTY ECONOMIC DEVELOPMENT ALLIANCE
J. CALVIN MELTON
PAGE 1 OF 1

RESOLUTION

WHEREAS, THE TRI CE IS A LEGALLY RECOGNIZED REPRESENTATIVE OF THE MEMBER COUNTIES OF ALLENDALE, BAMBERG, AND BARNWELL IN SOUTH CAROLINA; AND

WHEREAS, THE DUTY OF THE ALLIANCE IS TO ASSIST IN THE CREATION OF ECONOMIC DEVELOPMENT OPPORTUNITIES WITHIN THE MEMBER COUNTIES; AND

WHEREAS, THE ALLIANCE WAS CREATED TO WORK ON BEHALF OF THE MEMBER COUNTIES IN A UNIFIED AND MUTUALLY BENEFICIAL MANNER; AND

WHEREAS, ANY JOB CREATION AND CAPITAL INVESTMENT IN A HOST COUNTY ALSO BENEFITS THE OTHER MEMBER COUNTIES; AND

WHEREAS, SIXTY SIX PER CENT OF THE SAVANNAH RIVER SITE IS LOCATED WITHIN THE BORDERS OF TWO OF THE MEMBER COUNTIES AND MORE THAN 1400 EMPLOYEES OF THE SITE ARE RESIDENTS OF THE MEMBER COUNTIES; AND

WHEREAS, THE MEMBER COUNTIES BELIEVE ANY ASSISTANCE DERIVED FROM THE SAVANNAH RIVER SITE DURING THE DOWNSIZING OF THE FACILITY TO ANY MEMBER COUNTY OF THE ALLIANCE WOULD BE BENEFICIAL TO THE REGION; AND 1

WHEREAS, NO SPECIFIC CONGRESSIONAL MANDATE LIMITS THE DEPARTMENT OF ENERGY'S ASSISTANCE TO THE EFFECTED AREA; AND

WHEREAS, THE COMMUNITY REUSE ORGANIZATION (SRRDI) CAN RECCOMMEND TO THE DEPARTMENT OF ENERGY MODIFICATIONS WITHIN THE CHARTER OF THE SRRDI ORGANIZATION; AND

WHEREAS, THE THREE REGIONAL ECONOMIC DEVELOPMENT ORGANIZATIONS, THE AIKEN-EDGEFIELD PARTNERSHIP, THE METRO-AUGUSTA CHAMBER OF COMMERCE, AND THE TRI-COUNTY ALLIANCE, REPRESENT ADDITIONAL ADVERSLY EFFECTED COUNTIES WITH LARGE POPULATIONS OF SAVANNAH RIVER SITE EMPLOYEES BEYOND THOSE RECOGNIZED BY THE DEPARTMENT OF ENERGY UNDER THE CURRENT (CRO) STRUCTURE.

NOW, THEREFORE BE IT RESOLVED THAT THE BOARD OF DIRECTORS OF THE TRI-COUNTY ALLIANCE DOES HEREBY SUPPORT AND RECCOMMEND THE ADDITION OF BAMBERG AND EDGEFIELD COUNTIES IN SOUTH CAROLINA, AND BURKE COUNTY IN GEORGIA TO THE SRRDI SERVICE REGION.

ADOPTED THIS THE THIRTIETH DAY OF JANUARY, 1997.

J. Calvin Melton

J. CALVIN MELTON, CHAIRMAN

SCD100

SCD100–1 **Other**

DOE acknowledges the resolution that Bamberg and Edgefield Counties in South Carolina and Burke County in Georgia be included in the SRRDI service region.

TRI-COUNTY ECONOMIC DEVELOPMENT ALLIANCE
CALVIN MELTON
PAGE 1 OF 2

MR. MODERATOR, I ALSO WANT TO EXPRESS TO YOU AND THE DEPARTMENT OF ENERGY, OUR DESIRE TO HAVE THE PLUTONIUM DISPOSITION MISSION LOCATED AT THE SAVANNAH RIVER SITE.

I AM CALVIN MELTON, AND I AM CHAIRMAN OF THE TRI-COUNTY ECONOMIC DEVELOPMENT ALLIANCE, REPRESENTING ALLENDALE, BAMBERG, AND BARNWELL COUNTIES. + Vice Chairman of SRRDI - BOARD - Representing three Counties in SC + 2 Counties in Georgia.

AS YOU KNOW, OUR COMMUNITIES HAVE ALWAYS BEEN A GREAT SUPPORTER OF THE DEPARTMENT'S MISSIONS AND WE HAVE ATTENDED THESE PUBLIC HEARINGS NUMEROUS TIMES ON OTHER ISSUES TO VOICE OUR SUPPORT. 1

THIS ONE SEEMS TO BE A LITTLE DIFFERENT, IN THE FACT THAT THIS SHOULD BE A FAIRLY SIMPLE DECISION.

THE PREVIOUS SECRETARY HAS ALREADY ANNOUNCED THE DEPARTMENT'S DESIRE TO HAVE THE SAVANNAH RIVER SITE PERFORM THE VITRIFICATION PROCESS, AND HAS SELECTED THE SITE TO BE THE HOME OF THE MOX FUEL PROGRAM.

SCD32

SCD32–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TRI-COUNTY ECONOMIC DEVELOPMENT ALLIANCE
CALVIN MELTON
PAGE 2 OF 2

THEREFORE, IT ONLY MAKES SENSE THAT THE PIT CONVERSION PROCESS BE LOCATED AT THE SAVANNAH RIVER SITE AS WELL.

THE TRI-COUNTY ALLIANCE AND ITS MEMBERS, STRONGLY ENCOURAGES YOU TO MAKE A DETERMINATION BASED ON THE CAPABILITIES OF THE COMPETING SITES AND NOT ON POLITICS. 1

CONFIRM THE SAVANNAH RIVER SITE AS THE SITE OF CHOICE FOR ALL THE PLUTONIUM MISSIONS, AND LET'S GET ON WITH THE NATION'S BUSINESS.

THANK YOU.

SCD32

DOE Draft EIS for Surplus Plutonium Disposition
Thursday, August 13, 1998

Good afternoon, I'm Keith Benson, President and Chief Professional Officer of the United Way of the CSRA.

Thank you for providing this opportunity to comment on an issue that's so important to our region and to our friends and neighbors at the Savannah River Site.

Many speakers today have addressed the technical and political aspects of the decisions you are considering in order to ultimately make the world a safer place for all of us to live.

It sounds like they've raised some very good points. But I'm not a technical expert or a political scientist. I am, however, an expert on the quality of life and the quality of people, the people you have working at SRS.

I work with them on our Board of Directors, on the governing bodies of our various member agencies and many community projects. I've witnessed their talents in many other

1

SCD37

SCD37–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

aspects of our community. Our successes are due, in large measure, to them. And what I am certain of is that on top of their technical skills, on top of their unique capabilities, they are first and foremost quality people who take the safety and well-being of their neighbors to heart.

For 40 years, the men and women at the Savannah River Site have safely and responsibly supported, not only our nation's defense, but also the best interests and needs of their neighbors. Employees have donated millions of dollars and volunteer hours to improve quality of life. From what I've heard today, it's in the government's best interest to place the nation's plutonium disposition mission in the capable hands of our friends and neighbors at SRS. They've never disappointed me. I'm certain they won't disappoint you. 1

Thank you.

SCD37

3526 Boundbrook Lane
Columbia, SC 29206

September 16, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
PO Box 23786
Washington, DC 20026-3786

I wish to comment on the *Surplus Plutonium Disposition Draft Environmental Impact Statement.*

1. The Savannah River Site is not, in my opinion, a suitable site for plutonium disposal due to the unstable geologic conditions of the area. 1
2. Vitrification seems like a promising technology for immobilizing plutonium. 2
3. Any plan to reuse plutonium for energy generation (such as the MOX fuel) would seem ill-advised. Due to the highly toxic nature of plutonium, any reuse would be present needless risk to workers and the environment. If an enemy forced such exposure on our land and people, we would consider it a hostile act. I strongly oppose any plan by our own government which could increase the chance of accidental exposure to plutonium. 3

Respectfully submitted,
Meira (Maxine) Warshauer

FD322

FD322–1 **Geology and Soils**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at SRS due to unstable geologic conditions. Section 3.5.6.1 discusses the geologic conditions of the area, noting that no substantial geologic hazards or unstable soils exist at the site. Section 4.26.4.1 states that geology and soils would not appreciably affect, nor be affected by, the proposed facilities. Surplus plutonium would not be disposed of at SRS. This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

FD322–2 **Immobilization**

DOE acknowledges commentor's support for the vitrification alternative of the immobilization approach to surplus plutonium disposition. Vitrification alternatives were evaluated in detail in the *Storage and Disposition PEIS*, which states that DOE would make a determination on the specific technology on the basis of this SPD EIS. This SPD EIS identifies the ceramic can-in-canister approach as the preferred immobilization technology. Section 4.29 provides a detailed comparison of immobilization technology impacts.

FD322–3 **MOX Approach**

DOE acknowledges the commentor's opposition to reusing plutonium for energy generation. The use of MOX fuel in domestic commercial reactors is not proposed in order to produce electricity. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by

NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing. Analyses provided in Section 2.18.3 and Chapter 4 of Volume I for the alternatives that include MOX fuel fabrication and irradiation show that potential environmental impacts would likely be minor.

WESTINGHOUSE SAVANNAH RIVER COMPANY
DONALD L. SPEED
PAGE 1 OF 1

Donald L. Speed, Senior Engineer
Westinghouse Savannah River Company
Building 730-1B, Room 2162
Aiken, SC 29808
W: (803) 952-9353
Fax: (803) 952-9350

facsimile transmittal

To:	Office of Fissile Materials Disposition	Fax:	(800) 820-5156
From:	Donald L. Speed	Date:	09/16/98
Re:	Comments on SPD EIS Summary	Pages:	1

☐ Urgent ■ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

I attended the 8/13 evening meeting in North Augusta, SC. I was a little disappointed in that the meeting became a forum for public statement by an endless stream of politicians, though I assume you are accustomed to that by this time.

I primarily attended to hear technical comments, and there were few. One of the comments, however, piqued my interest because it centered on the question of purity in the MOX fuel. Before coming to SRS in 1990, I spent several years at LLNL as a systems engineer in the Atomic Vapor Laser Isotope Separation (AVLIS) program, primarily on the Pu side. Though the pilot plant for this program planned for NEEL was never built (it was a "peace dividend" after the Wall came down), the process itself was technically sound. In fact, I believe the uranium side of AVLIS is the source of USEC. My question is, has the AVLIS process been reviewed for possible use in the MOX program? After eight years at a site storing tens of millions of gallons of high level waste, I'd be encouraged to see at least one other alternative considered that doesn't involve complex, expensive-to-treat-and-dispose-of waste streams. 1

My other comment concerns a statement on page S-9 of the EIS Summary, which says "The construction of new facilities for the disposition of surplus US plutonium would not take place unless there is significant progress on plans for plutonium disposition in Russia." This is an admirable sentiment, and I fully concur, but what are the indicators to be used in this evaluation—parallel plant design and deployment? A signed treaty with the major states of the former USSR? Or is this simply a decision that will be made by the President or Congress when DOE is prepared to request the capital funds for design and construction? 2

I applaud the work you have done in exploring technologies for HEU/Pu disposition, as well as sorting through the siting alternatives. I also appreciate the opportunity to attend the public meeting, and to comment on this EIS. Thank you! 3

FD319

FD319–1 **Other**

Nearly all AVLIS research to date has focused on uranium isotope separation and enrichment rather than purification. The AVLIS technology might not be suitable for purification of plutonium. Considerable research and proof-of-concept demonstrations would be required prior to such an application. The cost and time required for deployment of the AVLIS technology for this application would also be significant. Due to the potentially long development time, high costs, and attendant technical uncertainties, application of the AVLIS technology for plutonium purification was not deemed a reasonable disposition option in this SPD EIS. Discussion of treatment options that were considered and the maturity of the various technologies can be found in the ROD for the *Storage and Disposition PEIS*.

FD319–2 **Nonproliferation**

The United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. Accordingly, the U.S. Congress appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain surplus plutonium disposition activities in order to encourage the Russians and set an international example.

FD319–3 **General SPD EIS and NEPA Process**

DOE acknowledges and appreciates the commentor's support for the surplus plutonium disposition program and the related public outreach activities.

WESTINGHOUSE SAVANNAH RIVER COMPANY
RICHARD TANSKY
PAGE 1 OF 2

MRS HOLGATE: MR. NULTON

MY NAME IS RICHARD TANSKY I AM HERE TODAY REPRESENTING THE TRAINING PROGRAM AT SRS AS THE ~~WSRC~~ ~~FOR WESTINGHOUSE SAV RIV CO AS THE~~ SITE TRAINING MGR FOR WESTINGHOUSE

I UNDERSTAND THAT AT THE HEARINGS CONDUCTED A PANTEX THIS WEEK, THE ISSUE OF THE TRAINING AND QUALIFICATION OF THE WORKFORCE WAS APPROPRIATELY RAISED - WITHOUT FEELING THE NEED TO POINT OUT THE IMPORTANCE OF THE QUALIFICATIONS AND COMPETENCE OF THE WORKFORCE IN THE DECISION MAKING PROCESS. I'D TO POINT TO A FEW OF THE REASONS WHY THE ~~WORKFORCE AT SRS IS BEST~~ TRAINING & QUALIFICATION PROGRAM AT SRS SUPPORTS A DECISION TO LOCATE THE PU PIT DISASSEMBLY & CONVERSION MISSION AT SRS. 1

SCD09

SCD09–1 **Alternatives**

DOE acknowledges the commentor's views on SRS workforce qualifications and support for siting the pit conversion facility at SRS. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SRS has the best trained most qualified workforce in the Complex. SITE HAS STAFF ALREADY QUALIFIED + EXPERIENCED IN PU CONVERSION PROCESS

SRS has the only training programs accredited by the DOE Accrediting Board and has 17 training programs accredited.

Training programs in Operations, RadCon, and Maintenance carry college credit.

~~Training to make facility operators enables them to Analyze, Predict and Troubleshoot.~~

Annual investment in Training at SRS is > $40 million – 97% is directly related to job qualification and safety. AN ADDITIONAL $2 MILLION IN TUITION REIMB.

SITE HAS OVER $26 MILLION INVESTED IN TRAINING FACILITIES

Training Program effectiveness is continually evaluated through:

- Formal Self-Assessment Program
- Facility Evaluation Board audits of facilities
- Training Oversight Committee - CHAIRED BY EVP

1

Other sites have adopted SRS training records management system, procedures manual, and many training courses.

SRS Integrated Safety Management System ensures a workforce competent to carry out assignments safely.

SRS Training is exported to other DOE sites, commercial enterprises (MCG), and internationally (Russia)

DNFSB obtains Radworker Training from SRS and has lauded our aggressive training in creating and maintaining a culture of Disciplined Operations.

DOE Spent Fuels Team trained by SRS in RWT, Respiratory, and Asbestos prior to their trips to China, Russia, N. Korea, and India

SCD09

WESTINGHOUSE SAVANNAH RIVER COMPANY
FRAN WILLIAMS
PAGE 1 OF 4

Intro

Fran Williams Vice President Environment, Safety, Health and Quality Assurance Division

- Provide oversight for Westinghouse to ensure our operations protect the safety and health of our employees and the public and that our operations are in compliance with state, federal, and DOE requirements in industrial safety, radiation and contamination control, environmental and health surveillance.

SCD34

Safety

- HISTORICALLY 1992-1996 Injury and Illness ranking of DOE Production Contractors prove WSRC is the best
  - » Lost Workday Case Rates for WSRC 0.3, Pantex 2.8 and DOE average was 1.0
  - » Total Recordable Case Rates for WSRC 0.7, Pantex 5.1 and DOE average 8.1
  - » Cases per 200,000 hours
- RECENTLY 1/97-9/97 Injury and Illness ranking of DOE Production Contractors prove WSRC is the best
  - » Lost Workday Case Rates WSRC 0.5, Pantex 2.4 and DOE Average 1.1
  - » Total Recordable Case Rates WSRC 1.1, Pantex 4.1 and DOE Average 7.4
- SRS has an outstanding Lost Work-Time Injury Record
  - – Construction Workers earned the Westinghouse President's Award for working more than 2.5 MILLION hours without a lost-time injury
  - – Operations recently reached the 3.8 MILLION hours mark without a lost-time injury
- Worker's Comp costs are 6 times LOWER than industry
- 1/97-9/97 Cost Index Ranking of DOE Production Contracts once again prove WSRC is the safest site in the complex
  - » WSRC 3.08, Pantex 28.85, and DOE average 14.4
  - » Coefficients should not be advertised as dollar figures - only as appropriate weighting factors
  - » Coefficients derived from study of direct and indirect dollar costs of injuries
  - » Index is approximately equal to cents lost per hour worked
- National Safety Council stated SRS level of employee participation is "incredible and an indication of a strong safety culture"
  - – SRS responses ranked in the 89th percentile of the National Safety Council data base
    - » Only 11 of 100 companies scored higher

1

SCD34

SCD34–1 **Other**

DOE acknowledges the commentor's views on the positive attributes of SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

WESTINGHOUSE SAVANNAH RIVER COMPANY
FRAN WILLIAMS
PAGE 3 OF 4

RadCon

- Historically SRS has been viewed as having the best RadCon Program in the DOE Complex
  - SRS supported Pantex in early 90s by lending technical assistance in directing cleanup and RadCon monitoring for TRITIUM releases
- Our employee surveillance programs are in place ON SITE and they exceed DOE requirements
  - Our State-of- the-Art Radiation Instrument Calibration Facility is a model for the DOE Complex
  - We also have a NEW Whole Body Count facility
  - External Dosimetry is DOELAP accredited
  - Bioassay program and Whole Body Count evaluation is in lock step for DOELAP accreditation
  - Nationally recognized expertise in both internal and external dosimetry
- SRS has the ONLY accredited RadCon Training Program in the DOE Complex
- SRS continuously strives to improve the programs to protect worker safety and health
  - Average Worker Dose (mrem/person) decreased 50% in last 10 years
    - » Better work planning, ALARA program (and scope reductions)
  - Intakes decreased by 67% over last 6 years
    - » Enhanced work planning and expansive RadCon job coverage
  - Personal Contaminations decreased 99% over last 10 years
    - » Engineering controls and rollbacks
- Medical Department consists of 9 physicians, 18 nurses and 5 facilities spread ACROSS the site to service our employees
  - Medical covers surveillance for radiological contamination, toxic and chemical exposure, injuries and illnesses, routine wellness programs and substance abuse testing.

1

SCD34

Environmental

- Largest DOE weapons site and second in the complex (WIPP 1st) to earn ISO 14001 certification.
- Met ALL environmental regulatory requirements in 1997
- Exceeded Goal of 98% Compliance with NPDES regulations by 1.9%
- SRS NEPA Team earned the National Association of Environmental Professionals Presidential Award of Excellence for NEPA/CERCLA Guidance
- Several SRS employees are working on ANSI standards development and regulation writing committees AT THE REQUEST of our regulators
  - WSRC expertise is valued based on our proven track record
- Another example of our regulator's confidence in WSRC is the fact that DHEC has granted WSRC permission to permit ourselves for drinking water, erosion control plans and for small volume waste waters

1

SCD34

WILLIAMS, DAVID
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) DAVID WILLIAMS
ADDRESS: 127 ROLLING ROCK RD., AIKEN, SC 29803
TELEPHONE: (803) 649-0121
E-MAIL:

CONGRATULATIONS TO DOE ON PERFORMING A THOROUGH INVESTIGATION INTO THE AREA'S OF CONCERN REGARDING SELECTION OF THE BEST SITE FOR DISPOSING OF COLD WAR PLUTONIUM STOCK PILES.

SRS SHOULD BE THE SITE CHOSEN BASED ON MERIT, TRACK RECORD OF SAFETY + ~~AA~~ RIGHT MIX OF TECHNICAL SUPPORT FROM IT'S WORK FORCE. DOUBTERING + EMPHASING THE CHOICE FOR SRS IS THE CONCERN OF COST SAVINGS TO THE CITIZENRY OF THIS COUNTRY AND THE PUBLIC SUPPORT THAT THE MAJOR ENTITY'S IN THIS COMMUNITY.

1

SCD71

SCD71–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

ZACHMANN, GEORGE
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) George Zachmann
ADDRESS:
TELEPHONE: (803) 952-4851
E-MAIL:

I feel that WSRC has proven itself as a safe and disciplined facility at which several stabilization missions have been successfully completed. It only makes sense to perform Pu disposition missions at WSRC. The highly skilled technical workforce understands Conduct of Operations standards while meeting integrated schedules. I feel the Pit Disassembly and Conversion and Mox Fuel Fabrication should be performed at WSRC. 1

SCD60

SCD60–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TENNESSEE GOVERNOR'S OFFICE
JUSTIN P. WILSON
PAGE 1 of 11

STATE OF TENNESSEE

DON SUNDQUIST
GOVERNOR

September 16, 1998

Mr. G. Bert Stevenson, NEPA Compliance Officer
Office of Fissile Materials Disposition
US Department of Energy
PO Box 23786
Washington DC 20026-3786

Dear Mr. Stevenson:

As the Governor's Lead Contact for State of Tennessee's National Environmental Policy Act (NEPA) reviews, I am providing comments in response to the "**Draft Environmental Impact Statement (DEIS) for Surplus Plutonium Disposition," DOE/EIS-0283-D**. The attached comments from state agencies represent the complete and official response of the State of Tennessee.

The State of Tennessee would like to remind DOE that, although this DEIS does not directly pertain to inventories of stored plutonium in this state, plutonium wastes and contaminated equipment do exist in Tennessee and DOE must address the disposition of these wastes in the near future. 1

In addition, the DEIS does not fully discuss transport of wastes for disposition. If wastes are to be transported through Tennessee, and particularly if wastes are to be brought into Tennessee for postirradiation, the State has significant concerns which are not addressed. Specifically, the DEIS does not provide adequate analysis of routing, safety or inspection procedures. 2

I request that the enclosed comments be given your full consideration. As always, your timely consideration of the interests of the State of Tennessee is appreciated. If you have any questions, please contact our staff policy analyst at 615-532-4968 (fax 615-532-0740).

Sincerely,

Justin P. Wilson
Deputy to the Governor for Policy

JPW:emw

Attachments

cc: Mr. Milton H. Hamilton, Jr., Commissioner
NEPA coordination file/Mr. Dodd Galbreath
NEPA contacts

State Capitol, Nashville, Tennessee 37243-0001
Telephone No. (615) 741-2001

FD326

FD326–1 **DOE Policy**

DOE acknowledges the Governor's concern that existing plutonium wastes and contaminated equipment in the State of Tennessee be dispositioned appropriately. Most of the plutonium stored at ORR is in the form of waste. Approximately 600 g (21 oz) of plutonium 238 (not weapons–usable) has been declared excess and is being held in storage at ORNL awaiting transfer for use in the space program. Approximately 780 g (28 oz) of other plutonium isotopes have been repackaged and are awaiting transfer to LLNL. The scope of this SPD EIS includes alternatives for the disposition of weapons-usable plutonium declared surplus to U.S. defense needs. Other radioactive materials, wastes and spent nuclear fuel that contain plutonium are beyond the scope of this SPD EIS. Alternatives for management of radioactive and hazardous wastes were evaluated in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997). RODs for TRU, hazardous and high-level waste have been issued; RODs for low-level and mixed low-level waste are expected shortly. Alternatives for management of spent nuclear fuel were evaluated in the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final EIS* (DOE/EIS-0203-F, April 1995). RODs for this EIS were issued in May 1995, and March 1996. Transportation and disposal of TRU waste are evaluated in the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). A ROD for the WIPP EIS was issued in January 1998. Transportation and disposal of spent nuclear fuel are evaluated in the *Draft EIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999). A ROD has not been issued for the *Yucca Mountain EIS*.

As shown in the revised Section 1.6, if postirradiation examination is necessary for the purpose of qualifying the MOX fuel for commercial reactor use, DOE prefers to perform that task at ORNL. ORNL has the existing facilities and staff expertise needed to perform postirradiation examination as a matter of its routine activities; no major modifications to facilities or processing

capabilities would be required. In addition, ORNL is about 500 km (300 mi) from the reactor site that would irradiate the fuel.

FD326–2 **Transportation**

If ORNL is used for the postirradiation examination of spent lead assembly MOX fuel, DOE would prepare detailed transportation plans, including routing and safety procedures, for the movement of these materials. Transportation of spent nuclear fuel to ORNL for postirradiation examination is discussed in the revised Section 4.27.6.3. Section 4.27.6.3 and Appendix H were revised to include waste management impacts from these activities at ORNL.

THE STATE OF TENNESSEE
TENNESSEE EMERGENCY MANAGEMENT AGENCY
EMERGENCY OPERATIONS CENTER
MILITARY DEPARTMENT OF TENNESSEE
3041 SIDCO DRIVE, P.O. BOX 41502
NASHVILLE, TENNESSEE 37204-1502
(615) 741-0001

September 11, 1998

Mr. G. Bert Stevenson, NEPA Compliance Officer
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

Dear Mr. Stevenson:

RE: Document No. DOE/EIS 0283-D, **Draft Environmental Impact Statement, Office of Fissile Materials Disposition - Surplus Plutonium Disposition**

The Tennessee Emergency Management Agency has reviewed the above document. The following comments are respectfully submitted for your consideration.

1. Environmental Impact Statement does not provide any substantial information or data on which to base an evaluation such as numbers of shipments, shipment routes, or processing locations. 3

2. Roadworthiness and oversight of commercial carriers rollingstock carrying various physical and chemical forms of Surplus Plutonium is not addressed. Tennessee Highway Patrol Commercial Vehicle Enforcement Division Officers perform Commercial Vehicle Safety Alliance (CVSA) Enhanced out-of-service criteria inspections of vehicles carrying radioactive materials of a sensitive nature. 4

3. The radiological status verification of shipments is not addressed. State Division of Radiological Health physicists must verify the status of a shipment to minimize public perception of hazards posed by a shipment and to verify CFR compliance. 5

4. This Environmental Impact Statement does not address the ancillary risks to the public that Many thousands of gallons of toxic and caustic industrial chemical compounds in hundreds of semi-tractor-trailer shipments will pose to the public. In most cases the chemical properties of these shipments pose a much greater danger to the public than do the radiological considerations. 6

FD326

FD326–3 **Transportation**

The shipment of spent lead assembly MOX fuel using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be coordinated with State, tribal, and local governments. Section 4.27.6 provides the number of shipments that would be required for this type of material.

The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997).

The transportation of special nuclear materials is the subject of detailed planning with the DOE Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

FD326–4 **Transportation**

DOE has developed and implemented a mandatory Motor Carrier Evaluation Program with 12 criteria for commercial trucking firms. Under the Motor Carrier Evaluation Program criteria, trucking firms with poor safety records would be excluded from transporting the materials required for the surplus plutonium disposition program. The Motor Carrier Evaluation Program would be invoked as one of the requirements in DOE's contract for shipping of any radioactive material. As stated in Appendix L.3.2, equipment used in this system is subjected to significantly more stringent maintenance standards than commercial transport equipment.

FD326–5 **Transportation**

Transportation of nuclear materials would be in compliance with all applicable Federal, State, and local laws, rules, regulations, and requirements.

The remainder of this comment is addressed in responses FD326–3 and FD326–4.

FD326–6 **Transportation**

Any shipment of hazardous materials involves some level of risk, and exposure to acutely toxic chemicals can pose a significant danger to the public. Fortunately, transportation accidents involving releases of hazardous materials occur infrequently.

The shipment of hazardous materials required for construction and operation of the proposed surplus plutonium disposition facilities would be in strict accordance with applicable DOT regulations that cover the packaging and transportation of hazardous materials on public highways, airways, and waterways. These shipments would also be in compliance with all applicable State, tribal, and local laws, rules, regulations, and requirements. The DOT regulations include those specified in 49 CFR 172 and 173. Part 172 contains the Hazardous Materials Table which lists and classifies various types of hazardous materials (e.g., explosives, flammables, gases, corrosives, poisons, infectious substances, radioactive materials, etc.) and specifies related modal and placarding, marking, and labeling requirements. Part 172 also describes shipper and carrier responsibilities including driver training and emergency response requirements. Part 173 describes DOT performance-based packaging requirements and shipper responsibilities for material classification and notification.

DOT implements these regulations through its Hazardous Materials Safety Program. This program is a risk-based, prevention oriented system that uses data, information, and experience to classify hazardous materials and manage the risks of these materials in transport. As part of this program, DOT maintains a Hazardous Materials Information System (HMIS), which is a database of the Hazardous Material Incident Reports that have been filed with DOT. According to HMIS, in 1994, the risk of a fatality in the general

population from a hazardous materials transportation incident was estimated to be 1 chance in 13 million on an annual basis. By comparison, the annual fatality risk values for selected other types of incidents were estimated to be: (1) motor vehicle accidents - 1 in 6,100; (2) drowning - 1 in 68,000; (3) fires - 1 in 83,000; (4) railway accidents - 1 in 390,000; (5) commercial air carrier accidents - 1 in 1 million; (6) floods (in 1991) - 1 in 2.5 million; (7) lightning (in 1995) - 1 in 3.5 million; and (8) tornado (in 1995) - 1 in 8.7 million (see http://hazmat.dot.gov/riskscompare.htm).

The industrial chemicals expected to be required for construction and operation of the proposed facilities are identified in Appendix E. These chemicals would be acquired through normal, commercial processes, and would be delivered in accordance with the established transportation safety standards described above. Since these chemicals would be acquired on the local or regional commercial markets, their origins cannot be determined; therefore, the incremental risks resulting from the shipment of these materials cannot be quantified. However, the DOT data presented above suggest that the incremental risks associated with these shipments should be small in relation to other recognized hazards.

TENNESSEE GOVERNOR'S OFFICE
JUSTIN P. WILSON
PAGE 6 of 11

Mr. G. Bert Stevenson
September 11, 1998
Page 2

5. The overall impact of MOX fuel on the commercial reactor fuel industry is not addressed. Projected usage needs by the industry versus quantities available from other in-place sources is not addressed. 7

6. What is the proposed disposition of Transuranic waste generated? 8

7. What is the proposed disposition of the High and Low Level waste generated?

If you have any further questions, please contact Elgan Usrey at (615) 741-2879 and he will be happy to assist you.

Sincerely,

John D. White, Jr.
Director

JDW:bc

FD326

FD326–7 **MOX Approach**

The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. However, this should have minimal impact on the industry. DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. As a result of this procurement process, DOE identified Catawba, McGuire, and North Anna as the proposed reactors to irradiate MOX fuel, as part of the proposed action in this SPD EIS. Therefore, only 3 out of approximately 107 operating domestic, commercial reactors would use the MOX fuel. MOX fuel is approximately 95 percent uranium dioxide and only about 5 percent plutonium dioxide, and no more than about 40 percent of any core would be MOX fuel. Production volume would also not change significantly; the number of MOX fuel assemblies would be only a small percentage of the total number of fuel assemblies produced annually. Finally, since the selected MOX fuel fabricator would also be a producer of LEU fuel, the work would remain in the same industry; the only changes would be the material used and location of the work.

FD326–8 **Waste Management**

As described in Appendix H and the Waste Management sections in Chapter 4 of Volume I, TRU waste would be disposed of at WIPP. MOX spent fuel and HLW canisters containing immobilized surplus plutonium would be disposed of in a potential geologic repository. This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

September 16, 1998

US Department of Energy
Office of Fissile Materials Disposition
c/o SPD EIS
Post Office Box 23786
Washington DC 20026-3786

Dear Sirs

DOCUMENT REVIEW: Draft Environmental Impact Statement, "*Surplus Plutonium Disposition,*" DOE/EIS-0283-D, July, 1998.

The Tennessee Department of Environment and Conservation DOE Oversight Division (TDEC DOE-O) has reviewed the above Draft Environmental Impact Statement (EIS). The subject EIS was reviewed in accordance with the requirements of the Nation Environmental Policy Act (NEPA) and associated implementing regulations 40 CFR 1500, 1508 and 10 CFR 1021 as implemented.

The State does want to note that there are quantities of plutonium in the form of TRU waste, contaminated equipment, spent fuel, and working inventory still present on the Oak Ridge Reservation. Although not pertinent to this EIS, this plutonium will require final disposition and should to be addressed by DOE. Attachment 1 contains our current understanding of the plutonium inventory on the Oak Ridge Reservation. 1

After review of the subject document, the Division offers the following comments for your consideration:

Specific Comments:

1. Volume I, Part A, Section 2.1.3., Page 2-9
ORNL is a potential site for postirradiation examination of the lead assemblies. The DPEIS states that *"...only minor modifications for the receipt of materials would be required."* The PEIS should address what these "minor modifications" include. 9

2. Volume I, Part A, Section 2.4.3.2, Page 2-30
The MOX facility's proposed design would warehouse a year's production of fuel assemblies. The DPEIS also states the individual fuel assemblies could be stored for as long as 18 months prior to shipment to the designated domestic, commercial reactor. The statement of storage for up to 18 months suggests overproduction and possibility of long-term storage of unused/unwanted MOX fuel assemblies. 10

FD326

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites would not be expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. LLW would be disposed of in accordance with current site practices. This could include disposal at the DOE site generating the waste, or disposal at commercial facilities or other DOE sites in accordance with decisions made with respect to LLW in the WM PEIS (DOE/EIS-0200-F, May 1997).

FD326–9 **Lead Assemblies**

As discussed in response FD326–1, ORNL is the preferred alternative for postirradiation examination of lead assemblies. Section 2.17.3 was revised to indicate that at either ANL–W or ORNL, minimal modifications to existing equipment would be required for acceptance of full-length fuel rods.

FD326–10 **MOX Approach**

The SPD Draft EIS's specification of assembly storage for up to 18 months is a bounding assumption for planning and analysis purposes. This SPD EIS reflects an extension of the possible storage time of individual assemblies to up to 2 years, a storage period that is neither expected nor desirable from a business standpoint. As stated in Section 2.4.3.2, production would closely follow product need. Reactor licensees typically order LEU fuel to coincide with their refueling outages, and fuel shipment is usually scheduled so that fuel does not have to be stored very long at the reactor site. Licensees work closely with each of the vendors involved in the fuel fabrication process, as well as the fuel fabricators, to ensure that the fuel is ready when needed. The only likely difference in this process for MOX fuel would be a closer relationship between the licensee and the fabricator; the two would work as a team. Reactor shutdowns and other operational issues that could affect the need for fuel would be accommodated in the fuel fabrication schedules, and adjustments would be made as required.

TENNESSEE GOVERNOR'S OFFICE
JUSTIN P. WILSON
PAGE 8 of 11

3. Volume I, Part A, Section 2.4.3.2, Page 2-30
Please provide additional details for the statement *"Individual fuel assemblies could be stored for as long as 18 months..."* Describe the significance of the 18 months and what happens if storage exceeds 18 months. 10

4. Volume I, Part A, Section 2.4.4.4, Page 2-36
This section needs to describe the events as listed in Table 2-3. Table 2-3 addresses transportation requirements for shipment of uranium fuel rods from a commercial fuel fabrication facility to the MOX facility. Section 2.4.4.4 does not address the commercial truck shipment of uranium fuel rods from a commercial fuel fabrication facility to the MOX facility. Describe the reason for shipment of these uranium fuel rods to the MOX facility. 11

5. Volume I, Part B, Section 4.27.6, Page 4-374
ORNL is a candidate for postirradiation examination of the lead MOX fuel assemblies. The DPEIS does not address the waste streams associated with the testing nor does it describe the storage/disposal of the lead assemblies once testing has been concluded. 12

If you have any questions regarding this letter, please contact Bill Childres or me at (423) 481-0995

Sincerely

Earl C. Leming
Director

xc: Justin Wilson - Governor's Office
Jim Hall - DOE
Dodd Galbreath - TDEC

el415.99

FD326

In the event that MOX fuel were made and then not be needed due to NRC not issuing a license amendment or other factors, DOE would be responsible for the unirradiated fuel and would reexamine its disposition option.

FD326–11 **Transportation**

Section 2.4.4.4 includes the shipment of uranium fuel rods from a commercial fuel fabrication facility to the MOX facility. Both uranium fuel rods and MOX fuel rods are bundled together at the MOX facility to form a complete MOX assembly.

FD326–12 **Waste Management**

Section 4.27.6.3 and Appendix H were revised to include waste management impacts from these activities at ORNL.

Attachment 1

SUBJECT: **Oak Ridge Plutonium Inventory and the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, DOE/EIS-0283-D, U.S. Department of Energy dated July 1998**

REFERENCE: 1. *Plutonium Working Group Report on Environmental, Safety and Health Vulnerabilities Associated with the Department's Plutonium Storage*, DOE/EH-0415, U.S. Department of Energy dated November 1994

2. *Site Integrated Stabilization Management Plan (SISMP) for the Implementation of Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-1 (and 97-1)* dated April 15, 1998

CRITERIA and SCOPE:

Surplus Plutonium from above subject *Surplus Plutonium EIS* (originally from the *Storage and Disposition PEIS*): This document evaluates "weapons-usable fissile materials" (including all isotopes of plutonium except plutonium-238) that were declared "surplus" by the President in March 1995. In addition, "...plutonium that may be declared surplus in the future..." was evaluated. It is noteworthy that none of the Oak Ridge plutonium is included in the PEIS or the EIS. 13

Plutonium evaluated under vulnerabilities as reported in Reference 1, *Plutonium Working Group Report*: This report includes all of the Oak Ridge plutonium that is not considered "waste," nuclear reactor fuel, or spent nuclear fuel.

Plutonium evaluated under *Recommendation 94-1* as reported in Reference 2: "These criteria define an acceptable interim "end state" for stabilization and repackaging of Pu-bearing materials. The criteria do not apply to materials in working inventory, Pu associated with SNF, Pu-bearing liquids, or sealed (fabricated) Pu-bearing components. The criteria also do not apply to waste items (e.g., tools and equipment) whose surfaces are contaminated with low levels of Pu."

FD326

FD326–13 **Waste Management**

As described in Section 1.1, this SPD EIS addresses only surplus plutonium that is considered weapons usable. None of this plutonium is currently located at the Oak Ridge Reservation, and therefore, it is not addressed in this EIS.

TENNESSEE GOVERNOR'S OFFICE
JUSTIN P. WILSON
PAGE 10 of 11

OAK RIDGE PLUTONIUM INVENTORY:
(from reference 1, *Plutonium Working Group Report* dated November 1994)

Building	Kilograms	Form	Packages
Inst. Calibration, 2007	**	sealed sources	2
Analytical Lab, 2026	**	metal	1
Special Nuclear Material Vault, 3027	1.385	metal, oxide, scrap/residues, & sealed sources	106
Isotope Dispensing, 3038	**	metal & oxide	15
I & C Calibration, 3500	**	sealed sources	1
Alpha Isolation Laboratory, 3508	**	sealed sources	1
High Level Radiochemical Lab, 4501	**	solution	10
Transuranium Research, 5505	**	metal, oxide, & solution	21
Heavy Ion Accelerator, 6000	**	sealed sources	2
Linear Accelerator, 6010	**	metal & sealed sources	6
Tower Shielding Facility, 7700	**	sealed sources	4
Dosimetry Research, 7710, 7712, 7735	**	sealed sources	8
Waste Exam. Facility, 7824	**	scrap/residues & sealed sources	86
High Flux Isotope Reactor, 7900	**	metal	3
Radiochemical Engineering Development Center (REDC), 7920	1.46	oxide, solution, & sealed sources	111
Radiochemical Engineering Development Center (REDC), 7930	**	metal, oxide, scrap/residues, & sealed sources	175
Isotope Enrichment, 9204-3	**	oxide & solution	16
Uranium Casting, 9212	1.04	sealed sources	8
Source Storage, 9213	**	sealed sources	46
K-25 (ETTP), K-1025D	0.031	oxide	3
Oak Ridge Institute for Science and Education (ORISE), 2715 & Room E-38	0.028	Pu/Be sources	2
Total amount of plutonium at Oak Ridge in the Working Group Vulnerabilities Report	4.6 Kg (Vol. I, page 50)	metal, oxide, scrap/residues, & sealed sources	627

**Inventory is < 1 Kg.

Note: 1. The above is 1994 data from Reference 1, *Plutonium Working Group Report*, Vol. I, pages 50, A-18, & A-19, and Vol. II, Part 13, pages 8, 9 & 10 and has changed as follows since the report was written:

185 g has been packaged as waste and some or all is being stored in retrievable storage at ORNL/SWSA 5.

627 g has been packaged as waste and will be sent to LLNL for disposal in 2000.

609 g is Pu-238 and is being sent to REDC for possible use on the RTG program if the RTG program is transferred form the Mound Plant to ORNL.

The remainder of the plutonium listed in the above table is "working inventory" and will remain in the respective programs.

The above updated inventory information was obtained from Reference 2 and updated by L. T. Gordon, Plutonium Vulnerability Assessment Program Manager at ORNL based on July 7, 1998 data.

13

FD326

2. **Oak Ridge also has approximately 40 to 70 Kg of plutonium, most of which is in the TRU waste or spent fuel categories and considered "out-of-scope" for the documents listed above.** Reference 1, *Plutonium Working Group Report*, Volume II, Part 9, pages 5-7 lists 37 facilities that contain material (plutonium waste or TRU containing no plutonium) determined to be outside the scope of that document. Page 31 of that document further clarifies plutonium that is out-of-scope for the vulnerabilities review. None of this plutonium is included in the 4.6 Kg total listed in the above table. 13

3. The above table does not include plutonium being processed at REDC for the Mark 42 Project. Plutonium waste products from the Mark 42 project will be added to the inventory explained under item 2 above.

FD326

WALTON, BARBARA A.
PAGE 1 OF 2

85 Claymore Lane
Oak Ridge, TN 37830
September 14, 1998

To: DOE-Office of Fissile Materials Disposition
From: Barbara A. Walton
Subject: Surplus Plutonium Disposition (SPD) Draft Environmental Impact Statement (EIS)

1. I support DOE's preference for siting plutonium immobilization at SRS. 1

2. I support Pit Disassembly and Conversion at Pantex.

3. Because I am concerned about the cumulative impacts at SRS, I would prefer alternative 9A to 3A or 5A. Even better would be to consider siting the MOX Fuel Fabrication at INEEL to create an alternative that was not considered in this EIS. It is not clear to me that this would detract from INEEL's focus on cleanup and nuclear technology. 2

4. Although I understand the need to consider Russia's progress in this matter, I don't think construction of items 1 and 2 above should wait. Delaying the MOX Fuel Fabrication construction should be sufficient along with potential for delay in processing 3

I am pleased to see continued progress towards resolution of this matter.

I also want to request a copy of the Final EIS and ROD.

Barbara A. Walton

MD185

MD185–1 **Alternatives**

DOE acknowledges the commentor's support for siting the immobilization facility at SRS and the pit conversion facility at Pantex. As indicated in the revised Section 1.6, DOE prefers siting the pit conversion and MOX facilities at SRS. SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. The preferred can-in-canister approach at SRS complements existing missions, takes advantage of existing infrastructure and staff expertise, and enables DOE to use an existing facility (DWPF). DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can–in–canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD185–2 **Cumulative Impacts**

DOE acknowledges the commentor's concern about the cumulative impacts from the proposed surplus plutonium disposition facilities at SRS. Section 4.32 takes into consideration existing missions at candidate sites, and analyzes the potential cumulative impacts of surplus plutonium disposition activities and other programs as well as current, past, and reasonably foreseeable

future activities at other sites. As discussed in Section 4.14, Alternative 7 considers siting the MOX facility at INEEL.

MD185–3 **Purpose and Need**

DOE acknowledges the commentor's concerns about scheduling the construction and operations of the proposed surplus plutonium disposition facilities. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Russian policy, however, is only one of the factors in decisions relative to the methods and timing of surplus plutonium disposition.

City of Amarillo, Texas

Comments of Hon. Dianne Bosch Regarding the DOE Surplus Plutonium Disposition Draft Environmental Impact Statement

I would like to begin by thanking the Department of Energy for the opportunity to comment on matters of great importance to the Amarillo area. As a City Commissioner for the largest city in this region, let me say that I strongly favor the Pantex Plant as the single preferred alternative for the DOE's Pit Disassembly and Conversion mission.

This mission has been extensively reviewed by experts from federal and state government agencies, university researchers and workers from Pantex. Based on their reports, I believe that the Pit Disassembly and Conversion facility can be operated in a manner that does not threaten our precious natural resources. Specifically, I believe that this facility would not pose a threat to the Ogallala aquifer, which supplies irrigation and drinking water to this region. 1

One reason for my confidence in the safety of this mission is the excellent work force at Pantex. Pantex has been a good neighbor to our city for over 50 years. Pantex has the best radiological safety record in the nuclear complex, and it is the only site that has a large number of workers who are specifically trained to handle and safeguard plutonium weapons components. The components, often called "pits," are already safely stored at Pantex.

The Pantex workforce is second-to-none in its implementation of safety initiatives such as the Voluntary Protection Program. This employee-based safety program has been successful in reducing occupational hazards and has become a model for the entire DOE weapons complex. In addition, the Metal

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TXD29

TXD29–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. As the commentor points out, and as indicated in Chapter 4 of Volume I, impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor. Decisions on the surplus plutonium disposition at Pantex will be based on such environmental analyses, as well as technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO
HONORABLE DIANNE BOSCH
PAGE 2 OF 2

Trades Council has safety officers to whom employees may directly address safety concerns. The Savannah River Site does not have either of these important safety programs in place.

The Department of Energy should carefully consider the enhanced safety programs already in place at Pantex when deciding where to locate the Pit Disassembly and Conversion Facility. Furthermore, the Department should understand that union support in Washington will play a crucial role in getting this expensive program funded by the Congress. A viable Pantex plant, with the strong bi-partisan support of the Texas congressional delegation and the national AFL-CIO is important to the long-term future of both the Surplus Plutonium Disposition program and the DOE weapons complex. 1

Pantex has the key technical and political advantages that make it the only logical choice for Pit Disassembly and Conversion. I urge the Secretary of Energy to name Pantex as the site for this important mission. Again, thank you for the opportunity to comment.

Dianne Bosch
City Commissioner
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TXD29

City of Amarillo, Texas

Comments of Hon. Robert Keys Regarding the DOE Surplus Plutonium Disposition Draft Environmental Impact Statement

Welcome to Amarillo and thank you to the Department of Energy for allowing the elected officials and residents of the Amarillo area comment on the Surplus Plutonium Disposition program. Pantex is a very important part of the economy for the entire northwest region of the state of Texas. As such, the economic future of this area is tied very closely to the future of the Pantex Plant.

The Amarillo City Commission has supported new missions at Pantex for many years. We have insisted, and continue to insist, that all such missions be conducted in a manner that protects the natural resources of the Texas panhandle. My fellow Commissioners and I believe that the Pit Disassembly and Conversion and MOX fuel manufacturing missions can, and should be, performed in a safe manner at Pantex.

When I am not wearing my "City Commissioner" hat, I operate a land surveying business. On numerous occasions, I have performed surveying work at Pantex. I am always impressed with the care shown by employees at the plant regarding care for the environment. The pump-and-treat and ground water monitoring systems in place at Pantex are state of the art. I have every confidence that the employees at Pantex would perform the Pit Disassembly and Conversion and MOX manufacturing missions with great care and in a manner that protects the environment of this region. 1

Furthermore, on my visits to Pantex, I am always impressed with the outstanding security procedures in place to protect classified weapons

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TXD28

TXD28–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO
HONORABLE ROBERT KEYS
PAGE 2 OF 2

Hon. Robert Keys
Page 2

components. With recent announcements of underground nuclear testing by India and Pakistan, and with well known weapons programs in Iraq, Iran and North Korea; it is obvious that many countries or other groups would like to have weapons such as those at Pantex. For this reason, the DOE's own non-proliferation experts have recommended that the transport of plutonium weapons components should be minimized. The United States even pays Russia to minimize the transport of their weapons components. Surely, if we are spending US tax dollars in Russia to minimize transport of their weapons, we should also be willing to equally safeguard our nuclear secrets in this country. 2

The workforce in the Texas panhandle is truly outstanding. We just received confirmation of this fact when Bell Helicopter announced plans to assemble the V-22 Osprey Tiltrotor aircraft in Amarillo. Surely the DOE should also recognize the outstanding work ethic and expertise of the people of this region. You need not look further than this room tonight to see evidence of the passion, integrity and expertise of Pantex workers from the panhandle of Texas. These same employees are the best qualified to work with plutonium pits removed from nuclear weapons. Since these pits are already stored at Pantex, the Pit Disassembly and Conversion and MOX Fuel Manufacturing missions should also be performed at Pantex. 1

Once again, thank you for the opportunity to comment on this important matter. I urge the Secretary of Energy to name Pantex as the site for Surplus Plutonium Disposition missions.

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TXD28

TXD28–2 **DOE Policy**

DOE acknowledges the commentor's concern regarding safe transport of weapons-usable plutonium. In order to address security against terrorist-related incidents, all intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications and additional couriers. The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in Appendix L of this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

CITY OF AMARILLO

August 10, 1998

Good Afternoon,

As always, I would like to thank the Department of Energy for the opportunity to provide comments on this most important issue. For the last four to five years, members of this community have come to these hearings you have provided for many issues relating to the Pantex Plant. We take time out of our days to do this because we care about the outcome of Pantex and the workforce who has provided a security comfort to the entire nation for many decades.

The issue involving pit disassembly may be the biggest issue that we as a nation will face going into the next millennium. The safety of our entire nation is at stake. The components making up our nuclear arsenal should be handled with the greatest of care in order to make certain that our environment doesn't suffer from this obviously needed procedure. Pantex has had the gargantuan task of providing this service to our nation for many years. The plant has always performed in the safest manner possible for the workers, environment and surrounding community members. 1

I represent the city of Amarillo as an elected official. For close to eight years the people have been asking me to speak in favor of expanded activity at the Pantex Plant. Today I come to you as an elected official as well as a resident of Amarillo to do just that. I believe there is only one site that has a proven positive track record in the handling of plutonium after disassembly, Pantex. The workers have proven that safety comes first before production, and have more experience in handling plutonium pits than any other site in the complex. The DOE should not place classified weapons components in the hands of employees at the Savannah River Site who have extremely limited experience in dealing with pits. 2

Just one advantage Pantex has over Savannah River Site is that converting classified plutonium weapons components ("pits") into non-classified forms at Pantex requires no off-site shipment of pits. Performing the work at Pantex would 3

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TXD02

TXD02–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on such environmental analyses, as well as technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TXD02–2 **Alternatives**

As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

TXD02–3 **Transportation**

DOE acknowledges the commentor's concern for the security of offsite shipment of pits. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS. Section 2.4.4.1 discusses safety measures taken for shipment of pits.

decrease the risk of classified weapons parts falling into unfriendly hands. The DOE should heed the advise of its own nuclear non-proliferation experts who have argued to minimize shipments of pits. 3

Given these advantages and many others that have or will be mentioned today, I urge you to give full consideration to Pantex for the mission of pit disassembly and disposal.

Sincerely,

Kevin Knapp
Amarillo City Commissioner

TXD02

AMARILLO
HONORABLE KEL SELIGER
PAGE 1 OF 4

AUGUST 11, 1998
COMMENTS OF HONORABLE KEL SELIGER REGARDING
THE DOE SURPLUS PLUTONIUM DISPOSITION
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Thank you for the opportunity to address the Department this evening. We live in exciting times in Amarillo and in the United States. The dawn of a new millennium is a signal that we are going to see the tremendous changes in the years ahead. However, our focus on the future should not be interpreted as an endorsement of forgetting our history. A big part of the history of this nation during the last half of the 20th century has been the nuclear weapons program. Amarillo and Pantex are proud to have played a big part in the success of that program for nearly 50 years. We believe that we are an irreplaceable element in this era of disarmament.

The success of the Pantex plant over the past 50 years should not be forgotten when considering the future of the nuclear weapons complex. Pantex has long had one of the lowest operating costs in the weapons complex and it has had excellent relations between the contractor and the largest labor bargaining unit. Pantex is among the cleanest weapons complex sites from an environmental perspective. The Department has recently 1

TXD37

TXD37–1 **Alternatives**

DOE acknowledges the commentor's support of Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

AMARILLO
HONORABLE KEL SELIGER
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Hon. Kel Seliger
August 11, 1998
Page 2

recommended that Pantex be removed from the National Priorities List because of the excellent progress being made in the environmental area. Pantex has long had outstanding support of the public in the Texas panhandle and the elected officials who represent this area at the local, state and federal levels. 1

When considering the future mission assignments that could come to Pantex, such as the Pit Disassembly and Conversion and MOX Fuel missions, the DOE should consider the substantial strengths possessed by Pantex. The recent financial analysis conducted by the DOE shows that there is no significant cost difference between Pantex and Savannah River. In fact, I believe that report significantly underestimates the cost of repackaging pits for off-site transport from Pantex to Savannah River if the South Carolina site is chosen for both new missions. In addition to the cost of shipping pits, the Department should listen carefully to its own non-proliferation experts who favor the minimization of pit transport. 2

From an environmental aspect, the Department has shown that both pit 3

TXD37

TXD37–2 **Transportation**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

The transportation requirements for the surplus plutonium disposition program are evaluated in this SPD EIS. If the pit conversion facility were located at Pantex (Alternative 5), the risks from transportation-related radiological exposures would be an estimated 7.8×10^{-2} LCF, and from traffic accidents (non-radiological), an estimated 5.2×10^{-2} fatality. For comparison, if the pit conversion facility was located at SRS (Alternative 3), the risks would be slightly higher, 8.0×10^{-2} LCF and 5.6×10^{-2} fatality, respectively. Transportation impacts are summarized in Chapter 4 of Volume I and Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

TXD37–3 **Alternatives**

This comment is addressed in response TXD37–1.

Hon. Kel Seliger
August 11, 1998
Page 3

disassembly and MOX fuel manufacture can be done without harm to the natural environment. The choice comes down to where the work will be done correctly. Pantex has a continuing production mission and a highly qualified workforce that pays careful attention to detail. The very people 3

who are promoting the Savannah River Site for this work say in essence "put the missions here because we are a dirty site and we don't care if we get it dirtier." In the future, can DOE afford to have that attitude prevail? We 4

believe this work can be done safely, but only if it is performed by employees who have a true commitment to doing so. Pantex employees have long demonstrated such a commitment.

I would like to remind the Department that it has enjoyed strong support from the Texas Delegation in the Congress to accomplish its defense, maintenance and remediation missions. This same delegation has supported Pit Disassembly, Conversion and MOX production at the Pantex plant. 5

There is no reason to assume that there will be such support in transporting weapons ready plutonium half way across the country. That is, unless the 6

TXD37

TXD37–4 **DOE Policy**

DOE acknowledges the commentor's concern for environmental issues related to surplus plutonium disposition. Cleanup at SRS is a priority and will remain a priority, and can coexist with other DOE initiatives. Although the surplus plutonium disposition program is also considered a top priority, it would be conducted in such a way that any additional waste would be processed and disposed of in a timely and environmentally acceptable manner.

TXD37–5 **Alternatives**

This comment is addressed in response TXD37–1.

TXD37–6 **Transportation**

This SPD EIS analyzes the risk involved in transporting weapons-usable plutonium between DOE sites for processing. Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. As discussed in Appendix L.3.2, key characteristics of the SST/SGT system include, but are not limited to, couriers who are armed Federal officers, specially designed escort vehicles, 24-hour real-time monitoring, and stringent maintenance standards. Appendix L.6.5 discusses sabotage or terrorist attack during transportation.

AMARILLO
HONORABLE KEL SELIGER
PAGE 4 OF 4

Hon. Kel Seliger
August 11, 1998
Page 4

Department of Energy has decided that minimization of the risk of proliferation is no longer a priority. I have seen no such pronouncement. 6

I urge the Secretary of Energy to carefully consider all of these aspects before making a final decision on the site location for Pit Disassembly and Conversion and MOX fuel manufacturing. Keeping these factors in mind, I strongly recommend that the Secretary name the Pantex Plant for these missions. 7

TXD37

TXD37–7 **Alternatives**

This comment is addressed in response TXD37–1.

CITY OF AMARILLO

Comments of Hon. Trent Sisemore Regarding the DOE Surplus Plutonium Disposition Draft Environmental Impact Statement

Thank you for allowing me the opportunity to represent my constituents in Amarillo by making comments on the draft EIS for Surplus Plutonium Disposition. It is an honor to represent more than 170,000 residents in Amarillo. Thousands of those residents are either Pantex employees or live in households of Pantex employees. Pantex has a profound effect on our local economy. I am proud of the support that the people of Amarillo have shown for the Pantex facility, and it is my pleasure to state that I wholeheartedly support the location of the Pit Disassembly and Conversion Facility and MOX Fuel Fabrication Facility at Pantex.

In addition to representing the citizens of Amarillo as a City Commissioner, I am also a retailer and music minister. Since none of these "credentials" qualify me as an expert in nuclear physics, I have sought to become familiar with Pantex and the proposed new missions that may come to Pantex. In my research on Pantex, I have read reports, talked with experts and even toured nuclear facilities in England and France. 1

After having done all that, one fact stands out. The type of work envisioned in the plutonium disposition program can be done safely by the outstanding employees at Pantex. In fact, the DOE has said that both the pit disassembly and MOX fuel missions can be done safely at Pantex. Furthermore, the DOE has stated that the anticipated cost differences between the sites being considered for these new missions are insignificant relative to the anticipated margin-of-error of the financial analysis. In the absence of major discriminators between the sites, the decision is likely to be very political.

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TXD27

TXD27–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO
HONORABLE TRENT SISEMORE
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Hon. Trent Sisemore
Page 2

The dual-track method of plutonium disposition is the best way for the United States and Russia to permanently reduce the amount of weapons grade plutonium in their nuclear stockpiles. This is an important task but it will be a controversial process because of the dedicated efforts of anti-nuclear activists around the globe. While it is my opinion that many of these activists are opposed to anything nuclear, they seem particularly opposed to the use of plutonium as a fuel in nuclear reactors. Keeping this controversy in mind, it is important for the Department to develop a program that has broad ranging support among Democrats, Republicans, state leaders, local officials, Indian tribes, and labor unions in many states to assure that this important function gets the funding in Congress necessary to carry out the program. Pantex offers strong, bi-partisan support from local, state and federal officeholders and the labor movement. 2

The Department has already chosen the Savannah River Site in South Carolina for the important task of immobilizing so called "non-pit" plutonium. In addition South Carolina has been chosen to produce tritium for weapons in the future. Since South Carolina has already received a great deal of new work, the Department should now place some new missions at Pantex. The powerful support of the Texas Congressional delegation will be crucial in getting this program funded. I encourage you to solidify that support by naming Pantex as the preferred alternative site for the pit disassembly and conversion and MOX fuel missions. 3

Thank you for the chance to be heard on this issue.

Trent Sisemore
City Commissioner
City of Amarillo
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TXD27

TXD27–2 **DOE Policy**

DOE acknowledges the commentor's support for the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. The U.S. Congress is supportive of DOE's efforts to implement U.S. nonproliferation policy.

TXD27–3 **Alternatives**

As indicated in the revised Section 1.6, SRS is preferred for the proposed surplus plutonium disposition facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

AMARILLO ASSOCIATION OF REALTORS, INC.
RANDY JEFFERS
PAGE 1 OF 1

AMARILLO ASSOCIATION OF REALTORS®, INC.

REALTOR®

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RESOLUTION

Whereas, the Department of Energy is seeking comments on the Surplus Plutonium Disposition Environmental Impact Statement; and

Whereas, the Secretary of Energy should name the Pantex Plant as the preferred site for the Pit Disassembly and Conversion Facility in the final Surplus Plutonium Disposition Environmental Impact Statement;

NOW THEREFORE,

We, the Board of Directors of the Amarillo Association of REALTORS® which represents over 500 members, hereby unanimously support the Pantex Plant in Texas as the Department of Energy's location for the Pit Disassembly and Conversion Facility provided such missions are done in a safe and environmentally-friendly manner.

As REALTORS®, we believe the Pantex Plant is the preferred site for the Pit Disassembly and Conversion Facility in view of the following facts:

(1) The primary mission of the Pantex plant is to take apart nuclear weapons as part of the United States' obligations under the START treaties that have been signed with Russia. It makes sense to finish the disarmament mission by converting the pits at Pantex which would require no off-site shipment of the pits, which would then decrease the risk of classified weapons components falling into unfriendly hands.

(2) For nearly half a century, the employees of Mason & Hanger Corporation have handled and worked with pits without ever exposing the environment or the residents of the Texas Panhandle to any contamination from plutonium. To further enhance employee and public safety, Mason & Hanger has implemented a Voluntary Protection Program and employees at Pantex have full-time union safety officers to whom they can raise safety concerns.

(3) The security force at Pantex has successfully guarded highly classified weapons components since 1951. Recently, the Pantex guard force was rated the highest in the DOE complex. DOE should protect the highly classified pits at the facility with the best guard force, which is Pantex.

(4) And finally, repeated public opinion polling has shown support for the Pantex Plant to be in the 80% range among residents of Carson, Potter and Randall Counties. In addition, Pantex has outstanding support from the elected officials representing local governments in the area around the facility and Pantex also enjoys unanimous support from elected officials representing the area in the Texas House and Senate and the United States House and Senate.

The Pantex Plant has played an invaluable role in the United States' history and should be the Department of Energy's location for the Pit Disassembly and Conversion facility.

1

Approved by the Board of Directors on the 16th day of July 1998,

RANDY JEFFERS, CRB, GRI - PRESIDENT

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TXD51

TXD51–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO CHAMBER OF COMMERCE
DAVID WILKS ET AL.
PAGE 1 OF 1

A RESOLUTION OF THE AMARILLO CHAMBER OF COMMERCE
BOARD OF DIRECTORS IN SUPPORT OF
PANTEX

WHEREAS, the Pantex plant currently employs 2869 Amarillo-area residents and puts over $200 million directly into our area, and is responsible for about one out of every ten Amarillo-area jobs

WHEREAS, Pantex has outstanding support from the residents in the area. Pantex enjoys strong support from local and state elected officials and the Texas congressional delegation. Pantex shows 80% support among area residents.

WHEREAS, Pantex employees have more experience in handling plutonium pits than any other site in the nuclear weapons complex.

WHEREAS, Pantex requires no off-site shipment of pits, decreasing the risk of classified weapons parts falling into unfriendly hands.

WHEREAS, Pantex has more than adequate storage space for converting plutonium.

WHEREAS, Pantex guard force is the highest rated in the nuclear weapons complex. Pantex has an outstanding safety record. The employees at Pantex have full-time union safety officers to whom they can raise safety concerns, and Mason & Hanger Corporation has implemented a Voluntary Protection Program to further enhance employee and public safety. 1

WHEREAS, Pantex employees have safely handled, worked with, and stored pits. The Savannah River Site has a history of radioactive contamination of the environment.

NOW, THEREFORE, BE IT RESOLVED that the Amarillo Chamber of Commerce Board of Directors supports the disassembly and conversion of nuclear weapons plutonium components (pits) program to be assigned to the Pantex plant.

BE IT FUTHER RESOLVED that the Amarillo Chamber of Commerce encourages the Texas Congressional Delegation to continue to support and work toward this goal.

ADOPTED this 10th day of August, 1998

David Wilks, Chairman of the Board

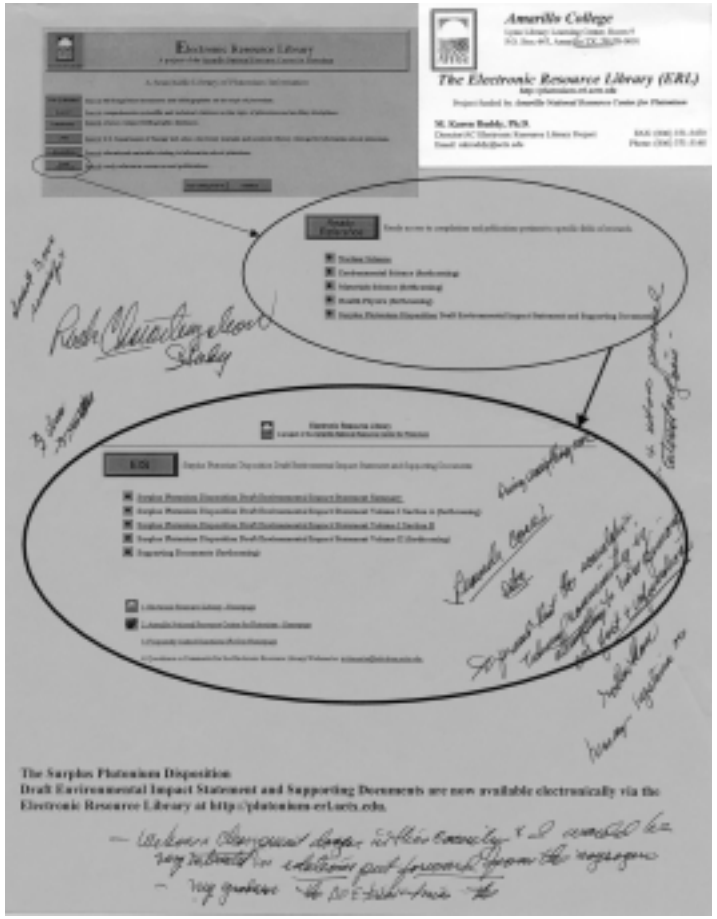
Gary Molberg, President & CEO

TXD50

TXD50–1 **Alternatives**

DOE acknowledges the commentors' support for siting the pit conversion facility at Pantex. Analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO COLLEGE
M. KAREN RUDDY
PAGE 1 OF 1



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TXD38

TXD38–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's support for DOE's efforts in coming to fair and well-reasoned decisions regarding surplus plutonium disposition. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

AMARILLO COLLEGE
M. KAREN RUDDY
PAGE 1 OF 2

To: U.S. Department of Energy
From: Dr. M. Karen Ruddy, Director of the Electronic Resource Library (ERL) Project at Amarillo College found at **http://plutonium-erl.actx.edu**.
Date: August 27, 1998
RE: **Comments on the Pantex Missions**

Dear Sir or Madam:

I believe that this country does indeed face a clear and present danger in the fact that plutonium disposition and waste materials in our environment need to be addressed. The issues need to be based on sound and reliable scientific and technical research (an exemplary effort in Amarillo is the work being carried on through the Amarillo National Resource Center for Plutonium).

I commend the DOE for the policy of openness over the last five or six years. I deal with the plutonium literature daily in my role as Director of the Electronic Resource Library - a library dedicated to the scientific and technical study of plutonium - use, disposition, storage, transportation, health policy and history, and I know that most of the environmental problems in regard to the USDOE policies have come about because of the Cold War legacy.

I also believe that the future energy source in the world is going to be nuclear and believe any decisions made today must keep that reality in mind. Ralph Nader used to be right, now he is old and confused.

I deplore the representation in the Amarillo meetings of the "left-over-hippies" who have no right to represent the majority of the citizens in Amarillo and the Panhandle of Texas. I think it is immoral for the areas that the government has poured money into over the years (Yucca Mt. in Nevada for example) to now be against the deployment of these areas to serve their purpose. I hope you disregard their comments and follow scientific and technical research to make your decisions. 1

Mr. Richardson was here in Amarillo yesterday and I wish I could have met him. I am comforted that he is the new Secretary of Energy and believe he will make the hard decisions for the good of all.

We (the Electronic Resource Library (ERL)) are collaborating with OSTI to digitize paper documents that they provide to us and we hope to acquire a microfiche scanning machine through a grant to the IMLS program in the Executive Office. We will be able to then digitize the DOE OSTI microfiche collections and retrieve documents stored only on that media.

We serve Pantex, Amarillo College, the Amarillo and Panhandle community and the researchers and scientists at UT, A&M and Texas Tech through the ERL services and resources and are proud to be part of the great effort to help our country as Pantex has done in the past.

FD151

FD151–1 **Alternatives**

DOE acknowledges the commentor's support of DOE and its surplus plutonium disposition program.

We collaborate with Los Alamos, with the Lovelace Institute, with the FOIA program, the DOE Reading Room program (interactively with the one here at Amarillo College) and with the WIPP site through other regional community colleges (i.e. New Mexico Junior College in Hobbs, NM) to obtain plutonium-related documents and joint grant proposals such as the IMLS (Institute of Museums and Library Services). 1

I believe that additional missions should come to Pantex for the following reasons:

1. You have incredible community support in Amarillo and surrounding areas.
2. The workforce is highly skilled in this area due to the past and present programs at Amarillo College (attested to by the recent announcement that Bell Helicopter is going to build their new aircraft here in Amarillo.
3. The pits are already here and as I understand the ARIES (Advanced Recovery and Integrated Extraction System) process, it includes "nuclear weapons dismantlement, reduction, and processing with minimal additions to the nuclear waste stream." This quote comes from a document found in the Electronic Resource Library collection.
4. The Pantex solution would meet the SPD-EIS mission of reducing the threat of nuclear weapons and the proliferation threat by avoiding transportation of pits in their "weapons-ready" form.
5. Spreading the dis-assembly program around (i.e. So. Carolina, Texas, New Mexico) would garner more support for your ultimate programs of storage and disposition.
6. Cost is turning out to be a non discriminating factor in the location decision.
7. The Amarillo National Resource Center for Plutonium (funds the ERL project through competitive grants) is a strategic social, political, educational, and research variable in this area - as in just three short years, the ANRCP has helped "thinking and reasoning" people in this area sort through the mire and confusion of exponentially exploding information to get to the facts, be more assured and make better decisions. 2
8. The Texas Energy Conservation program environmentally monitors the Pantex operation and helps ensure a safe and environmentally sound operation.
9. The safety and security record of Pantex.
10. Most important, I believe we must ACT SOON on plutonium disposition with all the ramifications in Russia and the rest of the world - trusting that you in the "drivers seat" of this great mission have secured our national future and act with the knowledge that plutonium must indeed be turned into plowshares for "planting and harvesting" of the energy needs of the future.

Thank you for this opportunity to comment on this potential program. We love our country, support our government and want to work toward world peace and prosperity.

Sincerely,
Dr. Karen Ruddy

M. Karen Ruddy, Ph.D.
Director, Electronic Resource Library Project at Amarillo College
Amarillo College
Amarillo, TX 79189
(806) 371-5148 office
e-mail: mkruddy@actx.edu

FD151

FD151–2 **Alternatives**

DOE acknowledges the commentor's support of expanded missions at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO ECONOMIC DEVELOPMENT CORPORATION
DEBRA BALLOU
PAGE 1 OF 1

Amarillo Economic Development Corporation

Comments of Debra Ballou Regarding the DOE Surplus Plutonium Disposition Draft Environmental Impact Statement

My concern today is with our area's future. While I am proud of our area's accomplishments in the field of economic development, I am still concerned with the long-term future of Pantex. Pantex is such a large force in our local economy that negative impacts from Pantex can essentially take away the gains we may make in other areas.

In essence, if the AEDC brings a new employer to town it may be like taking a step forward. However, if Pantex fails to grow, it may be like taking two steps backward. One step forward and two steps backward is no way to get where you want to go. 1

Pantex has been a great employer in the Texas panhandle for many years. The spin off of Pantex dollars in the local economy provides employment opportunities in all sectors of the economy. The jobs at Pantex and the skilled service jobs that result in the economy are the kind of opportunities that keep people who are raised in Amarillo from taking their skills to larger metro areas where jobs are abundant. We cannot afford to take two steps back for every one forward.

Pantex has operated safely for many years, and its excellent track record should weigh heavily in the decision making on the location for plutonium disposition missions. This area, and its elected officials at all levels, support Pantex overwhelmingly. Considering this area's strong support for Pantex and the good fit between these missions and Pantex's current mission, I strongly urge the Secretary of Energy to choose Pantex for Pit Disassembly and Conversion and MOX Fuel Manufacturing. 2

Debra Ballou
Secretary, Board of Directors
Amarillo Economic Development Corporation
Bank One Center, Suite 1503
600 S. Tyler Street
Amarillo, TX 79101
(806) 379-6411

TXD53

TXD53–1 **Other**

DOE acknowledges the commentor's support of expanded missions at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

TXD53–2 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Amarillo Economic Development Corporation

Comments of Michael Bourn Regarding the DOE Surplus Plutonium Disposition Draft Environmental Impact Statement

The Amarillo Economic Development Corporation is dedicated to expanding and diversifying the economy in the Amarillo area. We focus on basic employers, that is employers who derive their income from outside of our economic region. We have assisted many local basic employers and we continue to recruit new basic employers to our community. Because of our extensive work with hundreds of existing businesses and those that have considered Amarillo over the past eight years, we have gathered extensive, detailed knowledge of our area's business climate.

Beyond the quantitative measures such as our very low utility costs, affordable and available labor, and low cost of living lies the real key to this region's success – we have a truly outstanding workforce. As I mentioned, the quality of our workforce transcends the quantitatively measurable. Nevertheless, our quality workforce is very real. Recently, Bell Helicopter announced plans to locate the assembly plant for the V-22 Osprey Tiltrotor Aircraft in Amarillo. In announcing that decision, one of the key factors mentioned was the great skill of our workforce. But Bell did not make that decision just based on our word, they had twenty years' experience with a facility in Amarillo from the late 1960s to the late 1980s.

The Department of Energy should likewise recognize the skill of Amarillo's workforce when choosing its location for plutonium disposition missions. And the disassembly of plutonium pits should rightfully be seen as a logical extension of the weapons disassembly work already performed by the highly skilled workers at Pantex. The MOX mission also makes sense to be performed within the high security areas at Pantex. 1

Michael R. Bourn
Executive Director
Amarillo Economic Development Corporation
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TXD30

TXD30–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO ECONOMIC DEVELOPMENT CORPORATION
MICHAEL R. BOURN
PAGE 2 OF 2

Mr. Michael R. Bourn
Page 2

The controversial aspect of using plutonium as a fuel should also be considered. As we look at our neighbors to the west who are trying to open the WIPP site, we can see that political controversy can cause enormous delays in scientifically sound projects. While I believe the MOX program to be technically sound and the best policy for the United States, I also believe that the current timetable for implementation of MOX manufacturing is not realistic. The program could be delayed for years over political controversy regarding our nation's policy toward nuclear energy.

Given the likelihood of delays in the MOX program, the DOE should take an affirmative step in demilitarizing its surplus weapons components by putting the Pit Disassembly and Conversion Facility into operation as quickly as can safely be done. This work can be done best, and with the least likelihood of political delays, at the Pantex Plant. I therefore urge the Secretary of Energy to name Pantex as the sole preferred alternative for Pit Disassembly and Conversion. Furthermore, I would ask that Secretary Richardson to re-examine the decision made by Secretary Peña to locate the MOX facility at the Savannah River Site. In light of the controversy likely to surround the MOX program, a final decision on site location for that facility should be made after the site for the pit disassembly mission has already been determined. 2

Thank you for the chance to make comments on this very important issue.

Michael R. Bourn
Executive Director
Amarillo Economic Development Corporation
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600 S. Tyler Street
Amarillo, TX 79101
(806) 379-6411

TXD30

TXD30–2 **DOE Policy**

DOE acknowledges the commentor's concern over potential controversy surrounding MOX fuel fabrication. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this.

Further, selection of the disposition technology (immobilization or MOX approach) should not impact the pace of pit declassification. Pit declassification would likely depend on the agreements reached with Russia. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium.

As indicated in the revised Section 1.6, SRS is preferred for the proposed surplus plutonium disposition facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Amarillo Economic Development Corporation

Comments of Gilbert Guzman Regarding the DOE Surplus Plutonium Disposition Draft Environmental Impact Statement

Thank you for the chance to express the views of the Amarillo Economic Development Corporation regarding the surplus plutonium missions being considered for Pantex. The Amarillo Economic Development Corporation (AEDC) serves as the development arm of the City of Amarillo local government. The Corporation is funded by a half-cent sales tax and its board is appointed by the elected Mayor and City Commissioners of the City of Amarillo. As a public corporation our activities are carried out with the public interest first and foremost in mind.

Since the early part of this decade, the AEDC has striven to bring new work to the Pantex Plant in order to enhance the manufacturing base of our community. When measured by payroll and economic impact, Pantex is the largest manufacturer in a region comprised of over 50 counties in the Texas panhandle and south plains. Our support for new missions at Pantex is contingent on those missions being done in a manner that does not endanger human health or the environment.

The AEDC strongly supports the selection of Pantex as the site for the Pit Disassembly and Conversion Facility and MOX fuel manufacturing mission. These new missions will provide jobs for Pantex employees who might otherwise not have jobs as the disassembly work the plant now performs winds down. Pantex has been an important part of this community for over 50 years. We hope that with the addition of plutonium disposition missions, Pantex continues to be a major economic presence in this area for the next 50 years. 1

Gilbert Guzman
President
Amarillo Economic Development Corporation
Bank One Center, Suite 1503
600 S. Tyler Street
Amarillo, TX 79101
(806) 379-6411

TXD31

TXD31–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Analyses in Chapter 4 of Volume I indicate that impacts of operating these facilities on health, safety, and the environment at Pantex would likely be minor. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO ECONOMIC DEVELOPMENT CORPORATION
GLENN MCMENNAMY
PAGE 1 OF 2

Amarillo Economic Development Corporation

Comments of Glenn McMennamy Regarding the DOE Surplus Plutonium Disposition Draft Environmental Impact Statement

The people of the Texas panhandle are proud of the Pantex plant. They support the current plant operations and the expansion of the activities at Pantex. The payroll of Pantex pours hundreds of millions of dollars into the regional economy. All told, Pantex is responsible for about one out of every 10 jobs in the Amarillo metro area.

Today, you will hear from many people who come from different perspectives. Let me remind you of the overwhelming support the Department of Energy has in this area. Repeated polling has shown more than 80% of the residents of the area support Pantex. Our elected officials at the local, state and national level all support Pantex. Pantex is supported by Republicans, Democrats, Labor and Business. All demographic groups in our area support Pantex. I have been involved in local, state and national politics for many years and few of the candidates or issues with which I have dealt have ever had the broad support that Pantex enjoys. 1

Strong support is important for the DOE. In years past, the pressures of the Cold War made big budgets standard for the Department. In the post-Cold War era, the DOE budget receives an enormous amount of scrutiny. Different sites in the nuclear weapons complex have been reduced to fighting one another for new work and even for funding for the cleanup of heavily contaminated sites in Idaho, Colorado, Washington, and South Carolina. With all this budgetary scrutiny the DOE should seek the help of its political friends.

Glenn McMennamy
Vice President
Amarillo Economic Development Corporation
Bank One Center, Suite 1503
600 S. Tyler Street
Amarillo, TX 79101
(806) 379-6411

TXD33

TXD33–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Pantex, as well as the observations regarding broad political and community support. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

The Texas congressional delegation overwhelmingly supports the expansion of Pantex. The Governor and Lt. Governor of Texas support the expansion of Pantex. The AFL-CIO supports the expansion of Pantex.

These are very important constituencies to the Department of Energy. Their will should be carefully considered when deciding where to locate new missions. We know this work will be done in a safe manner. We know we are the right place to perform these missions. We will be very disappointed if the DOE fails to name Pantex as the site for this new work. The Texas congressional delegation will also be very disappointed if Pantex is not selected. I sincerely hope the DOE makes the right choice and decides to locate these new missions in Texas. 1

Glenn McMennamy
Vice President
Amarillo Economic Development Corporation
Bank One Center, Suite 1503
600 S. Tyler Street
Amarillo, TX 79101
(806) 379-6411

TXD33

AMARILLO ECONOMIC DEVELOPMENT CORPORATION
GEORGE RAFFKIND
PAGE 1 OF 2

Amarillo Economic Development Corporation

Comments of George Raffkind Regarding the DOE Surplus Plutonium Disposition Draft Environmental Impact Statement

I appreciate the chance to speak with you today about the draft Environmental Impact Statement on Surplus Plutonium Disposition. The Amarillo Economic Development Corporation (AEDC) has worked for years to try to bring new work to Pantex. We have always insisted, and continue to insist, that new work coming to Pantex be environmentally sound and a good "fit" with the existing missions. The Pit Disassembly and Conversion and MOX fuel missions meet both those criteria. Therefore, the I strongly encourage the Secretary of Energy to name Pantex as the sole preferred alternative for these plutonium disposition missions.

As a retailer in Amarillo, I understand the profound impact of agricultural income on the entire economy of this region. While I am not directly involved in agriculture, I know that my business' sales decline when times are hard for farmers and ranchers. I also know that for more than half-a-century, the presence of Pantex in this area has never led to reduced crop yields or reduced prices for commodity crops or livestock. The economy of all of West Texas is presently feeling the effects of drought and the subsequent decrease in farm and ranch income. Sales growth in the retail sector in Amarillo and surrounding towns has slowed. Even though the airlines are carrying record loads on a national basis, airline loads are down in Amarillo, Lubbock, and Midland. We all recognize that the rural and urban economies of this area are wholly and inextricably linked. 1

George Raffkind
Member, Board of Directors
Amarillo Economic Development Corporation
Bank One Center, Suite 1503
600 S. Tyler Street
Amarillo, TX 79101
(806) 379-6411

TXD32

TXD32–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Analyses in Chapter 4 of Volume I indicate that impacts of operating these facilities on health, safety, and the environment at Pantex would likely be minor. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

The proposed new missions at Pantex will lead to economic growth in our area, without harming agriculture. I would not support a project that negatively impacts agriculture, because my own livelihood is affected by the condition of the agricultural sector of the economy. Moreover, the AEDC receives a great deal of sales tax revenue from persons who live in rural areas and shop in Amarillo. We have no intention of growing one part of the economy at the expense of another. 1

I hope that the Secretary of Energy will keep in mind that the vast majority of the people in Carson, Potter and Randall Counties support agriculture and the Pantex Plant. Most people in this area recognize that both are essential to the well-being of our economy. I urge the Secretary to name Pantex as the sole preferred alternative for Pit Disassembly and Conversion and MOX Fuel Manufacturing.

George Raffkind
Member, Board of Directors
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TXD32

AMARILLO GLOBE-NEWS
GARET VON NETZER
PAGE 1 OF 3

Remarks
For DOE Hearings on Pantex
August 11, 1998, Amarillo, TexAs
By Garet von Netzer
Publisher, Amarillo Globe-News

Thank you for allowing me to present these remarks at today's hearing.

My comments are very brief.

They focus on the practical and cost-effective reasons the Pantex Plant should be awarded the mission of disassembly and conversion of nuclear weapons plutonium pits.

First, the pits already are securely stored at the Pantex Plant. The plant's security force is one of the finest paramilitary forces in the world, and it's the highest rated among all the DOE complex facility forces. 1

TXD54

TXD54–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Page Two

Why would the DOE even consider the risks and added expense of transporting plutonium pits to another site?

Second, the Pantex Plant already has the trained and highly qualified workforce to do the disassembly work. Workers at another site would have to be trained and would lack the background available already at the Pantex Plant.

Third, the Pantex plant's track record with handling and storing plutonium pits is proven, over many years, and without incident. In fact, the Pantex Plant has the finest safety and environmental record of all the major DOE sites in the nuclear weapons complex. 1

Fourth, consider the region's and city's strong support for the Pantex Plant, what it does and how it does

TXD54

AMARILLO GLOBE-NEWS
GARET VON NETZER
PAGE 3 OF 3

Page Three

it. Polls have shown for many years that more than 8 of 10 people strongly support the Pantex Plant and its role in our national defense. 1

These are just some of the reasons why the DOE should locate the disassembly mission at Pantex.

TXD54

AMARILLO HISPANIC CHAMBER OF COMMERCE
GILBERT GUZMAN ET AL.
PAGE 1 OF 1

Amarillo Hispanic Chamber of Commerce

CACHA

Camara de Comercio Hispana de Amarillo

P.O. Box 1861 Amarillo, Texas. 79105

A RESOLUTION OF THE AMARILLO HISPANIC CHAMBER OF COMMERCE
BOARD OF DIRECTORS IN SUPPORT OF
PANTEX

WHEREAS, the Pantex plant currently employs 2869 Amarillo-area residents and puts $200 million directly into our area, and is responsible for about one out of every ten Amarillo area jobs.

WHEREAS, the Pantex plant consistently employs Amarillo-area Hispanics at all levels, and consistently promotes minority business procurement opportunities.

WHEREAS, Pantex employees have more experience in handling plutonium pits than any other site in the complex.

WHEREAS, Pantex has more than adequate storage space for converting plutonium.

WHEREAS, the Pantex guard force is the highest rated in the DOE complex. Pantex has an outstanding safety record. The employees at Pantex have full-time union safety officers to whom they can raise safety concerns, Mason & Hanger Corporation has implemented a Voluntary Protection Program to further enhance employee and public safety. 1

WHEREAS, Pantex employees have safely handled, worked with, and stored pits. The Savannah River Site has a history of radioactive contamination of the environment.

NOW, THEREFORE, BE IT RESOLVED that the Amarillo Hispanic Chamber of Commerce Board of Directors support the disassembly and conversion of nuclear weapons plutonium components (pits) program to be assigned to the Pantex plant.

ADOPTED this 11 day of August, 1998

Gilbert Guzman, Chairman of the Board

Tony Quezada, President

TXD36

TXD36–1 **Alternatives**

DOE acknowledges the commentors' support for siting the pit conversion facility at Pantex. Analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO NATIONAL RESOURCE CENTER FOR PLUTONIUM
RICHARD HARTLEY
PAGE 1 OF 1

Amarillo National Resource Center for Plutonium

A Higher Education Consortium of The Texas A&M University System, Texas Tech University, and The University of Texas System

Comments of Richard Hartley, Ph.D., Technical Director of the Amarillo National Resource Center for Plutonium, August 11, 1998, at the Amarillo, Texas Public Meeting to discuss the Surplus Plutonium Disposition Draft Environmental Impact Statement (EIS).

It is the Center's mission to provide objective technical advice to the elected officials, regulators, and citizens of Texas on missions, like pit conversion and MOX, that potentially could come to Pantex. This independent technical advice is obtained by using academic experts from the consortium universities in Texas, (A&M, UT, TTU). We also work closely with the agricultural community through the Agriculture Research & Ag Extension Service here in the Panhandle of Texas.

One project the Center was asked to perform by the governor's office ~~permitted~~ was to provide an independent safety and health analysis of both the plutonium conversion mission and MOX at Pantex and a review of the EIS on behalf of the state of Texas. Our technical team included:

- Dr. Ian Hamilton, Texas A&M University, certified health physicist
- Dr. Randy Charbeneau, University of Texas, professional environmental engineer
- Dr. John Sweeten, agricultural engineer with Ag Extension Service
- Dr. Bobby Stewart, West Texas A&M University, agricultural scientist
- Dr. Jim Rock, Texas A&M, certified industrial hygienists
- Dr. Paul Vaughn, Texas Tech University, agricultural communications specialist
- Dr. James R. Clark, West Texas A&M, Dryland Wheat Institute
- Dr. Nolan Clark, Director, USDA Lab in Bushland, Texas

The results of that independent study were provided to elected officials, Texas regulators, and citizens of Amarillo in Nov. of 1997. The study was conducted by expert professional environmental engineers, certified health physicists, certified industrial hygienists, and agricultural engineers and scientists. The conclusion of that study was that the risks associated with the new missions is comparable to the risk of current operations at Pantex and there are no impacts on water resources, water quality, no impact on soil or air resource. 1

We were also asked by the governor's office to have the university principal investigators of that study review the draft Surplus Plutonium Disposition Environmental Impact Statement. As in the risk characterization effort presented in November, the researchers find that there are no significant environmental or safety impacts associated with the pit disassembly conversion or MOX mission coming to Pantex.

The ANRCP consortium represents substantial research capabilities that include: 1) 29 Campuses with 24,276 faculty, 259,534 students, and a $6.5 B combined budget, 2) academic credibility and independent verification, and 3) education based program that supports the Secretary of Energy's education initiative.

600 South Tyler • Suite 800 • Amarillo, TX 79101 • 806-376-5533 • Fax 806-376-5561

TXD43

TXD43–1 **Alternatives**

DOE acknowledges the findings of the ANRCP's study in support of pit disassembly and conversion and MOX fuel fabrication at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

AMARILLO NATIONAL RESOURCE CENTER FOR PLUTONIUM
K. L. PEDDICORD
PAGE 1 OF 2

Comments on the
Surplus Plutonium Disposition Draft Environmental Impact Statement

By

K. L. Peddicord
Amarillo National Resource Center for Plutonium

Presented at the SPDEIS Hearing
Amarillo, Texas
August 11, 1998

A key element in the surplus plutonium disposition mission will be provisions to allow for either bilateral inspections or multilateral inspection of excess weapons material. These functions contribute to important U.S. policy issues on transparency and openness relating to the disposition of surplus weapons materials both in the United States and the Russian Federation. Bilateral inspection with Russia will be important to develop a mutual level of confidence with the Russians for the entire disposition effort. Such bilateral inspection agreements will also provide confirmation to the U.S. through our inspection of Russian facilities that their efforts are proceeding accordingly. Likewise, potential multilateral inspection under the auspices of the International Atomic Energy Agency in Vienna, Austria, will give assurances to the global community of U.S. leadership in this key endeavor.

While the inspection function will be an ancillary enterprise, it also will have some environmental impact. Accommodations must be made for the facilities, equipment and individuals performing this role. These requirements can presumably be handled in a straightforward way with minimal environmental disruption. 1

In terms of the inspection function and its relation to the Pit Disassembly and Conversion Facility (PDCF), the input material to the PDCF will be in forms which are classified. However, the output material will be either converted to a metal "hockey puck" or plutonium oxide powder. Subsequent storage of this material will not be of a classified nature and will be subject to international inspection. It is noted that by locating the PDC Facility at the Pantex Plant, the necessary Perimeter Inspection, Detection and Alarm System (PIDAS) is in place to guarantee the security of weapons grade material. Reconfiguration of the existing areas at Pantex could be done in a straightforward way to allow for the inspection requirements while assuring that classified information and material is not compromised.

TXD48

TXD48–1 **Nonproliferation**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Once the United States and Russia complete an agreement providing the basis for exchanging classified nuclear information, the procedures to be used for inspection of pits in storage could potentially be adapted to contribute to bilateral monitoring of the pit conversion facility. International monitoring and inspection of the unclassified plutonium would also allow the United States and Russia to demonstrate to each other and to the international community that disposition was being carried out under stringent nonproliferation controls, and that the excess plutonium was not being diverted for reuse in weapons. Accommodation for international inspection of the unclassified material was incorporated in the design of the pit conversion facility, as shown in Figure 2–7. The MOX facility would be a separate function and would only process unclassified materials. Accommodation for international inspection was incorporated in the design of the facility, as shown in Figure 2–14. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AMARILLO NATIONAL RESOURCE CENTER FOR PLUTONIUM
K. L. PEDDICORD
PAGE 2 OF 2

A second aspect of the inspection requirements is also worth noting. As mentioned above, it is the material produced by the PDCF which will be subject to inspection. This precludes the possibility, which has been suggested elsewhere, that a fully integrated facility might be used which will have weapons pits as the input and MOX fuel as the output. Such a facility would not allow for the inspection of the product of the pit disassembly and conversion steps. If it were to be proposed at a Russian installation, presumably such a fully integrated approach with restrictions for the inspection of unclassified material would not be acceptable to the United States. We would want to be able to assure that the MOX fuel coming out was the result of the pits going in. As a result, separation of the pit conversion function from the MOX fuel fabrication will be necessary. 1

The Pantex Plant provides the opportunity for a facility for pit disassembly and conversion which meets, in a straightforward way, the requirements for key bilateral and multilateral inspection while minimizing the number of steps for the handling of sensitive weapons components. The selection of Pantex for the PDC Facility should assure expediency in carrying out U.S. and international nonproliferation goals. Bilateral and IAEA requirements could be more easily facilitated at Pantex thereby implementing pit disassembly and conversion more quickly, entering into an agreement to reach this same result with the Russians, and achieving the critical goal of timeliness which is a key factor in the surplus plutonium disposition mission.

TXD48

AMARILLO NATIONAL RESOURCE CENTER FOR PLUTONIUM
ANGELA L. WOODS
PAGE 1 OF 1

Amarillo National Resource Center for Plutonium

A Higher Education Consortium of The Texas A&M University System, Texas Tech University, and The University of Texas System

September 8, 1998

Mr. Bert Stevenson
NEPA Compliance Officer
US Department of Energy
PO Box 23786
Washington, DC 20026-3786

Dear Mr. Stevenson:

The Center is pleased to publish in its Center Report Series ANRCP-1998-11, "Routing of Radioactive Shipments With Time-Varying Costs and Curfews," by Laurie A. Bowler and Dr. Hani S. Mahmassani. This is key research that contains vital information for a key audience, and is the type of research the Center supports. 1

Please do not hesitate to contact us if any further information from the Center would be helpful.

Sincerely,

Angela L. Woods

Angela L. Woods
Technical Editor

Enclosure

600 South Tyler • Suite 800 • Amarillo, TX 79101 • 806-376-5533 • Fax 806-376-5561

MD175

MD175–1 **Transportation**

DOE appreciates publication of the referenced report by ANRCP.

ANDREW, MICHAEL
PAGE 1 OF 1

Michael Andrew
3512 Rutson
Amarillo, TX 79109

Ph: 806-359-6709
E-Mail: mandrew@arn.net

Title: Year 2000 considerations for the study.

As a concerned taxpayer and one knowledgeable about the Year 2000 crisis I am concerned with the report that lists Pantex and the Savannah River Sites as "equally preferred sites" for the DOE's Pit Disassembly and Conversion Facility.

As a proponent of Pantex and a resident of Amarillo I have seen the proactive approach Pantex has had on environmental impacts and just as critical the appropriate use of our tax dollars. I can not say the same for the Savannah River Site. Specifically I would like to cite two instances of many that drive home my point.

First, Savannah River was recently noted in several national Federal Computing publications as having abandoned a multi million dollar project to modernize their computer systems after spending in excess of $10 million on the effort. This upgrade was also to provide replacements for a number of systems that will not withstand the Year 2000, which is a little more than a year away. 1

Second, Savannah River was noted as having major deficiencies meeting dates in several of their systems including the Defense Waste Processing Control Systems. This prompted a special write-up in a recent quarterly report to the Office of Management and Budget from the DOE noting "the CIO determined that these justifications did not contain compelling reasons for granting exceptions." Savannah Rivers action in part caused a funding restriction for the Environmental Management branch of DOE imposed by OMB to remain in effect.

In summary I do not believe both are "equally" prepared to conduct work on January 1, 2000 much less conduct it safely and efficiently. Recognizing the importance on microprocessors in todays manufacturing processes and the unpredictable effects of ignoring Year 2000 problems I believe that if further evaluations were conducted into the readiness of each facility for the coming millennium that Pantex would be the clear choice.

Respectfully,
Michael Andrew

FD110

FD110–1 **Other**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. DOE is working diligently to correct the Y2K problems in all of its computer systems and will not operate any facilities subject to such problems. Construction of the pit conversion facility is scheduled to begin in 2001, and operations are scheduled to begin in 2004; therefore, the computer systems for the new facilities would not be affected by the Y2K problem.

As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

☑	YES!	Keep Texas Panhandle water, air, and soil safe from radioactive pollutants	1
☑	NO!	To any plutonium processing in the Texas Panhandle	2
☑	YES!	To minimal handling and processing of plutonium and other nuclear materials	3
☑	NO!	To converting military plutonium for use in mixed oxide (MOX) fuel	4
Signed:	Charge the Companies that made the profit for the clean up. Too many cook's spoil the brew!		5

CD1328

CD1328–1 **Alternatives**

Sections 4.17 and 4.26.3 describe the potential effects of the maximum impact alternative on air quality, water resources, and soil. These analyses indicate that the impacts of construction and normal operation of the pit conversion and MOX facilities on air, water, and soil at Pantex would likely be minor.

CD1328–2 **Alternatives**

DOE acknowledges the commentor's opposition to the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

CD1328–3 **DOE Policy**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. DOE is committed to public and worker safety during the construction, operation, and deactivation of the proposed surplus plutonium disposition facilities, and would implement appropriate controls and procedures to ensure compliance with all applicable Federal, State, and local laws, rules, regulations, and requirements.

CD1328–4 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

CD1328–5 **Cost**

DOE conducted a competitive procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

Yes, I think that the petroleum, the whatever it is, should be located at Pantex. Thank you. | 1

PD013

PD013–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

ANONYMOUS
PAGE 1 OF 1

Yes, I think they need to get rid of Pantex. It's bad for our crops and bad for our drinking water. Thanks. | 1

PD019

PD019–1 **Alternatives**

DOE acknowledges the commentor's opposition to the continued operation of the Pantex Plant. It is inferred that this would include opposition to siting any of the proposed surplus plutonium disposition facilities at Pantex. The *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996) was one of many references used during the development of this SPD EIS. Based on the information, analysis, and public comment contained in that EIS, DOE issued a ROD for the continued operation of Pantex. That EIS concluded that the continued operation of Pantex would have either minor or no impacts on the surrounding environment.

Yes, I just wanted to give my input on the deal that's going on about Pantex. And I'm all for it. 1

PD020

PD020–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

ANONYMOUS
PAGE 1 OF 1

I want to voice my opinion against Pantex. I think it is a dump about ready to explode and I think it is a hazard for the people that live in this area, not only for the people but for the cattle and the land. I think it needs to go, the sooner the better. 1

PD026

PD026–1 **Other**

DOE acknowledges the commentor's opposition to Pantex. The *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996) was one of many references used during the development of this SPD EIS. That EIS concluded that the continued operation of Pantex would have either minor or no impacts on the surrounding environment. Based on the analysis and related public comment, DOE issued a ROD for the continued operation of Pantex.

Yes, I am an Amarillo resident since 1926 and I want to express my support for the Pantex and everything it has done and been in Amarillo. It has the best safety record of any company that's ever been here. I've toured the plant and enjoyed getting to see what we've heard about for many, many years. I also want to support the use of Amarillo facilities to do the plutonium research and the, something about making the MOX, what ever it is, the dissassembly that doesn't make sense to ship it all across the country when it's already here, and you just have my family, all of us, our support and we're proud of you. Thank you for being here. 1

PD028

PD028–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BAKER, ROBERT D.
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Robert D. Baker
ADDRESS: 104 Riverie Trail Amarillo, Tx 79104
TELEPHONE: (806) 383-4502
E-MAIL: BBAKER4922@AOL.com

It is my understanding that Savannah River has been announced by DOE to be the preferred location for the MOX fuel conversion site. Also that Savannah River and Pantex are equally preferred for the Pit Disassembly and conversion site. Neither site has experience with MOX fuel fabrication nor Pit Disassembly and conversion. However Pantex has years of experience with the pits during the weapon assembly-disassembly process and pit storage. The source material is primarily located at PANTEX. The facilities for both the Pit Disassembly and MOX FUEL CONVERSION HAVE TO BE CONSTRUCTED AND BROUGHT INTO OPERATION. LOGISTICALLY IT DOESNT SEEM TO BE ECONOMICAL TO SHIP THE SOURCE MATERIAL TO SAVANNAH RIVER FOR EITHER THE PIT DISASSEMBLY OR MOX FUEL. ADDITIONALLY WHEN THE FUEL ASSEMBLIES ARE FABRICATED THEY WILL HAVE TO BE SHIPPED AROUND THE COUNTRY to the COMMERCIAL REACTORS. AMARILLO IS CENTRALLY LOCATED AND WOULD SEEM TO BE THE MOST ECONOMICAL SITE FOR THESE PROCESSES AS WELL AS THE DISTRIBUTATION POINT FOR THE MOX FUEL ASSEMBLIES. 1

TXD25

TXD25–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Potential impacts from intrasite transfer of pits would likely be minor if Pantex were chosen as the site for pit disassembly and conversion because pits are currently stored there. However, potential impacts from transportation of plutonium dioxide between the MOX and pit conversion facilities would be minimized if SRS were chosen because SRS is the preferred location for both facilities. Transportation impacts are summarized in Chapter 4 of Volume I and Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BATTELLE PACIFIC NORTHWEST NATIONAL LABORATORY
KIMBERLY BAKER
PAGE 1 OF 1

Ladies and Gentlemen, Strom Thurmond and the good people of South Carolina would have you believe that Savannah River is the place for the Pit Disassembly and Conversion Facility. This is obviously a political issue and I will address it as such. I will prove to you that Pantex, from a political standpoint, is far and above the only reasonable site for the Pit Assembly and Conversion mission. What is more political than safety at any Nuclear Facility?? The community and country as a whole scrutinize facilities such as Pantex and Savannah River on a continual basis. This has been the case for forty or fifty years. The threat of a radiation disaster is far more political than Strom Thurmond's current and albeit short-lived political agenda for Savannah River. I bring to you and can prove to you in black and white that the workers are healthier and therefore safer than those at Savannah River. I am a physician in the Occupational Medical Department. At Pantex we have a strong, active and progressive preventive medicine program which not only benefits the health of the employee (DOE's greatest asset), but the health of every mission at Pantex. With a strong interactive preventive medicine program, my department has been able to work closely with all aspects of Labor and Management to insure the health and safety of the workers. The health of the workers translates into the safe and healthy accomplishment of the variety of missions at Pantex. The medical department has worked diligently to interact on a continuous basis with every department on the plant. There are frequent visits directly with the workers and first-line supervisors to evaluate and resolve safety and health issues. There is one-on-one communication with the employees and the medical department. If meetings are needed to resolve issues, then there is no hesitation to meet with all players involved. The Medical department is blessed with a wealth of knowledge in preventive and radiation medicine. Our medical director is double boarded in both Preventive Medicine and Occupational Medicine. His area of interest is in radiation protection and he excels in his ability to take care of the employees at Pantex. The entire department is dedicated to the health of the workers and follows Dept. of Energy orders and regulations strictly. From a strong drug and alcohol program to the Graded Cardiac Exercise testing program, the Occupational Medical Dept. can insure you that the workforce is healthy, safe, and far superior to the workforce in Savannah River in their ability to undertake the Pit Disassembly and Conversion Mission. And is not the community and the country's concern over safe and healthy operation of a nuclear facility POLITICAL?? I think so!!! Political fifty years ago, political today, and yes, political years from now. Ladies and gentlemen of DOE, I challenge you to come to our medical dept. at Pantex and see how we run business, and then I challenge you to go to Savannah River and have them show you that their workforce is AS healthy and safe as those at Pantex. And I don't mean lip service, I mean cold, hard, substantiated data. From a political standpoint that holds up now and far into the future, I am convinced that you will find that Pantex is the ONLY politically correct site for the Pit Disassembly and Conversion Mission. Thankyou very much. 1

Kimberly Baker, MD
Pantex - Battelle
Box 30020, 12-2
Amarillo TX
79120-0020

TXD06

TXD06–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of human health risks to the public and workers), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

BENZINGER, DANIELLE
PAGE 1 OF 2

IF NOT NOW...

140 ARBORWAY, STE. 6, BOSTON, MA 02130-3502 USA
(617) 524-1342 • fax (617) 524-1347 • contact@ifnotnow.com

To: DOE, Fax 18008205156
From: If Not Now: A Citizens Lobbying Tool, EMail rep-info@ifnotnow.com
Date: Sep 16, 1998 7:04 GMT
Subject: Plutonium Disposal By Burning In Nuclear Reactors

If Not Now is a web-based citizen's lobbying tool. We are forwarding to you a letter from some of your constituents. At the end of this message there is a description of how our service works and how you can respond to your constituents.

Signatures as of Sep 16, 1998:
There were 2 new signers. Total signers to date: 4.

TOPIC: Plutonium Disposal By Burning In Nuclear Reactors

Dear DOE (Fissile Materials Program),

I am writing to oppose the current Department of Energy plan for plutonium disposition, which is based on mixed-oxide (MOX) fuel. MOX fuel is a bad idea. It is unproven technology as far as commercial reactors in the U.S. are concerned. MOX techniques for plutonium disposal are also slower and more expensive than immobilization techniques. In addition, the treatment of plutonium as an energy source sets a dangerous precedent for nuclear proliferation and the development of plutonium fuel economies. It is essential that the DOE do everything possible to discourage this proliferation. 1

New signers and comments:

Krista Bradford, New York, NY 10033
Danielle Benzinger, Arlington, TX 76006

DESCRIPTION OF IF NOT NOW SERVICE

Subscribers use If Not Now (www.ifnotnow.com) to get information about political and social issues of concern to them. The service also enables them to sign letters about these topics, which we then forward in consolidated form to officials such as yourself. It is important to emphasize that our subscriber list is authenticated through credit card verification, and only those signers who belong to your specific constituency are included in the signature list that you receive. FD312

FD312–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. While it is true MOX fuel has not been produced or used commercially in the U.S., it has been produced and used in Western Europe. MOX fuel fabrication is not a new technology. This experience would be used for disposition of the U.S. surplus plutonium. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Any difference between the cost of the hybrid approach and that of the immobilization-only approach would be marginal. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

IF NOT NOW...

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An important feature of If Not Now is that we follow up on every action letter that we send, and we report how representatives, officials and others have acted on the issue. We also provide you with the opportunity to respond to your constituents (via a password-protected web server, to ensure that only legitimate responses are posted). Follow the directions below. Your letter will be posted without editing; your constituents will be able to view your response when they check the results of that action. (We regret that we cannot process responses received via fax or US mail.) We strongly encourage you to send us a response! Our subscribers are active, involved citizens who want to hear from you.

To respond to an action letter: fill out the form at http://www.ifnotnow.com/respond.html -- you will need to use your special key: PeeTJIwV. This key is valid for one-time use only. Please send questions or comments via email to: rep-info@ifnotnow.com.

FD312

BUCKENAL, GEORGE
PAGE 1 OF 1

Yes, this is George Buckenal, and I live in Amarillo. It's 3:00 on Monday afternoon the 17th of August and I want to call and let you know that I would much support the pit dissassembly work that is being considered for Pantex. This is a needed program at Pantex and for the area. I know that we have been a great support in the past for Pantex out of Amarillo and we certainly would continue to be so. But we need that here in Amarillo for the jobs it would bring to Amarillo and also the work force could certainly utilize the extra income that would come out of that. But we would certainly support the pit dissassembly work being considered. I wish you'd please bring it to Amarillo. Thank you very much. 1

PD027

PD027–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

This is Patty Buckenal and I live in Amarillo, TX and I would like to state for the record that I support the pit dissassembly work going to the Pantex Plant here in Amarillo. Thank you. 1

PD029

PD029–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

C&B PRINTING
DENNIS CLOUNCH
PAGE 1 OF 1

C&B PRINTING

August 11, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
MD-4 Forrestal Building
1000 Independence Ave. SW
Washington, DC 20585

Dear Sirs,

I would like to take this opportunity to express my feelings about the location of the disassembly and conversion of nuclear weapons plutonium components ("pits") at the Amarillo Pantex plantn As a business owner and a citizen of Amarillo, I am totally in support of this function and hope you will consider the effort and the history of the Pantex plant in your decision making process for this site. 1

Sincerely,

Dennis Clounch
President

2400 West 7th • Amarillo, Texas 79106 • (806) 374-6262 • FAX (806) 374-7474 • 1-800-657-7131

FD149

FD149–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

CAMPBELL, CHARLES A.
PAGE 1 OF 1

3205 Kingston Rd
Amarillo, Texas 79106
8/1/98

To Whom It May concern:

I favor the retention and development of the Pantex facility at the present location for the following reasons:

First, I think the relocation of the facilities would be an unnecessary cost to both the tax-payer and the employees of the plant. We do not need to spend the money on non-productive activities.

Second, I believe that the Pantex plant and the City of Amarillo have enjoyed many years of mutual benefit. The folk at the plant are desirable citizens and have a good work ethic. 1

Third, the central location of the plant, geographically, would discourage possible terrorist attacks yet is easily accessible by Interstate highways, railroad, and airways.

Charles A Campbell

TXD22

TXD22–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex, which does not entail the relocation of any existing Pantex facilities. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

CAMPBELL, HELEN
PAGE 1 OF 1

3205 Kingston Rd.
Amarillo, Tx. 79106
8/11/98

To Whom It May Concern:

I am a long-time resident of Amarillo and do favor the retention and development of the Pantex Plant at the present location for the following reasons:

1. The saving in money and effort to all concerned.
2. The geographically central location would aid in security of the plant.
3. The excellent transportation facilities (air ways; railroads, and highways)
4. The positive impact upon the economy of Amarillo.
5. The vast majority favor the present location in spite of the loud clamor of a few special interest groups.

Sincerely yours,
Helen Campbell

1

TXD23

TXD23–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

CARPENTERS UNION LOCAL 665
JAMES N. BROOKES
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) JAMES N. BROOKES
ADDRESS: 702 S. MADISON
TELEPHONE: (806) 373 4574
E-MAIL: UBC665@PRN-Net

I am a carpenter and the business representative for the Carpenters Union Local 665. I represent 150 Carpenters and Millwrights in the Texas Panhandle. We currently work at Pantex and in the plant for contractors who build and remodel buildings. My members and I have personal experience as to safety and knowledge of handling the Pits. I am for the pit conversion process to be done at Pantex. I am confident this process can be done safely and securely here at Pantex. 1

Please consider this comment as a plea for Pantex to be the selected site.

Thank You
James N Brookes
Carpenters Union 665
Amarillo Texas 79101

TXD07

TXD07–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding the facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

CATTLE COMPANY
JAY O'BRIEN
PAGE 1 OF 1

Ninia Bivins
President

Jay O'Brien
Managing Partner

CATTLE COMPANY
Box 15305
Amarillo, Texas 79105

August 16, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition

Sirs:

As the manager/operator of an 80,000 acre ranch twenty miles north west of Pantex and another 160,000 acre ranch 60 miles south east of Pantex and the owner of a 45,000 acre ranch 60 miles east of Pantex, I have a vested interest in maintaining the quality, as well as the perception, of quality of agricultural products produced in the Panhandle. Chernobyl was a catastrophe because of the radiation, but also because it happened in Russia's bread basket.

As a member of the National Cattlemen's Beef Association's Industry Planning Group, I can tell you that beef prices are impacted more by perception of food safety than by fact. Pantex is within a few miles of IBP's large beef processing plant, in the center of an area that produces ¼ of the nations beef and within a few hundred feet of the Ogallala aquifer, which waters the nations grain supply. 1

There has to be a better place to put a facility dealing with deadly hazardous materials than on the incredibly small Pantex facility. Please consider the perception of food safety as you make your decision.

Sincerely,

Jay O'Brien

e-mail Jay@ranches.org

(806) 376-4147

FD109

FD109–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. The accidents analyzed for the proposed facilities are presented in detail in Appendix K, and the consequences are summarized by alternative in Chapter 4 of Volume I. It is impossible for DOE to predict how one of these accidents would be perceived by potential consumers of agricultural products from the Pantex. In the event of a severe accident, DOE would promptly take steps to interdict and contain any offsite contamination. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of facility accidents and the relative size of the site), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

I have worked at the plant for six years. I worked in the construction industry before that. I can honestly say this is the safest place I have ever worked at. 1

WD010

WD010–1 **Alternatives**

DOE acknowledges the commentor's support. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

CLEMENS, CARLTON
PAGE 1 OF 2

STATEMENT REGARDING PIT DISASSEMBLY AND CONVERSION FACILITY LOCATION AT PANTEX

My name is Carlton Clemens and I have been in the Real Estate business in Amarillo for the past 34 years. In those years of business in the Amarillo community, I have met and worked with a large cross-section of residents, and the vast majority of those people have been strong supporters of Pantex. We long term residents are confident that the Plant is operated in a manner that places safety far above all other considerations, and I am happy to say that my children and my grandchildren are residents of Amarillo and I never have had a concern with Pantex being one of our neighbors.

If I had the slightest concern over the safe operations at Pantex, I would pack my family and leave Amarillo as fast as I could. But that is not the case. I have enjoyed living in Amarillo for the past 34 years, confident that my family and I have chosen a community that is safe, progressive, and supportive of an installation that produces weapons to keep our country strong. 1

As a veteran and rational citizen of these United States, I believe that PITS should be de-militarized as quickly as possible. The competition between Pantex and Savannah River Plants for the PIT conversion facility seems to be a waste of time and tax payer money since the PITS are already at Pantex and can more safely be converted than be shipped half way across the country to do the same thing. It just does not make sense to go to the extra expense and effort to satisfy the whims of politicians.

TXD44

TXD44–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. DOE agrees that the surplus plutonium pits should be disassembled and converted in a timely manner. SRS employees and employees at all of the candidate sites are considered qualified to support the surplus plutonium disposition program. It is understood that at any of the sites there will have to be a training period since these facilities would require new processes and skills. DOE plans to move ahead with the program as quickly as possible, given the constraints of the U.S. agreements with Russia.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. Decisions on future missions related to the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Both Pantex and Savannah River have trained technicians who are certified to perform the work that is required and no site can claim an advantage in the number of trained workers. Pantex, however, can claim the highest work ethic of any DOE installation and is represented by a strong, well managed and highly respected labor union — a statement that the Non-Union Savannah River Site cannot claim.

I would like to remind you that the fine employees at Pantex have more experience in handling pits than any other site in the DOE complex. The DOE should not place classified weapons components in the hands of employees at the Savannah River Site who have extremely limited experience in dealing with PITS. 1

Thank you for your consideration, and I am confident that after you review all the FACTS in this important task, you will find that Pantex is the clear choice for the PIT Disassembly and Conversion Facility!

Thank you sincerely for your time.

Carlton Clemens 8/11/98

Carlton Clemens

August 11, 1998

TXD44

CONKLIN
PAGE 1 OF 1

We have had a safe and long history of handling plutonium. People in Amarillo back up the DOE and this will bring jobs to Amarillo. We need Pantex here and I totally support this. 1

WD014

WD014–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

3805 Overlook Drive
Amarillo, TX 79109
September 11, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

Re: Draft Surplus Plutonium Disposition EIS

I oppose any form of plutonium processing at the Pantex facility. The Plutonium Pit Disassembly and Conversion facility should be located at Savannah River for the following reasons:

1. The number of sites with plutonium contamination should not be increased. Every site which has been involved in plutonium processing is substantially contaminated. While Pantex has environmental damage, the contaminants do not include plutonium and it should not be introduced. 1

2. Plutonium processing requires substantial infrastructure which already exists at Savannah River. It is not cost-effective to duplicate facilities at Pantex. 2

3. The work force at Savannah River is trained and experienced in plutonium processing while the work force at Pantex has been confined to dismantling and storing sealed weapons components. These jobs require different skills. Retraining the Pantex work force would be expensive. 3

4. It would be cheaper and safer to ship sealed pits from Pantex to Savannah River than to ship disassembled and converted pits. 4

5. Pantex is located in an agricultural area and is situated over the Ogallala aquifer. The risk to the land and water by plutonium processing of any kind is unacceptable. 5

The prospect of additional jobs and federal dollars at Pantex does not offset the valid reasons for locating the Plutonium Pit Disassembly and Conversion facility at Savannah River.

In 1996, DOE stated that "plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost and complexity of introducing plutonium operation into sites without current capabilities." This was a logical policy in 1996, and it is a logical policy now.

Sincerely yours,

Louise Daniel

Louise Daniel

MD191

MD191–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the pit conversion facility at Pantex. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

MD191–2 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Although Pantex may not currently have the extensive plutonium processing infrastructure already present at SRS, analyses in Chapter 4 of Volume I indicate that impacts of construction and normal operation of the proposed facilities on infrastructure, health, safety, and the environment at Pantex would likely be minor. Decisions on the surplus plutonium disposition program at Pantex and SRS will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD191–3 **Other**

DOE acknowledges the commentor's support of the SRS workforce. Experienced employees would be trained in the specific activities involved with the surplus plutonium disposition program regardless of where the facilities are located.

MD191–4 **Transportation**

This SPD EIS analyzes shipping surplus plutonium both in the form of pits (Alternative 3) and plutonium dioxide (Alternative 5) from Pantex to SRS. The transportation risks and costs would be slightly higher for Alternative 3 because the required number of SST/SGT shipments are higher for pits

than plutonium dioxide. The radiological risk for both alternatives is about the same.

MD191–5 **Water Resources**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. The analyses presented in Section 4.26.3.2.2 indicate that there would be no discernible impacts on the quality of water in the Ogallala aquifer from normal operation of these facilities. Other sections show, moreover, that the normal operation of these facilities would likely have minor impacts on human health, agriculture, and livestock: Sections 4.17.1.4 and 4.17.2.4 address the potential radiological and hazardous chemical effects of the maximum-impact alternative on workers and the public at Pantex; Appendix J.3, the potential contamination of agricultural products and livestock, and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex.

DAY, HELEN C. AND JOE R.
PAGE 1 OF 1

Tuesday, August 11, 1998

Department Of Energy
Washington, D.C.

To Whom It May Concern:

My husband and I would like to go on record in support for the pit disassembly and conversion facility at Pantex. We believe that the Pantex Plant in Amarillo has had a very good safety record over the years that it has been in the city. 1

The city of Amarillo and Pantex have enjoyed a good working relationship for many years, and we would like to see Pantex have a new mission in Amarillo.

Sincerely,

Helen C. Day
Helen C. Day
Joe R. Day
Joe R Day
3509 Helen
Amarillo, TX 79109

TXD16

TXD16–1 **Alternatives**

DOE acknowledges the commentors' support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

DAY, HELEN CHARLENE
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Helen Charlene Day
ADDRESS: 3509 Kileen Amarillo, Tx. 79109
TELEPHONE: (806) 353-3252
E-MAIL:

Additional Comments:

I feel Pantex is the best location for the pit disassembly and conversion because the pits are already in storage at the Amarillo Pantex Plant and will never have to leave on a long dangerous road trip to Savannah River.

Pantex workers have highly skilled jobs ~~workers~~ with excellent work ethics and would contribute greatly to the new missions. 1

Pantex has the support of the city leaders, Chamber of Commerce, leaders of the State and a majority of Panhandle citizens.

It is my sincere hope that the location will be chosen where the work can be done safely and correctly. I feel that the Pantex Plant will be that site.

TXD18

TXD18–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Transportation impacts are summarized in Chapter 4 of Volume I and Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected under any of the proposed alternatives. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

DAY, RICK
PAGE 1 OF 2

To whom it may concern,

I would like to affirm my support of the Pit Disassembly and Conversion Facility being located at Pantex Plant. I would like to speak first from the perspective of a Pantex employee. I've worked in the Information Management Division for 16 years and have watched the Plant successfully face a broad range of challenges.

These include changes in legal regulations, changes in mission, and reduced budgets and staffing. In each case, I've watched as the Plant's employees (bargaining, non-bargaining, and management) have rallied to address the critical issues at hand. One of the accomplishments that I am most proud of, is the safety culture at Pantex.

The commitment to safety starts with the General Manager and is formally included as the #1 performance objective of every employee at the Plant. There is a high level of individual ownership in the area of safety and this is clearly evident by the improvements in recordable injuries made over the past 3 years. Safety is integrated into every activity carried out at the Plant.

Another area of excellence at Pantex is environmental stewardship. The staff and program in place at Pantex are *second to none*, as evidenced by the pro-active approach to issues such as aquifer protection. Pantex has consistently been favorably evaluated by 3rd party regulatory agencies -- groups who have nothing to gain from the Plant's continued operation!

From the perspective of a long-term (39 year) resident of Amarillo and the Texas panhandle, I believe the new PDCF mission would be beneficial to the local community -- from an economic, ecological, and social perspective. Obviously, the new mission would provide employment opportunities for local residents - our friends and our families. Also, we know these stable jobs have a ripple effect through the overall economy of the area. 1

In addition, I would like to remind everyone that the ground water, soil, air, and other natural resources do not solely belong to the area's agriculture industry. Everyone who lives in this area is a benefactor of clean air and water. As a citizen of this area, I am much more concerned about the ground water required and the waste stream created by industries other than Pantex.

As other citizens, I am concerned by the potential for aquifer contamination from the over-use of pesticides and fertilizers, the run-off from stock yards, and the inappropriate use of industrial chemicals. I believe that the work represented by the PDCF creates much less environmental impact to the area than other industries (e.g. hog farms).

The social impact of a business like Pantex is extensive. Employees of this Plant contribute financially to important social programs such as the United Way. In addition, they volunteer an in-numerable amount of their personal time to local schools, churches, and community service groups. Pantex provides employment opportunities for a wide variety of people ranging from High School graduates to Ph.D.'s -- pipe-fitters to scientists. This mixture provides a balanced social climate, with ample room for our children to live and grow.

TXD17

TXD17–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor. Decisions on the surplus plutonium dispositions program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

DAY, RICK
PAGE 2 OF 2

In summary, the PDCF mission would allow Pantex to continue providing stability to the local community. This is healthy for everyone who wants to continue living in this area. For the area to remain a viable place to live, we can't just rely on more hog farms, truck stops, and prisons. For the area to remain strong, there must be a patch work of businesses with diverse economic resources and business cycles, that employ a wide range of workers, with diverse educational backgrounds and vocational skills. 1

Thanks for your time ....

Rick Day
6101 Cornell
Amarillo, TX 79109

(806) 358-2717

TXD17

United States Department of Energy

Comment Form

NAME: (Optional) Don Dodson
ADDRESS: P.O. Box 32552, Amarillo, Tx 79120-2552
TELEPHONE: (806) 355-9661
E-MAIL:

I would like to express my support for Pantex and its mission.

It is only logical that since the plutonium pits are currently located in Amarillo/Pantex plant that Pantex should be location for disassembly 1

I had the opportunity to visit St. Petersburg Russia on vacation this summer and it was my observation that we need to take every opportunity to reduce Russia's plutonium inventory and to do it as soon as possible. 2

TXD10

TXD10–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TXD10–2 **DOE Policy**

DOE acknowledges the commentor's concern regarding the reduction of Russia's plutonium inventory. The United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile.

Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement.

DWORZACK, SARAH
PAGE 1 OF 1

August 10, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition c/o SPDEIS
Box 23786
Washington, DC 20026-3786

REF: Location of Pit Disassembly and Conversion Facility

As an employee at the Pantex Plant in Amarillo, Texas, and a long term resident of the Amarillo, Texas, I want to see the pit conversion work done at Pantex.

This is not just a personal issue. The real consideration should be safety, and of the two possible sites, Pantex is the safer facility. This can easily be confirmed by reviewing existing records for both facilities. At times it has almost seemed like Pantex was overlooked for additional weapons-related work because we are such a clean site.

The safety record is directly attributable to the efforts of plant employees, who have worked very hard through the years to meet or exceed requirements. Even in the years before the creation of the various oversight agencies such as OSHA, the plant functioned safely. The technical skills of the employees who do hands on weapon work is another reason for the excellent record.

The fact that Texas is not as strong politically -- we don't have aggressive PACs or Strom Thurmond fighting for us -- should not be the major deciding point. As a matter of fact, maybe politics should be left out of it altogether. 1

The Pantex Plant has provided jobs for my family since 1959, and I hope that it will continue to provide employment for me and many others in the future. The Pantex Plant now has thousands of pits stored. Why risk shipping these items to another location? Why increase the cost to do the job?

I sincerely hope that the DOE will look at all issues with an open mind with the major consideration being safety. The second and third considerations should be the technical skill of the employees, and the last consideration should be cost. If these things are considered without PAC or other political influence, the only logical choice is for the pit conversion to be done at the Pantex Plant.

Respectfully submitted,

Sarah Dworzack

Sarah Dworzack

MD019

MD019–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. DOE believes that all the candidate sites are suitable from an operational, community support, and safety standpoint.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

United States Department of Energy

Comment Form

NAME: (Optional) Mary Emery
ADDRESS: Box 148, Rockland, TX 77012
TELEPHONE: (936) 426-3405
E-MAIL:

The question I would ask is the following:

Which is more likely to be spread if there is an accident in transportation: PITS or MOX fuel

If MOX it would seem prudent to have MOX the shortest distance

If PITS then Pits should be transported the shortest distance 1

There are more nuclear plants relatively close to Savannah River than Pantex. If MOX (which is a powder) is more easily released through accident then it would seem prudent to make the conversion to MOX at Savannah River

TXD05

TXD05–1 **Transportation**

The transportation requirements for the surplus plutonium disposition program are evaluated in this SPD EIS. The analysis showed that the accident risk would be slightly higher for plutonium dioxide than pits because the dioxide is in a powder form and therefore subject to more dispersal in an accident. However, this single fact cannot be used as the deciding factor in making a decision on the location of facilities. The number of SST/SGT trips required to transport these two forms and the mileage between facilities are also considered in the overall transportation risk analysis of each alternative. Decisions on the surplus plutonium disposition program will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input.

ERWIN, INEZ
PAGE 1 OF 1

GOOD EVENING.....MY NAME IS INEZ ERWIN.....I AM AN EMPLOYEE AT PANTEX PLANT AND I WAS NOT BUSSED IN TO ATTEND THIS MEETING

.....I FEEL THAT THE WORK IN QUESTION CAN AND SHOULD BE PERFORMED AT PANTEX PLANT.....NOT ONLY ARE WE SKILLED IN OUR JOB PERFORMANCE - AND AS WE DEFINITELY ARE NOT AMATEURS - ADDITIONAL TRAINING WOULD NOT BE A MAJOR FACTOR .....IN FACT, WE HAVE BEEN KNOWN TO TRAIN PERSONNEL FROM OTHER SITES - SUCH AS- SAVANNAH RIVER.....IT WOULD BE COST EFFECTIVE FOR THE MISSION TO BE PLACED AT PANTEX PLANT.....AND AS WE ALL KNOW.....COST + Safety IS THE NAME OF THE GAME..... 1

PANTEX PERSONNEL ARE COMMITTED AS WELL AS BEING DEDICATED TO EXCELLENCE IN THE PERFORMANCE OF SUCH SKILLED ENDEAVORS.

THANK YOU LADIES AND GENTLEMEN FOR YOUR ATTENTION.

TXD34

TXD34–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

General Services Commission
1711 San Jacinto - P.O. Box 13047
Austin, Texas 78711-3047
Web Site: www.gsc.state.tx.us
(512) 463-3035

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EXECUTIVE DIRECTOR
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August 11, 1998

Mr. Bert Stevenson
NEPA Compliance Officer
U.S. Department of Energy
P.O. Box 23786
Washington, D.C. 20026-3786

Dear Mr. Stevenson:

Thank you for the opportunity to comment on the Department of Energy's *Surplus Plutonium Disposition Draft Environmental Impact Statement*. The State of Texas continues to support the Department's decision to pursue a dual track approach for the disposition of surplus plutonium. However, we believe it is in DOE's best interests to proceed in a manner that ensures broad acceptance for ultimate implementation of the dual disposition strategy.

The State of Texas is very proud of the work carried out at the Pantex Plant. Pantex and its thousands of dedicated, highly trained and motivated employees have made this nation a safer place to live, carrying out their primary mission of assembling and disassembling nuclear weapons. This same skilled workforce can apply its proven production culture and commitment to safety to the new mission of plutonium pit disassembly and conversion.

Because current and future personnel of this new mission will require training on new procedures, Pantex has a unique safety advantage over other sites in that its workforce will require training, not re-training. Clearly, it is preferable to train individuals on a new system, rather than re-train personnel who are used to older systems with outdated procedures and requirements. 1

The highly trained and motivated Pantex workforce has forged a strong relationship with the Amarillo community. Its commitment to maintaining the integrity of the environment, to implementing proper protocols to ensure the safety of workers and the larger community, and to working closely with the local community have earned Pantex the role of a good neighbor. Pantex enjoys considerable community support and enthusiasm for new missions.

TXD39

TXD39–1 **Alternatives**

DOE acknowledges the commentor's support for the hybrid approach to surplus plutonium disposition and for siting the pit conversion facility at Pantex. Analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

GENERAL SERVICES COMMISSION
ROGER MULDER
PAGE 2 OF 2

This support extends beyond the local community as well. Pantex has ample resources through the state and through the continuing research at the Amarillo National Resource Center for Plutonium to ensure the protection of human health and safety and the environment.

Pantex has another advantage in that it is currently storing more than 8,000 surplus plutonium pits. In addition to the compelling reasons such as the excellent safety culture and production culture already existing here at Pantex, it makes sense to carry out pit disassembly and plutonium conversion where the pits are already located. Selection of Pantex for pit disassembly and conversion should ensure some expediency in carrying out U.S. and international nonproliferation goals. 1

In view of Pantex's highly skilled workforce, its sound safety and production cultures, its existing mission of pit storage, and the extensive support which Pantex enjoys from the local community and from the state, I respectfully urge DOE to designate Pantex as the site for pit disassembly and conversion.

Thank you for the opportunity to comment in this important decision making process.

Sincerely,

Roger Mulder

ROGER MULDER
Director, Pantex Program

TXD39

Specification of "can-in-canister" immobilization as a preferred alternative.

DOE is proposing "can-in-canister" immobilization as its preferred alternative for immobilization. However, the DOE's own reports[1,2] indicate that "can-in-canister" immobilization does not currently meet the Spent Fuel Standard for long-term nonproliferation resistance. The United States must deploy an effective, accepted plutonium disposition technology or technologies if it wants to encourage international support for plutonium disposition. Duke expects that concurrent action on the part of Russia to dispose of its surplus plutonium will be predicated on the disposition of United States material in a manner that provides high confidence in its resistance to theft, diversion, or re-use. 16

Recommendations:

1. DOE should consider only those alternatives that meet the Spent Fuel Standard [i.e., mixed oxide (MOX) fuel and homogeneous immobilization] as preferred alternatives.
2. If the DOE pursues deployment of "can-in-canister" immobilization, the DOE should explain how it will demonstrate, in an open, objective, and peer-reviewed process, that the "can-in-canister" plutonium disposition approach will meet this fundamental program requirement - the Spent Fuel Standard.

Quantities of plutonium considered in the EIS for disposal using the two approaches.

The draft EIS states, "Since the ROD was issued, however, DOE has determined that an additional 9 tonnes of low plutonium content materials would require additional processing and would, therefore, be unsuitable for MOX fuel fabrication." DOE alternatives include disposing of a maximum of 33 tonnes of plutonium as MOX fuel, while the alternatives include immobilizing 50 tonnes of surplus plutonium.

DOE has never provided justification that any surplus plutonium is not suitable for MOX use. The DOE has not explained what form this "unsuitable" plutonium is in. The technology descriptions in the draft EIS make it clear that various kinds of processing will be used in the Conversion and Immobilization Facility. It would appear to be possible that some of this processing would render material that is suitable for fabrication into MOX fuel. Finally, the DOE has specified no requirements that the plutonium destined for either MOX fuel or immobilization must satisfy. Therefore, it seems very unlikely that there is any technical basis for any decision about quantities of plutonium that are suitable or unsuitable for either option. 17

Recommendation:

Given the lack of justification for any decision about quantities of material for the two options, DOE should include the evaluation of a 100% (50 tonne) MOX fuel alternative in the SPD EIS. This is the only way to preserve all appropriate options until the time that the DOE can make a technically defensible evaluation and decision on the allocation of material to the two plutonium disposition approaches.

[1] Sandia National Laboratories, SAND97-8203 - Proliferation Vulnerability Red Team Report, October 1996.

[2] U. S. Department of Energy, DOE/NN-0007 - Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives, January 1997.

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MD188–16 **DOE Policy**

In the *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), DOE identified two potential liabilities of the immobilization alternatives relative to the Spent Fuel Standard. These liabilities involve ensuring sufficient radiation levels and removal-resistant can-in-canister designs. Since that time, DOE has modified the can support structure inside the canisters and has focused its research on the ceramic form of immobilization. As part of the form evaluation process, an independent panel of experts determined (*Letter Report of the Immobilization Technology Peer Review Panel*, from Matthew Bunn to Stephen Cochran, LLNL, August 21, 1997) that the can-in-canister design would meet the Spent Fuel Standard. In addition, NAS is currently conducting studies to confirm the ability of the ceramic can-in-canister immobilization approach to meet the Spent Fuel Standard. DOE is confident that immobilization remains a viable alternative for meeting the nonproliferation goals of the surplus plutonium disposition program.

MD188–17 **Feedstock**

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

DOE reviewed the chemical and isotopic composition of the surplus plutonium and determined in the *Storage and Disposition PEIS* ROD that about 8 t (9 tons) of surplus plutonium were not suitable for use in making MOX fuel. Furthermore, DOE has identified an additional 9 t (10 tons) for a total of 17 t (19 tons) that have such a variety of chemical and isotopic compositions that it is more reasonable to immobilize these materials and avert the processing

Fast Flux Test Facility (FFTF).

It is not clear that using the FFTF to destroy nuclear weapons material (plutonium) would be acceptable to the international community if, at the same time, the facility was producing another kind of nuclear weapons material (tritium).

Recommendation:

In discussing the use of the FFTF for a combined plutonium disposition and tritium production mission, DOE should acknowledge that there is a significant nonproliferation issue associated with such a course of action. 18

Fast Flux Test Facility (FFTF).

The appendix states "If it were determined that MOX fuel (rather than uranium-only fuel) were needed for the FFTF operations, the MOX fuel fabrication alternatives may be eliminated, depending on the amount of surplus plutonium that would be required for tritium production." However, it is our understanding that the capability to fabricate significant quantities of MOX fuel for the FFTF does not currently exist within the DOE complex.

Recommendation:

DOE should acknowledge that use of the FFTF with plutonium fuel in this manner would require the design and construction of a MOX fuel fabrication facility for the FFTF fuel. It is the light water reactor irradiation of MOX fuel that might be eliminated by such a course of action. 19

Hot cell examinations of irradiated lead assembly fuel.

The environmental impacts in the draft EIS do not appear to include those impacts associated with hot cell examinations. In particular, there is no acknowledgement that the hot cell facilities would be responsible for the disposal of the spent nuclear fuel that results from destructive hot cell examinations.

Recommendation:

DOE should revise the EIS to include these impacts, or note that such impacts are already included in other environmental evaluations. 20

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complexity that would be added if these materials were made into MOX fuel. The criteria used in this identification included the level of impurities, processing requirements, and the ability to meet the MOX fuel specifications. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not considered a reasonable alternative at this time.

While it is possible to use impure plutonium in MOX fuel, the incremental burden to do so is unnecessary and complicates the MOX approach. A description of the types and amounts of plutonium currently planned for disposition can be found in *Feed Materials Planning Basis for Surplus Weapons-Usable Plutonium Disposition* (MD-0013, April 1997).

MD188–18 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

MD188–19 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. DOE agrees with the commentor that the LWR irradiation of the MOX fuel could be eliminated should there be a proposal to restart FFTF using surplus plutonium as a fuel source; however, the timeframe in which it could be accomplished is longer than that currently being proposed by the consortium using commercial reactors.

MD188–20 **Lead Assemblies**

The two DOE sites, ANL–W and ORNL, proposed for postirradiation examination conduct these types of activities on an ongoing basis. Impacts of activities associated with the postirradiation examination of lead assemblies are discussed in Section 4.27.6. Spent fuel after postirradiation examination would be the responsibility of the DOE spent nuclear fuel program. As stated in the ROD for the *DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory*

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COMMENTS ABOUT THE SURPLUS PLUTONIUM

In addition to the oral comments submitted in the public meeting on August 10, 1998, I have the following written comments on the Surplus Plutonium Disposition Draft Environmental Impact Statement.

- Reading the EIS, I noticed that in several areas it declares that all the sites to be considered except Pantex meet certain levels of potential aircraft crash probability. The oral response in the public meeting indicated that Pantex statement was a result of the November 1996 EIS for Continued Operation of the Pantex Plant. My point is that the previous EIS was conducted before the DOE standard for evaluating aircraft crash probability was finalized, and my research indicates that the analysis thoroughly over estimated the types and amount of traffic landing at Amarillo and from errors in the development of the standard related to military aircraft crash rates thoroughly overestimated the likely hood of an aircraft crash into the Pantex site. The point being that the previous analysis that was done is in error and should not be used to exclude Pantex in any way from the new mission and therefore the statement should be amended or removed from the document.
- In support of this assertion that the previous analysis overestimated the aircraft crash probability, I offer the following data:
  - In the previous EIS, the most significant crash probabilities were related to takeoff and landings of military aircraft. The analysis used radar data (RAMS) collected at Amarillo Airport as analyzed by Dr. Lin of Sandia Laboratories.
  - We have reviewed all the RAMS data and rewritten the FORTRAN program that analyzes the tracks to determine high altitude versus landing aircraft and found an order of magnitude reductions in the large military aircraft landing at Amarillo. We reduced the number of unknown category of flight tracks by a factor of three or more. We now have the most accurate database of aircraft operations at Amarillo Airport. 21
  - Using this database of aircraft traffic and using the DOE standard and support documentation crash rates (Which are also in error on the conservative side) for actual military aircraft types flown into the Amarillo airspace, we determined that the small military rates were 9 and 8 times overstated for zones 4 and 12 respectively. The large military aircraft crash probability were overstated in zones 4 and 12 by 2 and 4 times respectively.
  - Using these new aircraft specific traffic data, the probability of an aircraft crash by the general aviation single engine piston category of aircraft is three and one half times more likely to crash into Pantex than the small military category and 14 times more likely than the large military
  - The DOE standard, which was finalized after the previous EIS, has not been validated by outside review and is overly conservative in all categories. My research has determined that there are significant errors in the adoption of military crash rates. Error where made in the interpretation of Air Force accident descriptions as to classifying landing accidents, interpreting the location data of accidents, and in calculating the number of landings and landing approaches for aircraft types.

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Environmental Restoration and Waste Management Programs Final EIS (DOE/EIS-0203-F, April 1995), interim storage for this type of spent fuel would take place at INEEL before eventual disposal in a potential geologic repository.

MD188–21 **Facility Accidents**

The oral response provided in the public hearing did not fully answer the question. The *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996) was used to determine the operations of each aircraft type. The other remaining factors were from the DOE standard, *Accident Analysis for Aircraft Crash Into Hazardous Facilities* (DOE-STD-3014-96, October 1996), and calculations from equations in that standard. The aircraft crash evaluation used operations data from the Pantex EIS because it was the best available data at the time of the analysis for this SPD EIS.

In response to the claims about having the "most accurate database of aircraft operations at Amarillo Airport," until those data are verified by DOE and made available in a published document, the Pantex EIS operations data are considered the best known published operations data for Amarillo Airport. This SPD EIS disregarded any contribution from general aviation aircraft because the proposed surplus plutonium disposition facilities would be designed to withstand a general aviation aircraft impact. Figure 4 in the DOE-STD-3014-96 data document describes at least 68 small military off-runway accidents around the U.S. These crashes are included in the basis for the crash location density function. The arguments for a reduction of the frequency of 9 or more for in-flight crashes are not provided. The analyses are based on DOE-STD-3014-96 and are considered to be appropriate and adequate for the comparison of the alternatives being considered in this EIS.

- After reviewing the supporting data from all US Air Force crashes from 1979 to 1993, my analysis shows that only one landing crash occurred outside of 4 miles from the runway. In that accident, an F-111 aircraft crashed at nine miles as a result of an unusual situation where one engine was shut down during an emergency approach and the afterburner failed to light on the good engine resulting in the crash. Since all F-111 aircraft have now all been retired from Air Force service it ceases to be a problem and should not constitute a data point in the calculation of crash probability distribution functions for military aircraft.
- There is no data that supports that military aircraft landing accidents have any probability of crash into the Pantex site which is over 10 miles from the Amarillo Runway, let alone be the single highest risk factor.
- The inflight calculated crash rates in the DOE standard as applied to Pantex are overly conservative and I would argue that they should be reduced by a factor of nine or more as applied to the location of Pantex.

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At the request of the Amarillo National Resource Center for Plutonium, a consortium of the Texas A & M University System, the University of Texas System, and Texas Tech University, I have reviewed the 4-part document A Surplus Plutonium Disposition Draft Environmental Impact Statement: Summary, Volume I-Part A, Volume I-Part B, and Volume II@, U. S. Department of Energy, Washington, D. C., July, 1998.1,500 p. While my review of the Surplus Plutonium Disposition (SPD) Environmental Impact Statement (EIS) was focused on those parts relating specifically to the Pantex Plant and to the environmental quality assessment and impact considerations, a general review was given also to other locations under consideration.

The analysis of the 23 alternatives articulated and presented for review was thorough and balanced with respect to the various sites under consideration. I understand that some of these alternatives are no longer under consideration subsequent to a DOE recent decision to locate the fuel rod assembly fabrication process using plutonium oxide at Savannah River Site (SRS) which is the point of proposed final utilization in an existing nuclear power plant. This decision constrains the selection of alternatives involving Pantex to only those involving (a) current mission of long-term plutonium pit storage with upgrades, (b) pit disassembly, and (c) pit conversion of Pu into plutonium dioxide, a component along with uranium dioxide of eventual Mixed Oxide (MOX) fuel rods fabricated at SRS. In essence the remaining alternatives involving Pantex are as follows (n=8): Alternatives 1, 4A, 4B, 5A, 5B, 11B, 12C, and 12D.

I do not view Alternative 1 (No Action) as a viable option, in that the estimated half-life of plutonium in its present form is some 24,000 years. This is a long time for governments, militaries and taxpayers to guard and protect from terrorism, accident, environmental and natural resource damage, and human tragedy some 50 metric tons of active fissile material that has commercial value as well as obvious destructive potential. This potential Alegacy@ should not be left for future generations of Texans and other Americans. The 1:1 leveraging opportunities with the former Soviets with respect to their disassembled and stored fissile materials would be lost as well. The other 22 alternatives would put all this behind us by the year 2015, or with typical public works delays by the year 2020-2025 at least. The Panhandle, Texas, America and the world then will be a safer place. 22

So the question really becomes two-fold:

a) is the presently-proposed suite of technologies adequate to perform the plutonium handling and conversion safely and effectively?; and
b) is it environmentally secure?

I will defer the former question to the involved experts in nuclear engineering, nuclear physics, chemical engineering, occupational health and safety, and other relevant fields.

Regarding the second question, my involvement over the last 18 months with ANRCP technical staff and a team of experts evaluating and providing risk assessment for the Pu/MOX fuel conversion process, together with my reading of the SPD EIS document itself suggests that, with the data presented so far, the remaining alternatives involving Pantex can be carried out in an environmental secure manner. The probabilities, exposure, and health

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MD188–22 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's positions on environmental impacts at Pantex, as well as the interest of the organizations mentioned. The environmental analysis reflected in this SPD EIS involved the consideration of relevant and available information.

Technologies proposed for the disposition of surplus plutonium are described in Sections 2.3 and 2.4; environmental impacts of the implementation of those alternatives, in Chapter 4 of Volume I. As more information becomes available it will be posted to DOE's Web site at http://www.doe-md.com.

effect numbers are very, very small. The land area that would be affected by worst-case scenarios involving release of Pu to the environment are very small, contained within site boundaries, and off-site impacts would be practically negligible.

Nevertheless, there is necessary and continuing involvement by agricultural scientists and engineers with the agencies affiliated with the Cooperative Research, Education, and Extension Triangle for the Panhandle (Texas Agricultural Experiment Station, Texas Agricultural Extension Service, West Texas A & M University, USDA-Agricultural Research Service, and Texas Veterinary Medical Diagnostic Laboratory), joined by our colleagues at TAMU-College Station and at the TAES Blacklands Research Center at Temple, in providing new data, information, questions, answers and dialogue from the perspective of agricultural production and processing, including soil/water/plant/animal/wildlife relationships. We are interested as well in impacts on water, soil and air resources from the perspective of rural residents and communities. Our concerns with maintaining the viability of crop, feedlot, range and pasture production systems as part of the human food chain, and of those who operate them, is paramount. The recent, current and future scientific projects with ANRCP sponsorship and involvement reflect those concerns and provide answers that should be taken into account with regard to the present SPD EIS and future plant design and operations. We are available for continuing dialogue and partnerships involving scientific discovery, interpretation, exchange, and education in these areas. 22

In terms of the EIS document itself, my remarks will be restricted to only a few areas at this time.

***Summary, Section S.5**--Topics analyzed in the SPD EIS are appropriate: air quality, noise, waste management, socioeconomics, human health risk, facility accidents, transportation, environmental justice, geology and soils, water resources, ecological resources, cultural and paleontological resources, land use and visual resources, and infrastructure. However, agricultural production systems are not addressed for any of the potential sites, all of which sit in or adjacent to extensive crop and livestock production appropriate to the regions. 23

***Chapter 2, Alternatives for Disposition of Surplus Weapons-Usable Plutonium**--

- Page 2-3-- As noted above, several of these alternatives can be eliminated with recent decisions regarding the SRS mission, namely Alternatives 2, 4A, 4B, 6A, 6B, 6C, 6D, 7A, 7B, 8, 9A, 9B, and 10. 24
- Pages 2-4 to 2-7--From the maps, every site except Pantex has at least one river running through or adjacent to it.

***Chapter 3, Affected Environment**--

- **Section 3.1, Approach to Defining the Affected Environment**--the Region of Interest (ROI) did not directly include agricultural resources or production practices for any of the candidate sites. If environmental damage were to occur despite safeguards, the public would be very interested in food supply and food chain safety issues, and farmers/livestock producers would be directly affected in terms of restrictions on future production practices or marketing opportunities. These are an important considerations. 25

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MD188–23 **Socioeconomics**

Incident-free (normal) releases of radioactivity from the proposed surplus plutonium disposition facilities to the food production chain are explained for each candidate site in Appendix J. Current and future operations at any of the candidate sites are not expected to impact the soil used for agriculture and farming in any regions adjacent to these candidate sites. The potential impacts of the proposed facilities on prime farmlands are also evaluated in the Geology and Soils portions of Section 4.26. All activities would be limited to each of the candidate sites, and any impacts on the surrounding areas would be within Federal, State, and local regulatory limits.

Section 4.26 and Appendix K were revised to discuss potential impacts of radioactive emissions on agriculture and water resources.

MD188–24 **Candidate Sites**

DOE's preference for siting the MOX facility at SRS is not a decision. The alternatives cited by the commentor remain reasonable alternatives until the SPD EIS ROD is issued. However, DOE eliminated as unreasonable the 8 alternatives that would involve use of portions of Building 221–F with a new annex at SRS for plutonium conversion and immobilization, thereby reducing the number of reasonable alternatives to 15 that are analyzed in the SPD Final EIS. Table 2–1 was revised to reflect the deleted alternatives: 3B, 5B, 6C, 6D, 7B, 9B, 12B, and 12D. Alternative 12C was renamed 12B.

DOE acknowledges the commentor's statement that every candidate site, except Pantex, has at least one river running through or adjacent to it.

MD188–25 **Socioeconomics**

Section 3.1 defines the ROI for the affected environment for human health risks to the general public from exposure to airborne contaminant emissions as an area within an 80-km (50-mi) radius of the proposed surplus plutonium disposition facilities. The analyses in Appendix J consider the potential contamination of agricultural products and livestock, and consumption of these products by persons living within an 80-km (50-mi) radius of the

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- **Section 3.4, Pantex Plant, Pages 3-88 to 3-124**--the extensive agricultural production practices and programs within a 9-county area around Pantex nor adjacent to the site were not discussed or data listed. This information was provided to the ANRCP in January 1998 in a contract project final report and needs to be presented or summarized herein. The agricultural data should include: crops (types and acreage), soil management practices, livestock grazing (rangelands and wheat pasture), cattle feedlots including sources of feedstuff supplies , beef slaughtering and processing facilities, and grain storage. Dairies, horses swine, poultry, and other species of relevance are not identified as well. Potential secondary pathways of possible contamination--e.g. non-point source runoff, wind erosion, water erosion, etc.-- are not addressed. Similar information should be provided for all the other candidate sites in the respective sections within the Regions of Interest. For example, fruit, vegetable, cattle and dairy production are prominent in Idaho and Washington state in general vicinity of INEEL and Hansford plants, respectively, and South Carolina is a poultry production state. Also, no mention is made of local management districts for groundwater and surface water resources; these include the Panhandle Ground Water Conservation District No. 3, White Deer, which encompasses an 8-county area including Pantex. 25

*__Chapter 4, Environmental Consequences__--The forgoing comments for Chapter 3 generally apply to this chapter as well.

- **Section 4.6, Alternative 4A**--Indicates that the air quality impacts will be minimal along with waste management, human health , or water resource risks. Increments added by operation of the pit conversion at Pantex will be non-existent or minimal (Table 4-5 vs. Table 4-58), and resultant site concentrations will be far below EPA or TNRCC ambient air quality standards for most contaminants and below EPA NAAS for PM10 on both an annual and 24-hour averaging time basis. 26

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candidate sites. The analyses of doses consider bioaccumulation of radioactivity in grain crops, forage, and animals (and the resultant effects on ingestion doses to humans), and all potential dose pathways including direct ingestion, inhalation, external ground exposure, and plume immersion. These analyses indicate that the potential impacts of normal operation of the pit conversion, immobilization, and MOX facilities on agricultural products, livestock, and human health at any of the sites would likely be minor. The analysis takes into account plutonium doses; bioaccumulation of radioactivity in grain crops, forage, and animals (and the resultant effects on ingestion doses to humans); and all potential dose pathways including direct ingestion, inhalation, external ground exposure, and plume immersion. Transience consideration would have a negligible effect on dose results. Although specific agricultural data were not identified for each candidate site in Chapter 3 of Volume I, the 1987 Census of Agriculture was used as the source to generate site-specific data for food production in Appendix J for each of the candidate sites.

Section 3.4.7.2.1 states that Pantex is in the Panhandle Groundwater District 3, which has the authority to require permits and limit the quantity of water withdrawn. Impacts of releases of radioactivity from the proposed facilities at each candidate site on the food production chain are discussed in Appendix K. Section 4.26 and Appendix J were revised to discuss potential impacts of radioactive emissions on agriculture and water resources.

The remainder of this comment is addressed in response MD188–23.

MD188–26 **Air Quality and Noise**

DOE acknowledges the comment.

*Appendix F, Impact Assessment Methods, and Appendix G, Air Quality--

- Does not include information for any site concerning:
  - agricultural production practices
  - accidental releases--explosion, fires, spills, etc.
  - dispersion modeling
  - areas affected
  - redistribution of particulates from Pantex by water or wind erosion. 27

*Appendix I, Socioeconomics

- Does not include discussion concerning agricultural production, land use, or rural residents including whether or not they could be affected. 25

*Appendix J, Human Health Risks--

- The agricultural data mentioned (from the 1987 Census of Agriculture) but not shown should be presented for all four sites. This information should be presented in a separate Appendix.
  - Other agricultural data sources or more recent vintage than the Census of Agriculture are readily available as well, from entities such as the State Crop and Livestock Statistical Services, the Cooperative Extension Services (e.g. Texas Agricultural Extension Service), the USDA-Farm Services Agency, etc..
  - Analysis does not appear to take into account Pu doses, transience, or effects on field grain crops, forages, or animals, nor contamination pathways other than direct ingestion. 28

The opportunity to review and comment on the SPD EIS document is appreciated. I hope these remarks are useful in strengthening the document and provide the basis for continuing development of greater scientific information regarding the environmental quality for Pantex and other sites in other locations also.

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MD188–27 **Air Quality and Noise**

There are no changes in agricultural production practices associated with any of the alternatives. The remainder of this comment is addressed in responses MD188–23 and MD188–25.

The accident analyses in this SPD EIS are considered to be bounding and address a representative spectrum of possible operational accidents. No major chemical accidents were identified. As discussed in Appendix K.1.1, additional documentation on hazards and accidents would be developed for each facility during the design and construction process.

Appendixes F, G, J, and K describe the methods used to model air-quality-related impacts, provide the emission rates for each facility and alternative, discuss the areas affected, and the treatment of particle deposition. Because the radiological analysis is concerned with the MEI, the initial deposition of radionuclides and its effect on this individual are analyzed. Appendix J was revised to include expected radiological release quantities from each of the proposed surplus plutonium disposition facilities.

The remainder of this comment is addressed in response MD188–25.

MD188–28 **Human Health Risk**

Detailed agricultural data for each of the candidate sites are presented in the *Health Risk Data for Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement* (HNUS, October 1996). That data report supports this SPD EIS as well as the *Storage and Disposition PEIS*. A separate appendix is not needed to repeat these data verbatim; the data report is available in DOE public reading rooms. The agricultural data in this EIS are used to estimate the doses to the population in 2010. For these projected doses, DOE considers the data from the 1987 Census of Agriculture to be representative of the areas evaluated. These agricultural data are also consistent with those used for dose assessments in the *Storage and Disposition PEIS*.

The remainder of this comment is addressed in response MD188–25.

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COMMENTS ON COSTS ANALYSIS

The cost analysis is really a summary, so it is very difficult to determine how the numbers were developed.

On p 3-3, the comment is made that the cost to transport the plutonium from Pantex can vary from $10M to $15 M. At the top of p. 3-4 the statement is made that there would also be an additional cost of $69M for repackaging if the PD&CF is not located at Pantex, and this cost is charged to the other facilities. Yet, the operating costs that are estimated for Pantex are among the highest of any of the facilities. Why?

On p 3-8, the design and construction costs of the MOX FFF at Pantex are estimated to be: Design and construction - $510M; Operating Cost -$610M; Total Cost - $1,200M. This mistake is repeated throughout the report. These are figures that should be re-analyzed. 29

In our work with the S&S teams, they emphasized that the most vulnerable link in the disposition system was probably the SST transportation, and that exposing weapons-grade Pu to transportation rather than material that has already been transformed into a substance less attractive as a target for theft and terrorists would be highly desirable. How was that incorporated into the report?

The report does not allow for a more detailed analysis; however, these observations were made even based on this document.

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MD188–29 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

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RUSSIAN ASPECTS OF THE SPDEIS AND THE SITING OF THE PDCF

Timeliness is the key issue. It has been more than 4 years since the NAS declared the surplus plutonium a "clear and present danger." The United States needs to move quickly to maintain forward movement in Russia. Financing is not the only issue in Russia; they will not disposition unless the U.S. does so as well.

The United States should push for the earliest possible demilitarization of pits. I suggest putting U.S./Russian material under IAEA safeguards, thereby creating "political irreversibility." By doing this, it would show the world that we are serious about NPT commitments. Finally, we should separate demilitarization from the disposition technologies which are likely to experience significant delays due to political issues. Placing the PDCF at Pantex provides the quickest route toward demilitarization. 30

The U.S. would not look favorably on Russians shipping pits unnecessarily; therefore, we should practice what we preach. There is no reason to ship pits from Pantex to SRS when the pits are already housed at Pantex. It just makes sense to site the PDCF at Pantex.

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MD188–30 **Alternatives**

The United States will continue to work with Russia according to agreed-upon paths and timing for surplus plutonium disposition.

Potential transportation impacts of pit disassembly and conversion at Pantex are summarized in Chapter 4 of Volume I and Appendix L. Under any of the proposed alternatives, the risks to the public from the transportation of these materials are small as shown in Table L–6.

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A key element in the surplus plutonium disposition mission will be provisions to allow for either bilateral inspections or multilateral inspection of excess weapons material. These functions contribute to important U.S. policy issues on transparency and openness relating to the disposition of surplus weapons materials both in the United States and the Russian Federation. Bilateral inspection with Russia will be important to develop a mutual level of confidence with the Russians for the entire disposition effort. Such bilateral inspection agreements will also provide confirmation to the U.S. through our inspection of Russian facilities that their efforts are proceeding accordingly. Likewise, potential multilateral inspection under the auspices of the International Atomic Energy Agency in Vienna, Austria, will give assurances to the global community of U.S. leadership in this key endeavor.

While the inspection function will be an ancillary enterprise, it also will have some environmental impact. Accommodations must be made for the facilities, equipment and individuals performing this role. These requirements can presumably be handled in a straightforward way with minimal environmental disruption.

In terms of the inspection function and its relation to the Pit Disassembly and Conversion Facility (PDCF), the input material to the PDCF will be in forms which are classified. However, the output material will be either converted to a metal "hockey puck" or plutonium oxide powder. Subsequent storage of this material will not be of a classified nature and will be subject to international inspection. It is noted that by locating the PDC Facility at the Pantex Plant, the necessary Perimeter Inspection, Detection and Alarm System (PIDAS) is in place to guarantee the security of weapons grade material. Reconfiguration of the existing areas at Pantex could be done in a straightforward way to allow for the inspection requirements while assuring that classified information and material is not compromised. 31

A second aspect of the inspection requirements is also worth noting. As mentioned above, it is the material produced by the PDCF which will be subject to inspection. This precludes the possibility, which has been suggested elsewhere, that a fully integrated facility might be used which will have weapons pits as the input and MOX fuel as the output. Such a facility would not allow for the inspection of the product of the pit disassembly and conversion steps. If it were to be proposed at a Russian installation, presumably such a fully integrated approach with restrictions for the inspection of unclassified material would not be acceptable to the United States. We would want to be able to assure that the MOX fuel coming out was the result of the pits going in. As a result, separation of the pit conversion function from the MOX fuel fabrication will be necessary.

The Pantex Plant provides the opportunity for a facility for pit disassembly and conversion which meets, in a straightforward way, the requirements for key bilateral and multilateral inspection while minimizing the number of steps for the handling of sensitive weapons components. The selection of Pantex for the PDC Facility should assure expediency in carrying out U.S. and international nonproliferation goals. Bilateral and IAEA requirements could be more easily facilitated at Pantex thereby implementing pit disassembly and conversion more quickly, entering into an agreement to reach this same result with the Russians, and achieving the critical goal of timeliness which is a key factor in the surplus plutonium disposition mission.

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MD188–31 **Nonproliferation**

DOE acknowledges the commentor's support for Pantex, and appreciates the input on existing capabilities at the site. Further, DOE agrees that bilateral monitoring with Russia of the classified plutonium material and international inspection of the unclassified material would give assurances to the global community of U.S. leadership in plutonium disposition. Once the United States and Russia complete an agreement providing the basis for exchanging classified nuclear information, the procedures to be used for inspection of pits in storage could potentially be adapted to contribute to bilateral monitoring of the pit conversion facility. International monitoring and inspection of the unclassified plutonium would also allow the United States and Russia to demonstrate to each other and to the international community that disposition was being carried out under stringent nonproliferation controls, and that the excess plutonium was not being diverted for reuse in weapons.

Accommodation for international inspection of the unclassified material was incorporated in the design of the pit conversion facility, as shown in Figure 2–7. The MOX facility would be a separate function and would only process unclassified materials; accommodation for international inspection was incorporated in the design of that facility, as shown in Figure 2–14.

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Because of the public's concern about environment, safety, and health issues associated with Pantex, the Center was asked by the Governor's office to perform an independent safety and health analysis of the plutonium conversion mission and mixed oxide fuel fabrication mission at Pantex. The Center's technical team included:

- Dr. Ian Hamilton, Texas A&M University, certified health physicist
- Dr. Randy Charbeneau, University of Texas, professional environmental engineer
- Dr. John Sweeten, agricultural professional engineer, Resident Director of the Agricultural Research and Extension Center
- Dr. Bobby Stewart, West Texas A&M University, agricultural scientist
- Dr. Nolan Clark, agricultural professional engineer, Director of the USDA Agricultural Research Service, Bushland Texas
- Dr. Jim Rock, Texas A&M, certified industrial hygienist
- Dr. Paul Vaughn, Texas Tech University, agricultural communications specialist

The results of that independent study were provided to elected officials, Texas regulators, and citizens of Amarillo in November of 1997. The study was conducted by the team named above. The study concluded that the risks associated with the new missions are comparable to the risk of current operations at Pantex and there are no impacts on water resources, water quality, soil or air resources.

We were also asked by the Governor's office to have the university principal investigators review the draft Surplus Plutonium Disposition Environmental Impact Statement. As in the risk characterization effort presented in November, the researchers find that there are no significant environmental or safety impacts associated with the pit disassembly conversion or MOX mission coming to Pantex. These results are presented in the following pages.

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COMPARISON OF RISK CHARACTERIZATION AND SPD EIS

Main points brought out at the Amarillo Public Meetings (August 11, 1998):

- There are no adverse environmental impacts associated with conversion and hence no environmental discriminators between Pantex and SRS (EIS uses the word "modest differences")
  - We will use the expertise and results from the Risk Characterization to validate DOE's EIS that there are no significant environmental impacts of PDCF at Pantex
- There is no real cost difference between SRS and Pantex for conversion.
- There is definitely a timeliness, radiological dose and transportation issue if it is decided to move all missions to SRS.

1. ANNUAL WATER USAGE

	RISK CHARACTERIZATION (millions of gal./yr.)	EIS (millions of gal./yr.)
Carson County Water Usage	37,000	33,200
Current Pantex Operations	220 (0.6%) (1994)	163 (0.5%) (1995)
Pit Conversion (ARIES)	12.7 (0.03%)	12.7 (0.04%)

Risk Characterization p. 3 (slides)
EIS Table 4-225 on p. 4-330 & p. 3-113

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SUMMARY OF WATER

- **RISK CHARACTERIZATION RESULTS ARE COMPARABLE TO EIS**
- **OPERATIONALLY, THERE WILL BE NO IMPACT ON WATER RESOURCES**

2. WASTE

RISK CHARACTERIZATION			EIS	
WASTE TYPE	ANNUAL VOLUME (m^3)	ANTICIPATED TREATMENT AND/OR DISPOSAL METHOD (e.g. solidification)	ESTIMATED ADDITIONAL WASTE GENERATED (m^3/yr)	TREATMENT AND/OR DISPOSAL METHOD
TRU	17	Evaporate and/or solidify spent electrolytic decontamination and HEU processing solutions on-site. Disposal of all TRU waste by shipment to WIPP	18	TRU wastes would be treated, packaged, and certified to WIPP waste acceptance criteria. Liquid TRU wastes would be evaporated or solidified before packaging for storage.
Mixed TRU	1	Disposal of mixed TRU waste by shipment to WIPP	included in TRU	included in TRU
LLW	60.36	Solidify spent electrolytic decontamination and HEU processing solutions on-site; solidify/absorb small quantities of analytical lab waste on site. Off-site disposal	60	LLW would be packaged, certified, and accumulated at the new facilities before being transferred for treatment and interim storage at existing onsite facilities. Liquid LLW would be evaporated or solidified before being packaged for storage.
Mixed LLW	1.2	Solidify/absorb small quantities of analytical lab waste on-site. Off-site treatment and disposal.	1	Mixed LLW would be stabilized, packaged, and stored on the site for treatment and disposal in a manner consistent with the site treatment plan for Pantex
Hazardous	84	Off-site commercial treatment and/or disposal.	2	Hazardous wastes would be packaged for treatment and disposal at offsite permitted commercial facilities.
Nonhazardous Liquid Solid	34,000 570	On-site treatment of sanitary waste. Off-site commercial recycling and/or disposal and follow current practices on disposal of solid wastes.	25,000 1,800	Nonhazardous solid waste would be packaged in conformance with standard industrial practice and shipped to onsite and offsite disposal and recycling facilities. Nonhazardous wastewater would be treated before being discharged to the Pantex wastewater treatment system.

Risk Characterization Table 2.5 on p. 12 (paper) & p. 6 (slides)
EIS Table 4-62 on p. 4-84 & p. H-38 to H-40

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MD188–32 **Infrastructure**

DOE acknowledges the commentor's conclusion that operationally there would be no impact on water resources at Pantex.

MD188–33 **Waste Management**

DOE acknowledges the commentor's conclusion on waste management at Pantex.

SUMMARY OF WASTE

- RISK CHARACTERIZATION RESULTS ARE COMPARABLE TO EIS
- ALL WASTES GENERATED FROM THESE PROCESSES CAN BE MANAGED WITH NO ADVERSE EFFECTS
- WASTES FROM THESE PROCESSES WILL BE MINIMAL
- THE SMALL AMOUNT OF LIQUID WASTES WILL BE SOLIDIFIED FOR DISPOSAL
- WASTES WILL BE SHIPPED OFF-SITE FOR FINAL DISPOSAL
- IT IS ASSUMED THAT TRU WASTE WOULD BE STORED ON THE SITE UNTIL 2016, BECAUSE CURRENT SCHEDULES FOR SHIPMENT OF TRU WASTE TO WIPP FROM SURPLUS PLUTONIUM DISPOSITION FACILITIES WILL BEGIN IN 2016 (EIS P. 4-83)

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3. BACKGROUND FOR ROUTINE RELEASES TO PROVIDE RELATIVE IMPACT FOR AIR EMISSIONS AND ENVIRONMENTAL IMPACT FROM A HYPOTHETICAL ACCIDENTAL RELEASE

FOR THE AREA OF PANTEX AND AMARILLO

RISK CHARACTERIZATION		EIS	
SOURCE	DOSE (mrem/person)	SOURCE	DOSE (mrem/yr)
Annual Cosmic Ray Dose	33	Cosmic and External Terrestrial Radiation	93
Annual Natural Terrestrial Dose	28	Internal Terrestrial Radiation	39
Annual Natural Radon Exposure	200	Radon in homes (inhaled)	200
		Other Background Radiation*	65
Annual Total	261	Total	397

* Other Background Radiation includes diagnostic x rays and nuclear medicine, weapons test fallout, air travel, and consumer and industrial products

Risk Characterization p. 10 (slides), EIS Table 3-32 on p. 3-103

4. AIR EMISSIONS

ROUTINE RELEASES

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	RISK CHARACTERIZATION		EIS
MATERIAL	ARIES ANNUAL EMISSIONS (gm)	ARIES EMISSION DOSE (mrem/yr)	INCIDENT FREE OPERATIONS ANNUAL DOSE (mrem)
Plutonium	1.4×10^{-5}	1×10^{-4}	
Tritium	.1	8×10^{-3}	6.2×10^{-2}

	RISK CHARACTERIZATION	EIS
METHODOLOGY	-used Pantex average annual meteorological conditions -chose worst-case downwind location (similar to EIS, MEI) -	-used Pantex average annual meteorological conditions (7 m height) - Most Effected Individual (MEI)-

Risk Characterization p. 9, 10 (slides), EIS Table J-27 on p. J-24 & p. J-21

IMPACT OF ROUTINE RELEASES

- RISK CHARACTERIZATION RESULTS ARE COMPARABLE TO EIS
- ANY ROUTINE RELEASES WOULD BE ARE 5000 TIMES LOWER THAN BACKGROUND (22% VARIATION IS NOTHING)
- OPERATIONALLY, THERE WILL BE NO IMPACT ON AIR RESOURCES
- OPERATIONALLY, THERE WILL BE NO IMPACT ON SOIL
- OPERATIONALLY, THERE WILL BE NO IMPACT ON WATER QUALITY

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MD188–34 **Human Health Risk**

DOE acknowledges the commentor's conclusion that air emissions would not affect the air, soil, or water quality at Pantex.

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5. ENVIRONMENTAL IMPACT FROM A HYPOTHETICAL ACCIDENTAL RELEASE

	RISK CHARACTERIZATION	EIS
SCENARIO	DOSE (mrem/yr)	DOSE
Acute ingestion of plutonium from surface water	.7	N/A
Acute ingestion of plutonium from groundwater	.4	N/A

	RISK CHARACTERIZATION	EIS
METHODOLOGY	-used worst-cast meteorological conditions to predict amount of material deposited on area of interest used maximum credible amount of material released (100 gm)	used maximum material released (39 gm)
Surface Water Case	-assumed completely mixed with no settling -assumed no water treatment -assumed no blending with ground water	N/A
Groundwater Case	-assumed all particulates are washed into the playa -assumed water is consumed from a well drawing water from the Perched Aquifer directly below the playa	N/A

Risk Characterization p. 22 (slides), EIS Table K-12 on p. K-38

SUMMARY

- **RISK CHARACTERIZATION EXAMPLE WAS PURELY BOUNDING CALCULATION AND NOT TYPICALLY PERFORMED IN THE NEPA PROCESS**
- **THE EIS SOURCE IS SMALLER THAN THE RISK CHARACTERIZATION SOURCE**
- **THEREFORE WE WOULD EXPECT EVEN LOWER DOSES**

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6. IMPACTS ON AGRICULTURE OF A HYPOTHETICAL ACCIDENTAL RELEASE

	RISK CHARACTERIZATION	EIS
PATHWAY	ACRES AFFECTED	
Inhalation of resuspended material	110	N/A (see note)
Ingestion - deposition on fresh fruit	130	N/A
Ingestion - deposition on fresh vegetables	130	N/A
Ingestion - deposition on grain	80	N/A
Ingestion - milk deposition on forage	2	N/A
Ingestion - meat deposition on forage	2	N/A

	RISK CHARACTERIZATION	EIS
METHODOLOGY	-used maximum credible amount of material released (100 gm) -determined acres of land affected to measure agricultural consequence -used adverse meteorological conditions to compute affected areas -determined ways that material could enter a person's body (inhalation of dust, ingestion of food, etc.) -identified number of acres where corrective action would be required to reduce public dose below acceptable levels (Protective Action Guidelines limits)	-used maximum material released (39 gm)

Risk Characterization p. 23 (slides), EIS Table K-12 on p. K-38

SUMMARY

- **RISK CHARACTERIZATION WAS PURELY BOUNDING CALCULATIONS AND NOT TYPICALLY PERFORMED IN EIS**
- **THE EIS SOURCE IS SMALLER THAN THE RISK CHARACTERIZATION SOURCE**
- **HENCE THE AFFECTED AREA FROM A HYPOTEHTICAL ACCIDENT RESULTING IN POTENTIAL RELEASE WOULD BE SMALLER**
  - **NOTE: EIS, P K-8 PATHWAYS TO GROUND AND SURFACE WATER INCLUDING RESUSPENSION AND INHALATION OF PLUTONIUM AND INGESTIONS OF CONTAMINATED CROPS WERE STUDIED AND FOUND NOT TO CONTRIBUTE AS SIGNIFICANTLY AS DOSE TO INHALATION**

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MD188–35 **Human Health Risk**

DOE acknowledges the commentor's conclusion that doses that would be expected from an accident at Pantex are even lower than those presented in this SPD EIS.

MD188–36 **Human Health Risk**

DOE acknowledges the commentor's conclusion that the affected area from an accident analyzed in this SPD EIS would be smaller than that presented in the commentor's impact analysis because he was using a higher source term.

7. POTENTIAL IMPACTS DUE TO HYPOTHETICAL ACCIDENTS

RISK CHARACTERIZATION				EIS			
ACCIDENT	PROBABILITY (yr^{-1})	MATERIAL RELEASED (g)	POTENTIAL CANCERS PER YEAR OF FACILITY OPERATION[a]	ACCIDENT	FREQUENCY[b] (per year)	SOURCE TERM (g)	LATENT CANCER FATALITIES PER YEAR[c] WITHIN 80 km
Dock Fire	5.0×10^{-4}	9	1.8×10^{-5}				
Criticality	1.6×10^{-4}		3.8×10^{-10}	Criticality	Extremely unlikely 10^{-4} to 10^{-6}	1.0×10^{19} Fissions	1.4×10^{-9}
Deflagration	1.0×10^{-4}	4.8×10^{-4}	3.9×10^{-11}	Explosion	Unlikely 10^{-2} to 10^{-4}	3.2×10^{-5}	2.4×10^{-8}
Cell Fire	1.0×10^{-4}	9.8×10^{-4}	1.9×10^{-12}	Fire	Unlikely 10^{-2} to 10^{-4}	1.2×10^{-5}	9.1×10^{-11}
Oxy. Explosion	5.0×10^{-8}	65	1.3×10^{-3}	N/A	N/A	N/A	N/A
Spill	4.5×10^{-3}	8.8×10^{-7}	1.6×10^{-13}	Leaks/spills of nuclear material	Extremely unlikely 10^{-4} to 10^{-6}	4.4×10^{-6}	3.3×10^{-12}
Max. Earthquake	1.5×10^{-5}	100	6.0×10^{-6}	Beyond-design-basis[d] earthquake	Extremely unlikely to beyond extremely unlikely 10^{-4} to 10^{-6} to less than 10^{-6}	3.9×10^{1}	3.2×10^{-6}
Truck Fire	3.2×10^{-5}	30	3.8×10^{-7}	N/A	N/A	N/A	N/A
NOT CREDIBLE							
Max. Cell Fire	2.0×10^{-7}	N/A	N/A	Beyond-design-basis fire	Beyond extremely unlikely less than 10^{-6}	1.7×10^{-2}	1.4×10^{-10}
A/C into Oxide Storage Facility	8.0×10^{-5}	N/A	N/A				
A/C into DCF	4.7×10^{-5}	N/A	N/A	Aircraft crash	Beyond extremely unlikely less than 10^{-6}	2.2×10^{1}	1.8×10^{-7}

Risk Characterization p. 13, p. 14, p. 16 (slides), EIS Table K-12 on p. K-38

[a] The societal risk in potential cancers per year of facility operation is the probability of occurrence of the event that leads to a health effect (in units of yr^{-1}) multiplied by the health effect consequence per event (e.g., fatal cancers per accident event) (Risk Characterization p. 11 of Preliminary)
[b] The frequency listed for each accident category represents the estimated overall annual probability of occurrence for that type of accident. (EIS p. 4-40)
[c] Risk is usually defined as the product of the consequences (in terms of dose e.g., person-rem or health effects e.g., latent cancer fatalities) and estimated frequency of a given accident (per year). (EIS p. K-1)
[d] Design basis for Performance Category 3 plutonium facility - designed to withstand the 1/10,000 year earthquake with the performance goal that occupant safety, continued operations, and hazard confinement being assured.
[e] Beyond design basis - partial or total collapse of structure, spills, possibles fires, and loss of confinement of plutonium powder (p K-5)

CURRENT PANTEX OPERATIONS

ACCIDENT TYPE	POTENTIAL CANCERS PER YEAR OF FACILITY OPERATION
HE Initiated Pu Dispersal - Nat. Event	7.2×10^{-4}
HE Initiated Pu Dispersal - Int. Event	6.3×10^{-6}
Fire Driven Pu Release - Nat. Event	2.9×10^{-2}
Pu Release - A/C or Seismic	6.8×10^{-4}
Pit Breach - Int. Event	1.5×10^{-9}

Risk Characterization p. 17 (slides)

RISK SUMMARY

OUR RESEARCH SHOWS THAT THE POTENTIAL SOCIETAL RISKS ASSOCIATED WITH THE PROPOSED NEW MISSIONS WILL BE COMPARABLE TO THAT FROM CURRENT ACTIVITIES.

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MD188–37 **Facility Accidents**

DOE acknowledges the commentor's conclusion that the societal risks posed by the proposed plutonium disposition facilities would be comparable to those associated with Pantex's current activities.

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The total amount of space that would be required for storage of TRU waste resulting from operations of the planned facility at Pantex is around 2800ft^2, or an area that is equivalent to a modest size residential home. According to the DOE, this required space would be added onto the conversion facility and would constitute only 1.5% of the total space required for the planned facility. The total amount of space required to store LLW before shipment is about 0.25 acres, or 8% of the planned Hazardous Waste Treatment and Processing Facility. I am assuming that the DOE plans on constructing this WM facility are unrelated to the sitting decision (Reference to the WMPEIS). By my interpretation as an engineer, I do not believe that the facilities required to store this waste before shipment is significant compared to the overall magnitude of the project. By DOE's admission within the Surplus Plutonium Disposition Draft EIS, they do not believe that the waste generated from this facility is significant, or in DOE's own words "..impacts of the management of TRU waste at Pantex should not be major," and "Impacts of the storage of additional quantities of LLW at Pantex should not be major." Therefore, one can conclude that the required waste management should not be used as a discriminator in the sitting of a conversion facility. 38

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MD188–38 **Waste Management**

DOE agrees that impacts from the management of waste generated by surplus plutonium disposition activities would not be major, although costs may be higher at Pantex than at some of the other DOE sites due to the lack of an existing TRU waste management infrastructure. The construction of the Hazardous Waste Treatment and Processing Facility is independent of the decision on the siting of facilities for surplus plutonium disposition.

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DOE gives 3 reasons for selecting SRS for MOX:

- Activity complements existing missions.
- Takes advantage of existing infrastructure.
  - "Pantex does not offer a comparable infrastructure, including waste treatment."
- Staff expertise.

No supporting information is given to support conclusion #1. What existing missions are complemented? None seem obvious. There is no ongoing dry plutonium processing at SRS. 39

No supporting information is given to support conclusion #3:

- Has SRS ever done MOX fuel fabrication?
- Has SRS ever fabricated standard ceramic reactor fuel?
- Is SRS currently fabricating any reactor fuel?
- Is SRS doing any dry Pu processing?
- What expertise are we talking about?

If we examine #2 more closely, we find out that the Pantex site does not require any additional construction over SRS for the MOX facility (this can be determined by looking at the wastes produced during construction and the employment required during construction which are identical for MOX for SRS and Pantex), so what infrastructure is being taken advantage of that isn't at Pantex? Also, the document repeatedly states that the wastes should "not have a major impact" at Pantex, so what waste treatment facilities are Pantex lacking? In fact, in the section on cumulative results at SRS (summary page S-36), the "cumulative waste volume for hazardous waste exceeds the treatment and storage capacity" and the "treatment capacity for LLW could be exceeded." Also, projected water requirements will exceed current site capacity if APT is built. So if anything, SRS should be at a disadvantage. Also, no analysis was done on the environmental effects of expanding the water capacity. 40

If conversion is not done at Pantex, all the pits will have to be repackaged in AT400 (or some other approved transportation container) and shipped to SRS. This will not have to be done if the facilities are located Pantex. The EIS estimates a 40% dose reduction to Pantex workers due to this. Were ALARA considerations evaluated as part of the decision process? 41

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MD188–39 **Alternatives**

Complementary missions that are ongoing at SRS include plutonium storage, nuclear materials stabilization, waste management, and research and development.

Existing infrastructure includes DWPF; waste management facilities such as the TRU waste certification facility, Consolidated Incineration Facility, and LLW disposal facilities; and safeguards and security systems. DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S) on the operation of DWPF and associated ITP alternatives is being prepared. Although the SRS staff may not have training in dry plutonium processing, they are trained in plutonium processing. In addition, reactor fuel fabrication was conducted in M-Area at SRS in support of production reactor operation, which ceased in 1992.

MD188–40 **Waste Management**

There would be advantages to siting the proposed surplus plutonium disposition facilities at sites with active plutonium facilities, or to collocating two or more surplus plutonium disposition program facilities at a site. As described in Section 2.3.1, some infrastructure such as that associated with safeguards and security could be shared. Although DOE recognizes that some savings could be realized by collocating facilities, this SPD EIS includes a conservative analysis that generally does not account for these advantages. Section S.6 of the *Summary* states that because TRU waste is

not routinely generated and stored at Pantex, TRU waste storage space would be designated within the proposed surplus plutonium disposition facilities. Storage within the proposed facilities would only be required at Pantex because the other DOE sites have existing onsite TRU waste storage facilities. Section S.7 of the *Summary* states that although the cumulative volume of hazardous waste would exceed the treatment and storage capacity at SRS, major impacts on the waste management infrastructure would be unlikely because hazardous waste is generally not held in long-term storage, but rather is treated and disposed of at both onsite and offsite facilities. This section also states that although treatment capacity for LLW could be exceeded at SRS, major impacts would be unlikely because most LLW could be disposed of without treatment. The source of water for the accelerator, if built, would have been the Savannah River and it would not have affected the ability of the site to supply water to the proposed plutonium disposition facilities. The cumulative impacts section, Section 4.32, has been changed accordingly. The tritium production ROD that was issued in May 1999 chose the commercial light water reactors for tritium production.

MD188–41 **Transportation**

ALARA considerations were used by the engineering, technical, and safety and health personnel who prepared the source information upon which the environmental impacts in this SPD EIS were determined. ALARA considerations would continue to be applied during the detailed design, construction, operation, and eventual D&D of the proposed surplus plutonium disposition facilities. DOE acknowledges that any decision to locate the pit conversion facility at a site other than Pantex would result in additional repackaging for shipment, and thus, increased dose to workers at Pantex. Section 2.18 and Appendix L.5.1 were revised to discuss repackaging the pits.

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THE SPD EIS TREATMENT OF PROLIFERATION CONCERNS DUE TO TRANSPORTATION

- It appears that the majority of the shipments that involve significant volumes of material, and significant proliferation concern (as defined by an indication, in Table S-3 on p. S-20, to use SSTs) would occur as follows:
  - Campaign 1: 17 metric tons (t) of surplus nonpit Pu, from various DOE sites to the conversion immobilization facility.
  - Campaign 2: 33 t of surplus pits and clean metal from Pantex to the pit disassembly/conversion facility.[3]
  - Campaign 3: 33 t of weapons-grade Pu, in the form of PuO_2, from the pit disassembly/conversion facility to the immobilization or MOX facilities.
  - Campaign 4: 33 t of weapons-grade Pu, in MOX fuel bundles, from the MOX facility to a domestic commercial nuclear reactor.
- The second of the "equally weighted screening criteria" (p. S-13) "used to reduce the large number of possible facility and site combinations to the range of reasonable alternatives" (p. S-13) is entitled "proliferation concerns due to transportation of materials." It is applied in such a way that any alternative that involves all of campaigns 2, 3 and 4 is eliminated from further consideration. But NEPA requires that "all reasonable alternatives be considered." Therefore, in effect the application of this criterion puts the DOE on record as believing that *proliferation concerns associated with transportation of these materials are so great that a reduction of 33 t in the total amount of weapons-grade Pu to be shipped is sufficient to deem an otherwise reasonable alternative as unreasonable.* 42
- But there are alternatives that would provide an even further reduction in the amount to be shipped:
  - If all three facilities were located at Pantex, then only Campaign 1 (17 t) would be necessary. This is a 33 t reduction from the 50 t otherwise required under any other immobilization only option.
  - If a hybrid option were deemed essential for other reasons (e.g., achieving an agreement with the Russians), then collocating the pit conversion and MOX facilities at Pantex would require only Campaigns 1 and 4, which is a 33 t reduction in the amount to be shipped under any other hybrid option.

[3] This assumes all surplus pits and clean metal selected for disposition already are stored at Pantex. On p. S-4 it is stipulated that "most of the surplus pits are currently located there" (i.e., at Pantex).

MD188–42 **Transportation**

DOE acknowledges the commentor's preference for Alternatives 9 or 10, which involve collocating pit conversion and MOX facilities at Pantex. The location of the immobilization facility was considered in the *Storage and Disposition PEIS*, and the ROD states DOE's strategy to immobilize at either Hanford or SRS. Therefore, this SPD EIS does not analyze immobilization at Pantex. Table L–6 shows the total transportation risks for all alternatives, including Alternatives 9 and 10. The transportation impacts for the preferred alternative, Alternative 3, are similar to Alternatives 9 and 10.

- **Summary: If proliferation concerns associated with shipment of these materials is so great that a reduction of 33 t in the amount to be shipped is sufficient to cause an otherwise reasonable alternative to be deemed unreasonable, then why is there no record that those alternatives leading to similar further reductions were given commensurate credit?**
- The following bar charts are an effort to present this graphically. DOE deems the shipping reductions in going from the left bars to the middle bars as sufficient to make alternatives requiring the maximum shipment unreasonable, on the basis of the associated proliferation risk. But there is no evidence I can find that they value the equivalent further reduction in going from the middle to the right bars - which just happen to favor Pantex - as worth a tinkers damn.

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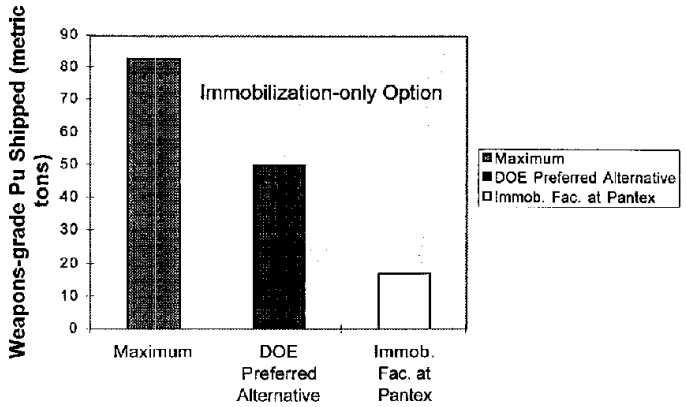

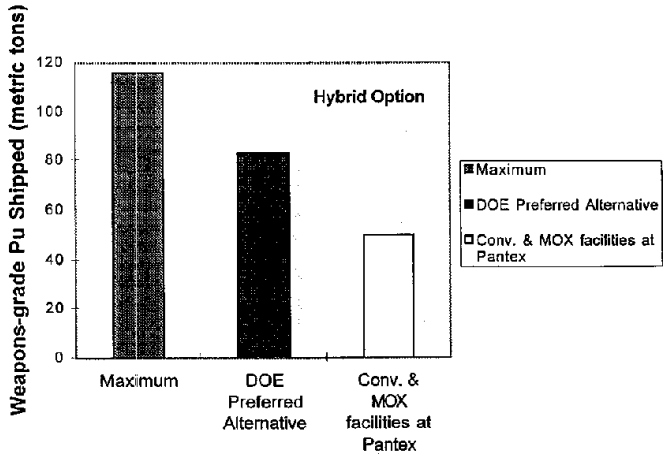

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Surplus Plutonium Disposition
Draft Environmental Impact Statement
Comments

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Processing and handling of unincorporated weapons-grade plutonium represents a clear departure from the historical radiological assembly/disassembly operations conducted at Pantex Plant. Given the restrictions of law and existing regulations, the Texas Department of Health has actively maintained limited surveillance of the Pantex Plant boundary and at readily accessible pre-selected monitoring points on site. Although by no means considered to be optimum, and given the nature of operations involving only handling of pre-fabricated radioactive components, this surveillance was considered to be the best achievable under the circumstances. To date, no significant off-site radiological degradation of the environment has been detected.

Any change in the nature of the mission or operations at the Pantex Plant must be undertaken with utmost sensitivity to needs of the neighboring community in addition to maximum attention to full compliance with published standards for protection against radiation. Texans must be assured the public health, the public safety, and the surrounding environment will be adequately protected.

While full Nuclear Regulatory Commission licensing of the Mixed-Oxide Fuel Fabrication Facility should be aggressively pursued, external regulatory oversight of the Plutonium Pit Conversion Process is not possible under existing law, nor is legislation to empower external regulation of Department of Energy Special Nuclear Materials operations likely to occur in the foreseeable future. There is, however, a discrete step in the pit conversion process, when Special Nuclear Material is removed from the pit shell and changed from its classified shape, that the Department of Energy should explore as a candidate for external oversight. This step in the process roughly coincides with the point of potential workplace and environmental radiological contaminant generation. The succeeding steps in the process should not by nature be precluded from external review. Cooperative activities undertaken by the Department of Energy over the past decade serve to indicate that independent external oversight can occur within national security constraints. The activities of the Defense Nuclear Facility Safety Board, Environmental Protection Agency, Occupational Safety and Health Administration, and of states hosting Department of Energy Facilities have produced some measure of compliance with accepted industry practice and published regulatory standards. Independent external oversight is clearly feasible, and would be in the best interest of the Department of Energy, the State of Texas, and the Nation.Should the Department of Energy decide to site the Mixed Oxide Fuel fabrication facility, the Pit Disassembly and Conversion Facility, or both facilities at Pantex Plant, active state participation in the review of facility

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MD188–43 **DOE Policy**

DOE acknowledges the commentor's environmental and health-related concerns. This SPD EIS was prepared to provide a comprehensive description of proposed actions and alternatives and their potential environmental impacts. DOE believes that all activities that are part of the proposed action and alternatives are analyzed adequately in this EIS. Each of the proposed surplus plutonium disposition facilities would be subject to some form of independent oversight. The pit conversion and immobilization facilities would likely be subject to review by DNFSB, and the MOX facility would be under the purview of NRC. As discussed in Section 2.4, it is likely that the United States would voluntarily offer to have the proposed facilities placed under international safeguards. However, the process of implementing international safeguards is not as yet fully defined. That process is part of ongoing sensitive negotiations between the United States and Russia.

As discussed in Chapter 5, DOE (or DCS) would have to obtain new or modified applicable State or Federal permits or licenses for construction and operation.

Based on the decisions made in the SPD EIS ROD, site emergency management programs would be modified to consider new accidents not in the current program. Similarly, as discussed in Appendix L.3.2, the Transportation Safeguards Division has established emergency plans and procedures that would be invoked whenever special nuclear materials are being shipped.

design would be imperative. Lessons learned from past Department of Energy activities at other locations should be applied to operations proposals. Best available technology should be utilized in the construction of the facility to ensure containment and control of potential radioactive contaminants. Subsequent state routine monitoring of process controls, such as task local exhaust ventilation, physical containment features and contaminant control procedures associated with the process would be necessary. Adequate resources would be required for the state to assemble and support a team of professionals dedicated to the routine surveillance of the new facilities.

An assessment of additional radiological impacts resulting from the proposed Pantex Plant expansion must receive priority consideration. The assessment would serve as the basis for further emergency planning efforts. Of particular interest would be issues relating to safe handling and transportation of the Special Nuclear Materials prior to processing, product resulting from processing and the wastes generated during the associated operations. Continued Department of Energy commitment to the upgrade of local emergency planning and response capabilities would be required. 43

Scrupulous management of Pantex Plant is crucial to the future of the Texas Panhandle, not only in postulated near term socioeconomic benefits, but also in fulfilling responsible stewardship of regional environmental resources. The decisions made in the Surplus Plutonium Disposition process must be made giving due consideration to the needs of the local citizens, the State of Texas as well as the Nation. Nurturing the existing positive relationship and further expanding the cooperative arrangements between the Department of Energy and the State of Texas to address these issues is in the best interest of all.

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United States Department of Energy Office of Fissile Materials Disposition

July 1998

Texas Natural Resource Conservation Commission Comments

Plutonium disposition includes three (3) processes: pit conversion, immobilization, and MOX fuel fabrication. Four (4) candidate sites are considered for plutonium disposition in the EIS, including Hanford, INEEL, Pantex, and SRS. Pantex is the preferred site for pit conversion. SRS is the preferred site for immobilization and MOX fuel fabrication. The following comments are predicated on the assumption that immobilization and MOX fuel fabrication will indeed occur at a location other than Pantex, in accordance with the preferred alternatives outlined in Sections 1.6 and 2.4.2.1 of the EIS.

1. The volume of hazardous wastes is not included in Table 2-4, *Summary of Impacts of Construction and Operation of Surplus Plutonium Disposition Facilities by Alternative and Site*. 44

2. A typographic error occurs on page 3-110; TWRCC should be TNRCC. Another typographic error occurs in Section 3.4.7.2.1, page 3-114; Texas Development Board should be the Texas *Water* Development Board. 45

3. Drinking water should be examined as a possible route of exposure for radiological impacts. 46

4. We concur with DOE's appraisal that the Pantex Plant Federal Facility Compliance Act Compliance Plan/Agreed Order (FFCA) will have to be modified to accommodate the new TRU and LLW mixed waste streams. The Hazardous Waste Permit will also have to be modified to accommodate the new hazardous waste streams. Please clarify whether wastes generated during decontamination of the disposition facilities will be considered new waste streams. We assume that DOE will provide a detailed lists of waste components when the modifications are submitted to the TNRCC for approval. We recommend that DOE not commingle TRU and LLW wastes with their corresponding mixed waste streams. 47

5. The EIS states that the plutonium polishing process will either be attached to the plutonium conversion process or the MOX fuel fabrication process (Appendix N, page N-1). We prefer that DOE collocate the aqueous plutonium polishing process with the MOX fuel fabrication facilities. We understand that MOX fuel fabrication will occur at SRS, rather than at Pantex. 48

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MD188–44 **Waste Management**

Table 2-4 was revised to include hazardous waste volumes for each of the alternatives.

MD188–45 **General SPD EIS and NEPA Process**

DOE acknowledges and appreciates the feedback on typographical errors in the SPD Draft EIS. The errors cited have been corrected.

MD188–46 **Human Health Risk**

If the proposed surplus plutonium disposition facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways.

MD188–47 **Waste Management**

Neither the SPD Draft EIS nor this SPD EIS states that the Pantex FFCA Agreement Compliance Plan/Agreed Order would have to be modified to accommodate new TRU waste and mixed LLW. Although wastes would be managed in accordance with applicable laws, regulations, agreements, DOE orders, and permits, it is premature at this time to determine whether the FFCA Agreement Compliance Plan/Agreed Order would have to be modified.

D&D is discussed in Section 4.31. DOE will evaluate options for D&D or reuse of the proposed facilities at the end of the surplus plutonium disposition program. At that time, DOE will perform engineering evaluations, environmental studies, and further NEPA review to assess the consequences of different courses of action, including projected waste generation quantities.

DOE continues to work hard to minimize the generation of mixed wastes, and therefore will segregate the LLW and TRU waste from LLW and mixed TRU waste generated by the proposed facilities when feasible.

MD188–48 Plutonium Polishing and Aqueous Processing

DOE acknowledges the commentor's support for collocating the plutonium-polishing facility with the MOX facility at SRS. On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

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6. If would be helpful if the EIS consistently acknowledged that TRU waste also includes mixed (hazardous) TRU waste. The mixed TRU waste component is often referred to as a footnote (e.g., the tables in Chapter 4) or not acknowledged at all (e.g., Appendix N). In contrast, mixed LLW is consistently presented as a separate waste category. 49

7. Please specify what wastes will be generated during pit bisection process (Section 2.4.1.2) and how DOE anticipates these wastes will be managed, e.g., recycled, treated and stored, etc. 50

8. Shipping routes to Pantex and from Pantex to SRS should be incorporated into the EIS unless this is considered a security issue and random routes will be used. 51

9. The risk characterization states that the Advanced Recovery and Integrated Extraction System(ARIES) facility will be licensed by the Department of Energy(DOE) and overseen by the Defense Nuclear Facilities Safety Board(DNFSB). Define what is meant by "overseen". 52

8. Have considerations been made for ongoing radiologic public health surveillance and environmental assessments throughout the life of the project? 53

10. On page J-23, volume II of the SPD draft EIS, a calculational assumption was made stating that "ground surfaces, at Pantex, were assumed to have no previous deposition of radionuclides". Since data from ongoing projects at Pantex indicate that there has been previous deposition of radionuclides (e.g. survey data from Firing Site 5 residing in the Radioactive Material Licensing Section), please explain how that assumption was made. Will this have any effect on the modeling results for exposures to members of the public? 54

11. Page S-35 of the SPD EIS summary states that the number of latent cancer fatalities in the general population from Pantex site operations would be expected to increase from 5.5x10E-5 to 3x10E-3 if the proposed SPD facilities were located there. Clarify this large increase in the number of fatal cancers due to SPD facility operations. 55

12. There is no indication that the non-radioactive or hazardous air quality impacts will be significantly different from the current operation at Pantex. Hazardous air pollutant emissions from pit disassembly and conversion process and/or from mixed oxide fabrication process will be minimal. Sources of potential air quality impacts will include emissions from fuel- burning construction equipment, soil disturbance by construction equipment and other vehicles, the operation of a concrete batch plant, trucks moving materials and wastes, and employee vehicles. According to the EIS, air quality impacts during construction would be mitigated by applying, as appropriate, standard dust control practices such as watering or sweeping of roads and watering of exposed areas. This will control the potential increase in the PM10 emissions due to construction activities. 56

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MD188–49 **Waste Management**

Appendix H was revised to clarify that TRU waste includes mixed TRU waste.

MD188–50 **Waste Management**

Information on waste generated by specific pit disassembly and conversion processes is summarized in Appendix H and is available in detail in the supporting data reports, such as the *Pit Disassembly and Conversion Facility, Environmental Impact Statement Data Report—Hanford* (LA-UR-97-2907, June 1998). These supporting reports state that LLW and TRU waste would be generated by the pit bisection process. These wastes would be managed along with the other LLW and TRU waste as described in the Waste Management sections of Chapter 4 of Volume I and Appendix H. Supporting reports are available in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MD188–51 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD188–52 **DOE Policy**

In this SPD EIS, the ARIES facility is referred to as the pit conversion facility. It is not correct to state that the pit conversion facility would be licensed by DOE because DOE does not issue licenses. However, DOE would be responsible for the safe operation of this facility. Before the proposed facility could begin operations, a safety analysis report would have to be prepared and an operational readiness review would likely be conducted; this is similar to the NRC licensing process. DNFSB would then periodically review DOE operations and report to the U.S. Congress and the Secretary of Energy on the safety of these operations. In this way, DNFSB oversees DOE operations at nuclear facilities.

MD188–53 **DOE Policy**

Each year DOE prepares a separate environmental report for each site with significant environmental activities. Each report provides a comprehensive summary of the site's environmental program activities. The sites for which annual reports are prepared include all those evaluated in this SPD EIS. Included in each report are discussions of the site's radiological surveillance programs and the results of environmental assessments. These reports, which are distributed to relevant external regulatory agencies and other interested organizations or individuals, would continue to be prepared throughout the life of the surplus plutonium disposition program. In addition to these annual assessments, health effects studies would continue to be conducted to evaluate the health of the public in the vicinity of the sites, and of workers at the sites. These studies are discussed in Chapter 3 (Volume I) of this EIS and in Appendix M of the *Storage and Disposition PEIS*. It is anticipated that these health studies would also continue throughout the life of the program.

MD188–54 **Human Health Risk**

The calculations in this SPD EIS were performed to assess the doses from operating the proposed surplus plutonium disposition facilities. The presence on the ground of previously deposited radionuclides does not affect the doses specifically associated with operating the proposed facilities. Doses from existing ground contamination are included in the

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13. Since no increase in the hazardous air pollutant emissions are expected from the pit disassembly and conversion process and/or from mixed oxide fuel fabrication activity, none of the alternatives proposed for Pantex in the surplus plutonium disposition EIS would create a significant change in the non-radioactive air quality at Pantex. TNRCC would revisit the proposed impacts of facility operations and emissions and conduct a detailed technical review should DOE submit a permit application for a plutonium disposition facility.

14. In general, the predicted non-radiological air emissions at Pantex ,which are proposed in the PuEIS, are not expected to differ significantly from existing operations at the facility. However, there are several issues which need to be addressed in the Final PuEIS. The draft PuEIS provides predicted short-term(1-hour or 24-hour average) maximum concentrations for "Hazardous and Other Toxic Compounds." While concentrations are predicted to be less than the 1-hour Effects Screening Levels (ESLs), the predicted 24-hour concentration are estimated to exceed the 24-hour ESLs for benzene and hydrogen chloride. While these exceedances of short-term ESLs are not expected to result in adverse effects, information was not available regarding annual (long-term) predicted concentrations. While the short-term ESLs for benzene and hydrogen chloride were established to protect the general public from acute adverse effects, it is also necessary to evaluate the annual predicted impacts for these compounds. For compounds such as benzene, a known human carcinogen, it is important to evaluate predicted impacts with respect to long-term or annual exposures. For hydrogen chloride, the annual ESL was derived to prevent corrosion of protect. For compounds such as these and depending on the specific circumstances, the technical review may focus largely on long-term exposure. 56

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Pantex site doses reported in Section 3.4.4. The total doses from existing contamination and from operating the proposed facilities are reflected in the cumulative doses given in Section 4.32.

MD188–55 **Human Health Risk**

The increase in the number of LCFs from 10 years of operating the proposed surplus plutonium disposition facilities at Pantex is the difference in the two numbers cited by the commentor, i.e., 0.003 minus 0.000055, which equals about 0.00295. This amounts to an increase of about 1 chance in 340 of an LCF in the total population within 80 km (50 mi) from 10 years of operation.

MD188–56 **Air Quality and Noise**

For the purpose of this SPD EIS, toxic air pollutant concentrations were compared with the Texas effects screening levels which are based on short-term (1-hr) and long-term concentrations. The concentrations compared with the long-term effects screening levels in the SPD Draft EIS were 24-hr values. The concentrations compared with the long-term effects screening levels were changed to an annual average value, which is consistent with current TNRCC guidance. The exposure to benzene is analyzed in the Human Health Risk sections of Chapter 4 of Volume I for each of the hybrid alternatives (e.g., see Section 4.3.1.4). No emissions of hydrogen chloride to the atmosphere are expected from construction and operation of the pit conversion or MOX facility.

Surplus Plutonium Disposition
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Comments

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Review of Surplus Plutonium Disposition Draft Environmental Impact Statement

My review focused on the site description and on alternative 9A.

1. Section 3.4.2.6 Nonhazardous Waste
Page 3-96, paragraph 3, lines 3-4, "A *proposed* upgrade to the sanitary wastewater treatment system would ensure that effluent limitations are met."

The DEIS should address whether the proposed upgrade will in fact tack place, or the odds that it will not take place, the likelihood that effluent limitations will not be met if the upgrade does not take place or has a delayed schedule, and the impact on water quality if the *proposed* upgrade does not take place or has a delayed schedule. Table on page 4-219 implies that discharge will increase by about 10 percent; is this correct? Is the upgrade for ensuring compliance with existing discharge or with the 10 percent increase in discharge? Why is the upgrade needed if the wastewater treatment plant is only operating at 35 to 50 percent of capacity, and only expects an increase of 5 percent (page 4-221)? 57

The text should identify the number and frequency of occurrences when the discharge permits are exceeded under the present operations.

The pathway for contaminant migration through Playa 1 to the perched ground water has in the past been a critical one for ground water contamination at the site so the DEIS needs to thoroughly address implications such as the one raised in the preceding comment.

2. Section 3.4.6.1 General Site Description
Page 3-108, paragraph 3, lines 1-2, "The Ogallala Formation of Tertiary age consists of fluvial sands and gravels as well as eolian sands and silts."

The designation of the Ogallala as fluvial and eolian is a little simple and overlooks extensive geologic studies done in support of Pantex Plant operations (e.g., Gustavson, T. C., 1996, Bureau of Economic Geology Report of Investigations No. 239). Gustavson (1996) stated that the Ogallala includes basal fluvial facies and that paleovalley-fill facies of heterogeneous gravel and sand channel deposits and sand and clay overbank deposits are interbedded with eolian sediments. 58

3. Section 3.4.6.1 General Site Description
Page 3-110, paragraph 1 on playa hydrology
Text on lines 2-3 overlook the fact that the playas can be dry because infiltration rate exceeds water inflow rate and thus perpetuates the myth that playa basins are evaporation ponds. 59

4. Section 3.4.6.1 General Site Description
Page 3-110, paragraph 2 on Playa 1 water inflow
Text states inflow of 946,000 L/day, which is equivalent to ~345,000 cubic meters per year (CMY). This is only 72 percent of the 473,000 CMY cited in table 3-28 as generation rate of nonhazardous liquid waste. What is the difference between these numbers? Is 128,000 CMY of liquid waste discharge elsewhere than Playa 1 (Text on page 3-96, paragraph 3, states sewage and industrial wastewater are discharged only to Playa 1)? 60

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MD188–57 **Waste Management**

The Pantex Wastewater Treatment Facility upgrades described in Chapter 3 of Volume I would occur regardless of the proposed discharges from the proposed surplus plutonium disposition facilities. These upgrades are needed due to the age of the facilities, changing regulations, and problems with compliance, and are not related to the capacity of the facility. An EA, *Final Environmental Assessment for Wastewater Treatment Capability Upgrade, Project No. 96-D-122* (DOE/EA-1190, April 1999), for the treatment plant upgrade was completed in April 1999. If necessary, wastewaters would undergo treatment within the proposed facilities to meet influent requirements of the Wastewater Treatment Facility. Section 3.4.2.6 was revised to update the status of the treatment facility upgrade. As described in the EA, the upgraded and expanded facility would no longer discharge effluent to Playa 1. Instead, effluents would be stored and used to irrigate crops grown on the site in cooperation with the Texas Tech University Research Farm. The waste management impacts table in Section 4.17.2.2 indicates that the 51,000 m^3/yr (66,708 yd^3/yr) of liquid nonhazardous waste generation would be 5 percent of the existing capacity of the Wastewater Treatment Facility. This additional wastewater would increase the 473,125 m^3/yr (618,848 yd^3/yr) of current discharges to the Wastewater Treatment Facility by approximately 11 percent. Section 3.4.7.1.1 describes the December 2, 1997, Administrative Order issued by EPA regarding the Pantex Plant NPDES Permit. This section notes that a comprehensive corrective action plan was developed. Corrective actions include upgrade of the Wastewater Treatment Facility, soil stabilization and erosion control, and operational, maintenance, and monitoring program modification. The engineering solutions are scheduled for completion in 2003.

MD188–58 **Geology and Soils**

Section 3.4.6.1 was revised to include the description provided.

MD188–59 **Geology and Soils**

Section 3.4.7.1.1 was revised to incorporate the concept that playas may become dry because the infiltration rate can exceed the water inflow rate.

MD188–60 **Waste Management**

The rate that wastewater enters the Wastewater Treatment Facility is different from the rate at which treated water is discharged from the facility due to evaporative losses, losses through the liner of the lagoon, and water that is retained in the moist sludge from the treatment plant.

The remainder of this comment is addressed in response MD188–57.

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Text on page 4-221 states that the wastewater treatment plant capacity is 2.6 million L/day. Is that correct? Given the number of 0.9 million L/day (page 3-110) for inflow to Playa 1, and assumption that all Playa 1 inflow is from the treatment plant, then the plant presently must be operating at ~35 percent of capacity. Is this correct? Or is the treatment plant operating at 50 percent capacity (using table 3-28 number on generation rate instead of Playa 1 inflow rate)? 61

5. Section 3.4.6.1 General Site Description
Page 3-113, paragraph 5 " depth to the Ogallala groundwater aquifer varies from.....
This flow direction....."
This section is poorly written and should be rewritten to demonstrate that the DOE understands groundwater hydrology at the site. First, the word 'aquifer' in Ogallala groundwater aquifer is redundant and confusing; is the reference to the water table or to formation structure. Second, the 'flow direction' is not stated; the word 'this' starting the next sentence has no antecedent. Third, the apparent comparison of the water table dip to the 'regional northwest-to-southeast trend (?) of the remaining portion of the Southern High Plains' does not make sense. 62

6. Section 3.4.6.1 General Site Description
Page 3-113, paragraph 6 " extent, thickness, and hydraulic characteristics of (the Dockum Group) have not been established"
Statement is vague or inaccurate. For a regional study that includes the Pantex Plant and a list of older references refer to Dutton, A. R., and Simpkins, W. W., 1986, Hydrogeochemistry and Water Resources of the Triassic Lower Dockum Group in the Texas Panhandle and Eastern New Mexico, Bureau of Economic Geology Report of Investigations No. 161. 63

7. Section 4.17.2.2 Waste Management
Page 4-219, paragraph 4, Nonhazardous liquid waste generation is expected to increase by 5 percent of treatment plant capacity
See comments no. 1 and no. 4 above.

Whether a 5 percent increase in wastewater generation has an impact on groundwater or surface water quality has not been addressed. See comment no. 1 above regarding the need for analysis of past experience in meeting or violating liquid waste discharge permits. Should one assume that the rate of violation will increase by 5 percent? Would that have a major impact? Is the issue here the impact on the treatment system or on surface water and ground water quality? What impact would a 5 percent increase in wastewater generation have on water quality in Playa 1 and in ground water? Would that be a minor impact or a major impact? Is a minor impact on the treatment system or water quality acceptable? 64

Regardless of whether this is addressed in the Storage and Disposition Final PEIS (DOE 1996a), this needs to be addressed here.

8. Section 4.17.2.2 Waste Management
Page 4-324, paragraph 1, lines 3-5
It is not acceptable to refer to the Storage and Disposition Final PEIS (DOE 1996a:3-498) with the statement that wastewater discharge would have no impact. This finding needs to be argued here. A similar comment on an unrelated matter was raised at public hearing in Amarillo August 11 by a member of the public.

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MD188–61 **Waste Management**

As discussed in Section 3.4.2, the capacity of the Wastewater Treatment Facility is approximately 946,250 m^3/yr (1,237,700 yd^3/yr), with current wastewater discharges to the facility of approximately 473,125 m^3/yr (618,848 yd^3/yr). Therefore, current use is approximately 50 percent of capacity.

MD188–62 **Water Resources**

Section 3.4.7.2.1 was revised to incorporate corrections based on the commentor's observations.

MD188–63 **Water Resources**

Information on the Triassic Dockum Group found in Section 3.4.7.2.1 was taken from the information on Pantex provided in *Environmental Information Document: The Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components EIS* (ES:96:0156, September 1996). The particular reference in this SPD EIS to the Triassic Dockum Group underlying the Ogallala aquifer was taken from *Hydrogeology and Hydrochemistry of the Ogallala Aquifer, Southern High Plains, Texas Panhandle and Eastern New Mexico* (Texas Bureau of Economic Geology Report of Investigation No. 177, 1988) and *Natural Phenomena Hazards Assessment for the Pantex Plant, Amarillo, Texas* (Jacobs Engineering Group, Contract 05-G010-S-91-0211, Task 35, October 1993). However, the referenced report given by the commentor was reviewed, and Section 3.4.7.2.1 was revised.

MD188–64 **Waste Management**

The Waste Management sections of Chapter 4 of Volume I describe impacts to the waste management infrastructure. Impacts on water resources (including surface water and groundwater) are discussed in the Water Resources portions of Section 4.26.

Section 3.4.7.1 was revised to reflect the status of the Pantex sanitary Wastewater Treatment Facility upgrade. As described in that section, beginning in 2003, the Wastewater Treatment Facility will no longer discharge effluents to Playa 1. Effluents will be used to irrigate crops grown

9. Section 4.17.2.2 Waste Management
Page 4-324, paragraph 3
28 million L/yr of additional groundwater withdrawal is 4.5 percent of 1995 production rate (617 million L/yr [page 3-113]). Where does the number on 23 percent of groundwater capacity come from?

It is not acceptable to refer to the Storage and Disposition Final PEIS (DOE 1996a:4-686 to 4-687) with the statement that groundwater demand would have no impact. This finding needs to be argued here. Groundwater levels are declining because withdrawal exceeds recharge. Does the DOE assume that the Panhandle Groundwater Conservation District No. 3 will allow Pantex to exceed 1995 production rates? Is this assumption valid or founded on discussion with the District? The same comment applies to the statement on impact from operations in section 4.26.3.2.2. 65

10. Section 4.32.3.3 Waste Management
Page 4-401, Table 4-280
Table gives 15 yr production of 554,900 cubic meters of liquid nonhazardous waste. This averages ~37,000 CMY. Table 4-157 gave a number of 50,000 CMY for operations liquid waste generation. How has the savings of 13,000 CMY or 195,000 cubic meters during 15 years been achieved? If Table 4-280 understates waste generation rate by 35 percent, what impact does that have on the findings? 66

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on the site in cooperation with the Texas Tech University Research Farm. Therefore, beginning in 2003, effluents from Pantex facilities will no longer impact the surface waters of Playa 1.

The remainder of this comment is addressed in response MD188–57.

MD188–65 **Infrastructure**

Note that page 4–324 of the SPD Draft EIS is part of Section 4.26.3.2.1, Water Resources, and not part of Section 4.17.2.2, Waste Management. This SPD EIS references the *Storage and Disposition PEIS* for impacts on groundwater quality, but does not rely on that EIS for impacts on groundwater capacity. The percentage cited in this SPD EIS is calculated from the addition of the construction-related water demand plus current usage divided by the site groundwater supply production capacity. Both the current usage and site capacity figures are cited in Table 3–36. Section 3.4.7.2.1 was revised for clarity and updated; it now better describes the relationship between the Panhandle Groundwater District 3 and groundwater use at Pantex.

MD188–66 **Waste Management**

Section 4.32.3.3 describes waste generated during both construction and operations. The total presented in the Cumulative Impacts section cannot simply be divided by 15 to determine the annual waste generation rate for each alternative. During construction of the pit conversion and MOX facilities at Pantex, 25,000 m^3 (32,700 yd^3) of liquid nonhazardous waste would be generated annually, for a total of 75,000 m^3 (98,100 yd^3) over the 3-year construction period. During operation of the pit conversion and MOX facilities at Pantex, 51,000 m^3 (66,708 yd^3) of liquid nonhazardous waste would be generated annually, for a total of 510,000 m^3 (667,080 yd^3) over the 10-year operating period. Thus, if both the pit conversion and MOX facilities were at Pantex, a revised maximum total of about 590,000 m^3 (771,720 yd^3) over the combined construction and operating period would be expected.

GRAVES, DOROTHY
PAGE 1 OF 1

This is Dorothy Graves at 429 Mesquite Avenue in Amarillo, Texas and I was unable to go to the meeting that they had here in Amarillo at the Radisson Inn and we were making, we were voting either for or against having this, having this program, at the, at the Pantex Plant. And just wanted to say that I am in favor of it, of it coming to Amarillo. I worked at Pantex for fourteen years. I'm retired now, but I worked there fourteen years and I do know that they were very good, very careful and we certainly were not afraid of working there. And I just wanted to say I do hope that you come to Amarillo. We would love to have you. Thank you and bye-bye. 1

PD024

PD024–1 **Alternatives**

DOE acknowledges the commentor's support for new missions at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

7616 Tarrytown Avenue
Amarillo, TX 79121

August 7, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition c/o SPDEIS
P. O. Box 23786
Washington, DC 20026-3786

Gentlemen:

The following factors and thoughts are offered in favor of Pantex as the selected site for the Pit Disassembly and Conversion Facility:

1. The plutonium is at Pantex. Processing this material at Pantex avoids the cost of packaging, transporting, and unpackaging the plutonium. Potential safety concerns associated with personnel radiation exposure due to handling the material or due to shipping accidents are avoided. The inevitable public outcry opposing the movement of plutonium on public highways will be avoided. Public outcry could easily be elevated into court challenges involving legal delays and expense for the Department of Energy.

2. Pantex is closer to the National Laboratories than Savannah River. Travel expense for supporting technical personnel will be reduced if Pantex is the selected site. 1

3. Pantex enjoys commendable public and community support at all levels of the political, economic, social and academic institutions.

4. The DOE should consider the cost of not selecting Pantex for this work as well as the direct cost of constructing the facility. Pantex has a large fixed cost with the infrastructure to support 3000-4000 workers. It is much more efficient to operate Pantex in a fully busy state than to maintain it at a half utilized state of approximately 2000 workers. In addition locating new work at Pantex will improve employee morale and provide a young workforce incentive to work at Pantex. Continuing the present trend of downsizing Pantex is going to result in a hollow facility that will be increasingly expensive to operate and maintain and that is staffed by an aging workforce.

Very truly yours,

Charles E. Green

MD014

MD014–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. For a better understanding of the cost and schedule estimates for each alternative, consult *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative. These documents are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

Worker exposures from repackaging pits to shipping containers as required by the decision to use the AL–R8 sealed insert container were revised in Section 2.18 and Appendix L.5.1. These results will be factored into the siting decision for the pit conversion facility. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

HEMPHILL, DAVID H.
PAGE 1 OF 1

August 11, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition
MD-4 Forrestal Building
1000 Independence Avenue, SW
Washington, D. C. 20585

As a citizen of Amarillo, I wish to express my feelings about the location of the disassembly and conversion of nuclear weapons plutonium components ("pits") at the Amarillo Pantex plant. I feel very comfortable with the expansion of Pantex's responsibilities. This comfort is based on the long history of responsible action that has been conducted through the DOE (its predecessor organizations) and through the excellent day-to-day management by the plant's primary contractor, Mason & Hanger Company. 1

Given the past history of the Pantex plant, the environmental assurances given by the DOE and the proven history of the plant operator, I support the expansion of the Pantex facility for either or both of the pending opportunities.

Sincerely,

David H. Hemphill
7041 Chelsea
Amarillo, TX 79109

TXD09

TXD09–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

HERNON, DAVID
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Donald HERNON
ADDRESS: 107 Sunset Terrace, Amarillo TX 79106
TELEPHONE: (806) 379-9784
E-MAIL:

Welcome to the Amarillo Area.

I want to call your attention to the excellent worker safety and health record at the Pantex Plant.

From FY 95 to FY 98 (through June), Pantex employees have achieved a reduction in OSHA recordable cases of about 45%, and a reduction in First Aid cases of about 75%.

This significant achievement is, in my opinion, a result of Pantex employees and management working together, while embracing the principles of the Voluntary Protection Program (which is an OSHA Program adopted by the DOE). 1

Pantex employees have demonstrated their ability to accomplish new tasks both safely and efficiently.

I believe the safety and health record of the Pantex employees should be seriously considered when the DOE selects a site for the pit disassembly and conversion facility.

Thank you for your consideration.

TXD26

TXD26–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

HICKMAN, JOYCE
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Joyce Hickman
ADDRESS: 3400 Milam - Ama, Tx. 79109
TELEPHONE: ( )
E-MAIL:

Shipping cross country is too dangerous. Let's keep our highly trained and experienced people in Amarillo doing what they are trained to do in Amarillo. 1

I am personally acquainted with Jerome Martin of Amarillo. You couldn't find a more knowledgeable co-worker. We need him in Amarillo. 2

Be sure the storage is lead-covered vitreous can in storage in pits. Pits should be lined in at least 2" liners. Think what a problem we now have at Hanford with that thin (proposed to last 20 years) lining so close to the Columbia River. Sometimes the area too shortsighted. Savanna River also is on a river, and that precludes it as a site. You are too secular. (Politics aside). Savanna site has a lot of subsoil moisture. Water can, over time, adversely affect the canisters. You have a mess when it blends into the river, as could happen at Hanford. But Pantex needs to own more land for future needs now. 3

We are in homes nearby. 4

TXD11

TXD11–1 **Transportation**

DOE acknowledges the commentor's concerns about the dangers of shipping plutonium cross-country and losing talented personnel to plutonium-related missions at other sites. Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

TXD11–2 **DOE Policy**

Plutonium pits are stored in AL–R8 containers, which were developed by DOW Chemical in the late 1960s. The AL–R8 container was certified as a Type B package in 1974 and was used mainly for the movement of pits between RFETS and Pantex. The container is no longer used for shipment; it is now the primary container used for pit storage at Pantex. The containers have a uniform, nominal outside diameter of 51 cm (20 in). All AL–R8 containers are constructed of 18-gauge carbon steel. Within the AL–R8 container, a pit is secured on a metal frame and surrounded by Celotex (a high-density, cane-fiber pressboard) insulation.

TXD11–3 **Water Resources**

A description of water resources at the candidate sites is provided in Chapter 3 of Volume I. Section 4.26 analyzes the impacts of the immobilization and MOX approaches at the candidate sites. This analysis includes both surface water and groundwater resources. No impacts are expected on water resources at either Hanford or SRS. Chapter 4 of Volume I also includes an analysis of human health risk and the results of this analysis demonstrate that the activities would likely have minor impacts at any of the candidate sites.

TXD11–4 **DOE Policy**

There are no land acquisitions planned as part of the surplus plutonium disposition program.

HOPPS, HARVEY B.
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Harvey B. Hopps, Ph.D.
ADDRESS: 3236 Julian St, Amarillo, TX 79109
TELEPHONE: ~~(806)~~ (806) 371-5334
E-MAIL: HBHOPPS@ACTX.~~EDU~~ EDU

I strongly support the Pantex plant as the site for surplus disposition of plutonium pits. I have had over 36 years of industrial experience as an organic chemist during which time I have worked with many various hazardous chemicals. Safety begins with full knowledge, respect & training to produce a proper attitude. I have every respect for the staff at Pantex & urge the DOE to select this site for the surplus Plutonium Disposition site. 1

Harvey B. Hopps Ph.D
Instructor, Amarillo College

TXD42

TXD42–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

HUGHES, TOMMY AND DAD
PAGE 1 OF 2

Director,
Ms. Carol Borgstrom, My dad and I were "talking" Saturday about these bad air plane crashes they have had lately. He is seventy nine years old, and a World War II veteran. He stated: that it had probably been dissussed by scientists before, but he thought it might be safer if they put a "big" parachute on top of the plane incase it might have trouble, one thats big enough to hold the plane up in case the motors quit running
I later though that maybe if they had a big "helium" ballon that would inflate during trouble.
I saw on "television" the other day that Latraid Ultra is good for a person, in which this young "brunette", says "come to Mama". 1

MD323

MD323–1 **Other**

DOE acknowledges the commentors' observations.

Sincerely,
Tommy Hughes and Dad.

MD323

INTERNATIONAL GUARDS UNION OF AMERICA, LOCAL 38
RANDALL SKINNER
PAGE 1 OF 1

Pantex Guards Union
Local Number 38
International Guards Union of America

3820 Holiday Drive
Amarillo, Texas 79109
Phone / Fax (806) 467-9089

The International Guards Union of America (I.G.U.A.) Local # 38, supports Pantex in its pursuit to be awarded the Plutonium Pit Disassembly and Conversion Facility contract with the Department of Energy (D.O.E.).
Currently Mason & Hanger Corporation is one of the largest employers in the area employing around 3000 people in Amarillo and the surrounding area. With the M.O.X. fuel contract being awarded to Savannah River and production being at an all time low it is imperative that we strive to acquire new work in this field.
The future of Pantex will be uncertain without new work. Pantex may lose the ability to retain essential personnel, which would erode our Commitment to Excellence Program currently maintained at Pantex. The economic hardship of Pantexans losing their jobs, would affect all areas of Amarillo's economy.
Currently the storage process is already in place at Pantex Plant and we are the only facility able to accommodate the storage of these materials without spending millions of dollars converting existing structures at other plant sites and the added expense of transportation to accomplish this task.
The work that is presently being performed at Pantex has been done for more than 45 years with the best safety record in the D.O.E. complex, the personnel that preform these duties are highly and constantly trained and genuinely concerned about industrial safety, nuclear explosive safety and the future impacts on the environment.
One of the details concerned with the final disposition of our nations nuclear weapons, is security, the security force at Pantex consists of more than 320 armed Security Police Officers and more than 50 Supervisors and support personnel.
The security force members are continually trained in all aspects of the protection and safeguarding of nuclear materials. The Pantex Security Forces continued their tradition of being the best in not only the D.O.E. complex but the entire nation this year by winning the National Security Police Officer of The Year Competition in Savannah River and bringing home the National Championship and the Secretary's Trophy.
So please consider the alternatives and then add up the dollars saved, the safety records of Pantex and the comfort afforded by a world class security force and commit your support to Mason & Hanger Corporation in this endeavor to secure the futures of our jobs and families. 1

Randall Skinner
Business Agent
I.G.U.A. Local # 38

TXD35

TXD35–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

JEFFERSON STREET FAMILY PRACTICE, PA
ELLIOT J. TRESTER
PAGE 1 OF 1

Jefferson Street Family Practice, P.A.

16 August 1998

1600 W. 38th Street
Suite 212
Austin, Texas 78731
(512) 459-4147
Fax (512) 459-9134

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026

Dear Fellow Citizens:

I would like to take this opportunity to voice my opposition to the use of the Pantex site for plutonium processing. Although Pantex is not in a heavily populated area, the fact that it is above the Ogallala aquifer is quite important to the region. Any contamination of the water supply would have far reaching effects. 1

Also, the need to transport the plutonium would be a major risk as well. Any accident in its transportation could have devastating results. Since this would be the case in any scenario where plutonium would need to be sent from one place to another, probably the best option would be for a ceramification can-in-canister approach to its disposition with more local storage of the containers. 2

There are already doubts about the safety of storage of plutonium currently occurring at Pantex. Plutonium is now being kept in containers that are not corrosion free and they are being temporarily stored in bunkers that are inadequate for any long term storage, and probably are dangerous even in the short run. 3

I admit that I am no expert on nuclear technology or waste, but the processing and storage of plutonium at Pantex seems an unwise plan.

Sincerely,

Elliot J. Trester, M.D.

Pamela Gotcka, M.D.
Ajay Gupta, M.D.
Mark J. Levy, M.D.
Ann H. Messer, M.D.
Elliot J. Trester, M.D.
Martha Gooch, RN, FNP

Gay L. Zahn, Manager

MD040

MD040–1 **Water Resources**

DOE acknowledges the commentor's opposition to locating the pit conversion and MOX facilities at Pantex. Section 4.26.3.2 indicates that there would be no discernible impacts to water quality from construction and normal operation of the proposed facilities.

MD040–2 **Transportation**

DOE does not agree that the transportation of nuclear materials required to disposition surplus plutonium is a major risk. Section 2.18 describes the transportation risk for each of the alternatives analyzed in this SPD EIS. DOE does, however, recognizes the public concern about this issue and will work with State, tribal and local officials on transportation plans related to the shipment of nuclear materials in accordance with DOT, DOC, and DOE agreements. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures (accidental or not) or vehicle emissions are expected. DOE acknowledges the commentor's support for the use of the ceramic can-in-canister approach.

MD040–3 **DOE Policy**

DOE acknowledges the commentor's concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. In addition, DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

JOHNSON, J. P.
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) JP Johnson
ADDRESS:
TELEPHONE: ( )
E-MAIL:

I AM A quality Assurance Technician at Pantex I am also the union Steward for my area. On behalf of those in my area that couldn't make it here tonight I would like to express ~~those~~ feelings brought to me.

We are proud of the work that is done at Pantex. Our area does exactly what our title states. We ensure the quality of work at the Pantex plant. Let Me assure you, the quality of the work that is performed at the Pantex Plant is top notch. Again, our commitment is to the pursuit of excellence in the work place. 1

We strive to give you, DOE the best product possible. ~~We strive to give the public the safest done~~

~~Remember Safety First!~~

We strive to give you the public, our families & the environment the safest workplace possible.

TXD21

TXD21–1 **Alternatives**

DOE acknowledges the commentor's views on the high quality of work at Pantex and appreciates the assurance of continuing efforts to that end. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

United States Department of Energy

Comment Form

NAME: (Optional) Mina Fields Johnson
ADDRESS: Box 114, Adrian, TX 79001
TELEPHONE: (806) 538-6214
E-MAIL: minarelle@arn.net

I moved back to the panhandle to restore my family farm so there would be a legacy for my grandsons.
I don't want my lovely state ruined by the mistakes of bureaucrats. Don't increase the plutonium situation in West Texas. Let's decrease it. 1

Mina Johnson

TXD08

TXD08–1 **Alternatives**

DOE acknowledges the commentor's opposition to the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

KACZMAREK, DORIS K.
PAGE 1 OF 2

Aug. 11, 1998

To Whom It May Concern:

I am a 22-year resident of Randall County and the city of Amarillo and I fully support the proposed expansion of the Pantex mission. Pantex is an honorable member of this community and has been operated in a safe and efficient fashion. There is no reason to forecast that this will change if the added plutonium disposition project is assigned to Pantex. I believe that the plant has operated in an environmentally sound fashion and has caused no irreparable harm to the surrounding area, thanks to careful attention paid to developing scientific research and resultant commercial applications. I do not think it is wise to hold the Pantex facilities hostage to past misdeeds which occurred at the Rocky Flats or Hanford sites. 1

Likewise, I feel the Pantex security

TXD03

TXD03–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

forces are superior and fully capable of protecting the plant from terrorist activities which present an ever-growing problem. It seems only logical to locate the expanded plutonium mission in this area which is 300-400 miles from any major metropolitan area and thus far more easily circumscribed and protected. The potential for terrorist activity would be greater, harder to detect, and could result in greater harm in the Savannah River corridor which includes Miami, Atlanta, Washington, D.C., and New York City. This argument alone should be sufficient to tip the scales in favor of Pantex as the preferred location for the expanded operations. 1

Therefore I encourage the Texas congressional delegation and DOE representatives to speak forcefully and favorably concerning the assignment of plutonium disposition duties to the Pantex plant.

Sincerely,
Doris K. Kaczmarek

DORIS K. KACZMAREK
3501 EDGEWOOD; AMARILLO, TX 79109
806 359-5338; FAX 806 359-5838

TXD03

KARRH, ROBERT
PAGE 1 OF 1

This is Robert Karrh. My address: Route 8, Box 40-10, Amarillo, Texas 79118. I would like to voice a comment on why doesn't it make sense that we put the station in Amarillo instead of taking it, you know, somewhere else. The pits are already here and it looks to me like it would be, logical to place the pit disassembly and conversion facility in Amarillo instead of having to cart these pits X number of hundred miles to Savannah River or somewhere else. There, in the possibility of them, you know getting damaged or whatever. So I want to voice my comments for Amarillo, Texas and the Pantex Plant for the preferred pit disassembly and conversion facility. The community here really supports Pantex. They got a great safety record. They got qualified people, engineers and technicians and I think it makes more sense to place it here. 1

PD012

PD012–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Potential impacts of transportation of pits would likely be minor if Pantex were chosen as the site for pit disassembly and conversion because pits are currently stored there, while transportation would be minimized if SRS were chosen because SRS is the preferred location for the MOX facility. Transportation impacts are summarized in Chapter 4 of Volume I and Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures (accidental or not) or vehicle emissions are expected. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analysis of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Yes, this is Marilyn Keen at 4018 Tulane, Amarillo, Texas, 79109. (806) 355-6271. I'm in favor of the Pantex expansion and the disposition of the nuclear, plutonium pits at the Pantex Plant. Thank you. 1

PD015

PD015–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

KELLY, DOUGLAS M.
PAGE 1 OF 1

Douglas M. Kelly, Hereford, Texas 79045. 704 11th Street. And I thought this was to make a comment on whether we needed that facility up there for the plutonium and my ideas was heck no due to the water. And the one mistake and it's gone. That was it. Good bye. 1

PD014

PD014–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

I am for the location of additional missions at the Pantex Plant in Amarillo. The Amarillo economy needs the additional jobs that offer good pay and good benefits. The Pantex Plant adds an enormous, and welcome, boost to the Amarillo economy. 1

WD021

WD021–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

KOPKE, MARK
PAGE 1 OF 1

Question/ Information Request Card

Name: MARK KOPKE
Address: 4116 SILVERSTON
AMARILLO, TEXAS
Phone: 806 358-4063 Fax:
E-mail:
Question/ Request: YOU TOOK ARE AIR BASE AWAY SAVANA HAS GOTTEN A MISSION, BE FAIR GIVE PANTEX A MISSION, WE HAVE EARNED IT. LOOK AT ARE RECORDS 1

For further information contact:
U.S. Department of Energy, Office of Fissile Materials Disposition, MD-4
Forrestal Building, 1000 Independence Ave., SW, Washington, D.C. 20585
1-800-820-5156

TXD12

TXD12–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

August 11, 1998

Keena Ladd
Rt 7 Box 680
Amarillo, TX 79118

To whomever this may concern,

As a citizen of Amarillo, I would like to express my feelings upon the issue of the Pantex Plant. I have lived here for 23 yrs. and have yet to hear many critical points about this plant. As many people that it employees, that tells you right off that Mason & Hanger is a fantastic company to work for. Why don't people just go on about their business? How would they like it if someone tried to close their doors? The reason I am discouraged, my Dad is an Master Electrician at the plant. How is there going to be food on our table if he has no work? **Leave it alone** and help our Nation with **Drugs, Teen Pregnancy, Weapons,** things that are far more important. Please consider this my vote. Thank you! 1

"I AM FOR PANTEX IN OUR COMMUNITY!!"

Sincerely,

Keena Ladd

Keena Ladd
Age 23
Amarillo, TX

FD005

FD005–1 **Alternatives**

DOE acknowledges the commentor's support of Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

MARTIN, JEROME B.
PAGE 1 OF 1

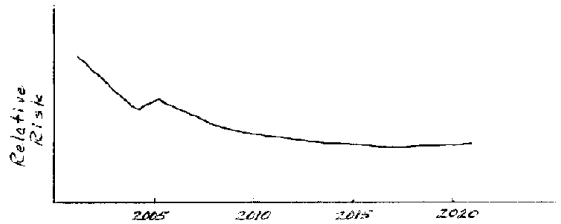
United States
Department
Of Energy

Comment Form

NAME: (Optional) Jerome B. Martin, CHP
ADDRESS: 5 Locke Place, Amarillo, TX 79124
TELEPHONE: (806) 342-9995
E-MAIL: jbmartin@arn.net

The major risk to workers and the public from current operations at Pantex Plant is the accidental detonation of high explosives. Nuclear weapons contain two types of high explosives: sensitive and insensitive HE. As the nuclear stockpile is modernized and older weapons programs are disassembled, sensitive HE is gradually being eliminated from the stockpile. Thus, the relative risk of operations at Pantex is decreasing with time.

If the Plutonium Disassembly and Conversion Facility were built and operated at Pantex, there may be a small incremental risk added to the risk of current operations. However, further reductions in risk achieved by continued elimination of sensitive HE would soon counter the added increment from a new mission at Pantex. A sample plot of risk vs. time is shown below. If the relative risk can be quantified and illustrated as shown below, it would be helpful in explaining risk to the public and for demonstrating that the risk of the Plutonium Disassembly and Conversion Facility is small and manageable. 1



For further information contact:
U.S. Department of Energy, Office of Fissile Materials Disposition, MD-4
Forrestal Building, 1000 Independence Ave., SW, Washington, D.C. 20585
1-800-820-5156

FD201

FD201–1 **Human Health Risk**

While the commentor's input is illustrative, the accident analysis performed in this SPD EIS is limited to characterizing risk of the alternatives at issue. The accident risks associated with constructing and operating the pit conversion facility at Pantex can be found in the Facility Accidents sections of Chapter 4 of Volume I and in Appendix K.4.

MARYKNOLL EDUCATION CENTER
PATRICIA RIDGLEY
PAGE 1 OF 1

Maryknoll Education Center

a bridge among peoples

The Maryknoll Society
4301 Bryan Street # 202 Dallas, Texas 75204
Area Code (214) 821-4501

August 17, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

I do not support plutonium processing at the Pantex Plant. In the *Surplus Plutonium Disposition Draft Environment Impact Statement,* the Department of Energy prudently decided against locating one plutonium processing facility at the Pantex Plant. For the following additional reasons, a Plutonium Pit Disassembly and Conversion facility also should not be located at Pantex: 1

1. Pantex should not become the next Rocky Flats. As Pantex has never processed plutonium, it has apparently escaped the type of contamination found at plutonium processing sites like Rocky Flats and Hanford. Let's keep it that way.

2. There is so much about the potential risks that is unknown. It is not the time to proceed. It is unacceptable to have plutonium operations above the Ogallala Aquifer, and only one mile from where people live and work in a vibrant agricultural producing area. 2

3. There is valid, strong criticism of safety in the current storage of Plutonium at Pantex. Promises to improve safety conditions at the site have not happened. The U.S. Government Accounting Office and the Defense Nuclear Facilities Safety Board have both issued reports critical of plutonium storage safety at Pantex. If the DOE cannot accomplish the job of safely storing Pantex plutonium in the most stable environment, there is no reason to accept its unsubstantiated assurances to safely process deadly plutonium powders at Pantex. 3

Thank you for this opportunity to comment.

Sincerely,

Sr. Patricia Ridgley

Sr. Patricia Ridgley, SSMN

"We are called to be bridges between our own U.S. Church that sends us and the local churches where we serve." - Maryknoll Mission Vision

MD041

MD041–1 **DOE Policy**

DOE acknowledges the commentor's opposition to Pantex as a candidate site for surplus plutonium disposition activities. Analyses in Chapter 4 of Volume I indicate that impacts of operating these facilities on health, safety, and the environment at Pantex would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed facilities in compliance with today's strict environmental, safety, and health requirements. Decisions on the surplus plutonium disposition program at Pantex will be based upon environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

MD041–2 **Water Resources**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. As discussed in Section 4.26.3.2.2, there would be no discernible impacts on water quality from normal operation of these facilities. Other sections show, moreover, that the normal operation of these facilities would likely have minor impacts on human health, agriculture, and livestock: Sections 4.17.1.4 and 4.17.2.4 address the potential radiological and hazardous chemical effects of the maximum-impact alternative on workers and the public at Pantex; Appendix J.3, the potential contamination of agricultural products and livestock, and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex.

MD041–3 **DOE Policy**

DOE acknowledges the commentor's concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. In addition, DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

MASON & HANGER-SILAS MASON COMPANY, INC.
CHARLES ELSEA
PAGE 1 OF 1

Concerning the pit reprocessing (MOX conversion), I feel Pantex should be considered the #1 choice for the mission. I have worked at Pantex for 12 years and have been thoroughly impressed by the commitment of the employees and community in safety and environmental issues when performing a mission as well as performing the mission in a timely and efficient manner. 1

WD015

WD015–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. However, to clarify, the pit conversion facility does not involve reprocessing plutonium. The facility would be used for disassembling pits and converting the recovered plutonium (as well as plutonium metal from other sources) into plutonium dioxide suitable for disposition. Similarly, the use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Comment on the Location of the Pit Disassembly Operation

I am a degreed Industrial Engineer with 26 years experience in the manufacture of the various types of products including:

- Small AC Motors
- Large Steam Turbines
- Aluminum Reduction, Coil, Sheet, and Plate
- Industrial Water Filtration Equipment
- Solid Fuel Motors for C4, D5, MX, P2 Missiles and Space Craft
- Air Force C17 Transport Aircraft

For the last 4-1/2 years I have been employed at PANTEX. Naturally, as an Industrial Engineer, I have mentally compared the characteristics of PANTEX versus other employers I have worked for. Based on my substantial manufacturing experience, I present the following reasons why PANTEX should undoubtedly be selected as the site for the Pit Disassembly operation :

1

Quality of the workforce

The Production Technicians and other "hands-on" operations personnel are far superior to their counterparts at other manufacturing locations I have observed. They are highly trained. New employees are carefully monitored after initial training, and systems and procedures are in place to assure that they do not work on various operations until they are fully capable. They have an extremely strong "esprit de corps" which translates to pride in workmanship, plant mission, and dedication to their country. I have never seen such a high level of positive workplace interpersonal relationships. The education level of the workforce varies, but includes personnel working on Engineering and other degrees and those who already have a Bachelors Degree in Engineering.

Quality of work

The type of work performed here is very technical and precise, and the product generated by PANTEX continuously meets the high quality

FD243

FD243–1 **Alternatives**

DOE acknowledges the commentor's support of Pantex and appreciates the enumeration of reasons for siting the pit conversion and MOX facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

parameters typically required for nuclear weapons. Quality is constantly emphasized and monitored and operations personnel stress it to each other. Management and other support functions have the same level of commitment and pride in high quality output.

Security

The superiority of the PANTEX security force is legend both within and outside the DOE complex. Due to their high emphasis on physical conditioning and continuous training and application of proven security principles, the members of this force are constantly alert and perform their duties in a highly professional and effective manner. Security is increasingly becoming more demanding in its requirements and the PANTEX Security force is the "best there is".

Workforce Experience

The PANTEX work force has decades of successful experience in nuclear weapons assembly and disassembly. This type of experience is rare and the numbers of personnel possessing it is limited. DOE should capitalize on this reserve of personnel with this rare type of qualification and utilize them and their skills in the Pit Disassembly operation which is closely related to work they are already performing. This factor cannot go unconsidered in the final selection process. 1

Community Support

For every public issue there are those who support it and those who oppose it along with others who either don't care or are not knowledgeable about the issue. The important factor is what portion of the public fall into each category. As a result of the Freedom of Speech, which all Americans possess, parties for and against an issue can proclaim their views in person, through displays, and through the news media. The news media generally present the views of each camp equally although one camp may be substantially smaller in number than the other. This can lead to mis-understanding by the public as to the amount of support that exists in the public domain for each side of the issue.

The fact of the matter regarding community support for the possible location of the Pit Disassembly operation at PANTEX is that support for locating it at PANTEX is overwhelmingly in favor of doing so. The

FD243

opposition is minute in comparison and, as it appears to me, is composed of some sincere local citizens along with a mixture of persons who are not from the Texas panhandle, possessing other "agendas" which might include trying to maintain an apparent need for them to remain in the area as an opposition force which also would assure them of a continued monthly pension from their parent organization.

Conclusion

The above factors make it extremely clear that the Pit Disassembly operation should be located at PANTEX. As you review these factors it should also become clear that an apparent mistake has been made concerning the DOE decision naming SRS as the preferred sit for the MOX facility. Politics should not enter into decisions concerning issues as critical as the location of Pit Disassembly and MOX operations. By locating both the MOX facility and Pit Disassembly facility at PANTEX, unnecessary possible hazardous transportation problems would be alleviated and the operations would be performed by a work force highly superior to those at any other DOE site. Please emphasize at the highest levels within DOE and Congress that truth cannot successfully be denied and the truth is that **THE PIT DISASSEMBLY OPERATION AND THE MOX FACILITY SHOULD BE LOCATED AT PANTEX.** 1
This would be in the best interest of the United States of America.

William R. Henry
Sr. Project Engineer
PANTEX

FD243

MASON & HANGER-SILAS MASON COMPANY, INC.
SCOTT
PAGE 1 OF 1

Move ANY or ALL operations to Pantex. Count me as FOR Pantex Expansion. Thanks. | 1

WD016

WD016–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MASON & HANGER-SILAS MASON COMPANY, INC.
LEON E. TOMLINSON
PAGE 1 OF 1

I believe since Plutonium was first made in a nuclear reactor, it should like wise be expended in a nuclear reactor. I would like to see Plutonium be processed into mixed oxide fuel for use in a nuclear reactor to produce electricity. Futhermore DOE should sell this fuel to reactor sites in the U.S. to try to defray any cost it has accrued in producing the fuel rods. I think Pantex site in Amarillo, Texas can do this for DOE in a safe and efficient manner and at substancially less cost than other DOE facilities. Please consider Pantex as a site for the pit dissasembly and conversion process. I am a Pantex employee of 23+ years, and I can attest of our safe work practices. Thank you!
Leon E. Tomlinson 1

WD013

WD013–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Use of MOX fuel in domestic, commercial reactors is not proposed in order to generate electricity. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

DOE has identified as its preferred alternative the hybrid approach to surplus plutonium disposition. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium, as quickly as possible, in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MAXIE, DONALD
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) Donald Maxie
ADDRESS: 2108 S Hayden, Amarillo Tx.
TELEPHONE: (806) 376-7413
E-MAIL:

During the testimony from the Public. We heard some about the effect on property values with no information on what effect if any it has had at the sites referenced in the testimony. As an ex-regulatory employee with the state of Texas I heard many people tell how a new or expanded facility would damage/destroy property values. I never saw it happen. 1

We also heard from an organization called Citizens Against Nuclear Dumping or STAND. This organization is not seriously against nuclear dumping. In the time I've been in Amarillo they have never been anything except against Pantex. If they were serious about nuclear dumping why haven't we heard anything from them about the largest stream of nuclear materials going into the local landfills – smoke detectors from households 2

TXD20

TXD20–1 **Socioeconomics**

DOE acknowledges the commentor's observation concerning property values.

TXD20–2 **Other**

DOE acknowledges commentor's views. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

August 10, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
MD-4 Forrestal Building
1000 Independence Avenue, SW
Washington, D.C. 20585

As a citizen of Amarillo, I wish to express my feelings about the location of the disassembly and conversion of nuclear weapons plutonium components ("pits") at the Amarillo Pantex plant. I am totally ~~in support of~~ this function and hope you will consider the effort and the history of the Pantex plant in your decision making process for this site. 1

opposed!!!!

Sincerely,

Signature

Amarillo TX. 79101

Address

FD131

FD131–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

McMurtry, Leroy
Page 1 of 1

Dear Sirs

There are 2 main resons the pit conversion project Should be given to the Pantex Plant.
#1 The workforce at Pantex is dedicated to doing the best job possiable for DOE and all others concerned with this mission
#2 The Pits are allready stored here so why risk moving them to another site when Pantex can do the work here. 1

I have worked at Pantex 3yrs and am truely convinced the mission would be a complete success if given to the people of the Panhandle area.

Thank you

If you have any questions for me please call

Leroy McMurtry
Box 1503
Panhandle, Tx 79068
806 537 5703

TXD14

TXD14–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions on facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

I support Pantex and the ability for them to safely dismantle the plutonium pits. I am certain that the contractor will be responsible and accountable to the landowners and the citizens of the area. 1

WD011

WD011–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

METCALF, STACY
PAGE 1 OF 1

Subject: support for pit assembly | 1

WD019

WD019–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Question/ Information Request Card

Name: ROBIN MILLS
Address: HCR 01 BOX 245A
PLAINVIEW TEXAS 79072
Phone: _____ Fax: _____
E-mail: _____
Question/ Request: WHAT IS THE RECORD OF SPILLS AND/OR CONTAMINATION AT OTHER SITES WORLDWIDE THAT HAVE PROCESSED PLUTONIUM. 1

For further information contact:
U.S. Department of Energy, Office of Fissile Materials Disposition, MD-4
Forrestal Building, 1000 Independence Ave., SW, Washington, D.C. 20585
1-800-820-5156

TXD13

TXD13–1 **Other**

The scope of this SPD EIS is focused on analysis of alternatives on whether and how much U.S. surplus plutonium should be used as MOX fuel, which technology should be used for immobilization, where to construct the proposed surplus plutonium disposition facilities that are needed, and where to perform lead assembly fabrication and testing.

Although, DOE does not have specific data on spills or contamination from plutonium processing in other countries, DOE has visited some of these European plants and will use any pertinent experience in the development of its proposed facilities.

MRD INVESTMENTS, L.L.C.
D. EDWARD AND MELVA M. DAVIS
PAGE 1 OF 1

MRD INVESTMENTS, L.L.C.
d/b/a MRD INVESTMENTS (In Missouri) MRDU INVESTMENTS, L.L.C. (In Texas)
905 S. Fillmore Suite 105
P.O. Box 2808
Amarillo, Texas 79101
Office (806) 376-9844 Fax (806) 376-8552

August 11, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
MD-4 Forrestal Building
1000 Independence Avenue, SW
Washington, DC 20585

Ladies and Gentlemen:

We are small business owners here in Amarillo and own several commercial office buildings as well as our home. We appreciate having Pantex located here and want you to know that we sincerely hope that Amarillo is the location chosen for the plant to disassemble and convert nuclear weapons plutonium components. 1

We intend to live in Amarillo for the rest of our lives and look forward to having Pantex be a vital part of our community.

Sincerely,

D. Edward Davis

Melva M. Davis

TXD01

TXD01–1 **Alternatives**

DOE acknowledges the commentors' support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

August 10, 1998

USDOE
Office of Fissile Materials Disposition
MD-4 Forrestal Building
1000 Independence Avenue, SW
Washington DC 20585

I live in Panhandle TX 10 east of Pantex Plant and work at the plant. I have been there since 1984 and hope to retire from Pantex.

I am totally in support of this function and hope you will consider the effort and the history of the Pantex Plant in your decision-making process for this site. 1

People of the Panhandle of Texas have an excellent work ethic. They are proud, dependable people on whom I'd be pleased to place the responsibility of this new effort. We would not let you down.

Sincerely,
Darlene Muna
Box 158
Panhandle TX 79068

TXD15

TXD15–1 **Alternatives**

DOE acknowledges the commentor's support of the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

NUNN ELECTRIC SUPPLY CORPORATION
JOE D. BREWTON
PAGE 1 OF 2

TEXAS
Amarillo
Abilene
Austin
Lubbock
Odessa (Zimco)
Midland (Builders' Choice)

NUNN

NEW MEXICO
Clovis
Hobbs
Roswell
Alamogordo

NUNN ELECTRIC SUPPLY CORPORATION

WHOLESALE DISTRIBUTORS

August 5, 1998

The Department of Energy
c/o Amarillo Chamber of Commerce
P.O Box 9480
Amarillo, Texas 79105

Dear Sirs,

I am writing you this letter on behalf of the company I work for, Nunn Electric Supply Corporation. Nunn Electric has been a part of the Amarillo economy for more than 70 years and has been fortunate enough to do business with the Pantex facility for more than fifty of those. During that time, we have been directly involved with virtually every area of the Pantex plant and in most cases, three generations of workers. From our viewpoint, there is no industrial facility in this part of the country that has been as involved with the community and as concerned with safety as Pantex.

The plant has constantly concerned itself with liberal upgrades in all electrical areas of the plant. To that point, Pantex was the first DOE site to implement the use of "stand-by" HID lamps for security purposes, a procedure that is now commonplace throughout the nuclear complex as we understand it. They were also the first to use rechargeable alkaline batteries to reduce hazardous waste in that area. The same can be said for their use of low-mercury fluorescent and HID lamps, which again shows their commitment not only to a safe working environment, but the safety of the entire panhandle area as well. 1

These examples are but a few of the many electrical upgrades that Pantex has put into practice that we (as only one of hundreds of their vendors) know of. Pantex has an outstanding safety record with full-time union safety officers with whom these critical issues may be discussed and resolved. It is our understanding that the alternate site has nothing like this is place and no plans for it in the foreseeable future.

FD004

FD004–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

On July 1, 1998 Nunn Electric was awarded the first Vendor Managed Inventory contract in the history of the DOE nuclear complex. The estimated cost-savings for electrical supplies and their related expenses for the first year will be in excess of $500,00.00. We can think of no better way to demonstrate this facility's commitment to cost-savings and streamlined efficient management. To our knowledge, there is no another plant in this part of the panhandle that has exhibited such forward thinking.

1

We know that the plant enjoys the support of some 80% of the surrounding community and it is said that Pantex is ultimately responsible for one out of every ten jobs in this area. The influx of 450 new jobs with the PDCF located here would be an invaluable shot in the arm to our local economy. We would hope that the DOE would look most favorably on the selection of Pantex for the critical PDCF and consider the overall impact that placing this facility here at Pantex - the best location in the nuclear complex.

Most Cordially Yours,

Joe D. Brewton
Amarillo Division Manager

FD004

Pantex doesn't deserve MOX

Richard L. Geddes

NORTH AUGUSTA, S.C. — I read your recent editorial regarding the public hearings for selecting the site for the Department of Energy's pit disassembly and conversion mission. These important hearings are being held at each of the potentially affected sites, but most significantly at Amarillo and in North Augusta, S.C.

I too encourage Panhandle residents to participate in this important decision. I also think it is important they not be blinded by the possibility of federal government dollars and jobs but really consider the facts and what is good for the country.

The disposition of surplus weapons-usable plutonium is an issue of international importance. We, in conjunction with the Russians, need to get on with this task in a safe and efficient manner.

I have worked in the plutonium processing area of the Savannah River Site for about 20 years. I am well aware of the technology, requirements and issues involved in plutonium disposition. Dismantling pits and converting the plutonium to an oxide is the necessary first step in the disposition process. Nothing else can happen until this occurs.

What is the best way to make this happen? Let's look at the facts.

Handling plutonium is a complicated task. The DOE sites which made and processed plutonium (Hanford, Rocky Flats and Savannah River) are all much larger and more complex operations than Pantex. Each of them has a legacy from the plutonium era which, in total, will cost all of us hundreds of billions of dollars to remediate and will take decades to complete.

Handling plutonium requires extensive support facilities, skills and oversight — generally called infrastructure. There are not "modest differences" between the plutonium infrastructure of Pantex and SRS, as DOE recently said. SRS is a 300-square-mile complex of 14,000 employees engaged in major nuclear processing operations. It has a fully integrated, self contained nuclear waste management system capable of handling all forms of nuclear waste, operates the nation's only tritium purification and loading operation, and will be the site of the next generation of tritium production.

SRS produced nearly half of the plutonium which is no longer needed. In 1997, DOE called SRS "a plutonium competent site with the most modern, state-of-the-art storage and processing facilities" in the complex.

Pantex has no experience, capability or infrastructure with plutonium, only in handling and storage of sealed plutonium weapons components.

Handling plutonium creates a costly future legacy. DOE needs to explain why it is considering creating a new plutonium processing site. The determination that the Pantex site is "equally preferred" for the pit disassembly and conversion mission represents a dramatic repudiation of DOE policy.

In 1996, DOE announced that "plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost and complexity of introducing plutonium operation into sites without current capabilities." With DOE engaged in a multi-decade program to downsize, consolidate and remediate existing plutonium sites, the wisdom of continuing this policy is obvious.

Consolidation of the three major elements of the Plutonium Disposition program (pit disassembly, MOX and immobilization) is intuitively cost-effective. How much can be saved is a point of contention, but the fact that savings will accrue from co-locating all facilities is indisputable.

Storage of sealed weapons components containing plutonium metal is very different than processing, packaging and shipping dispersible plutonium oxide. DOE is proposing to invent a new process, build a new facility, create and operate a plutonium infrastructure, and eventually clean up and remove a plutonium processing operation so it can make a larger number of shipments of dispersible plutonium oxide to Savannah River for disposition. Alternatively, DOE could pack the pits and ship them — fewer shipments, more safety. SRS can make storage available, and the processing and disposition of these pits is just an extension of routine operations.

What is the logic of locating this mission at Pantex? Technically, financially, safety-wise and environmental protection-wise, there is none.

Jobs and federal dollars — that's the issue. But is plutonium, with its proliferation and safety issues, the right arena to be searching for federal pork? Our collective good sense should tell us no.

The Globe-News said that Pantex "deserves" this mission for being such a good neighbor over the years. I'm sure it has been.

I wish the plant and its employees well. But for plutonium processing, I don't think so.

Richard L. Geddes of North Augusta, S.C., worked in plutonium processing at the Savannah River Site.

Aug 16, 1998 Amarillo Globe News

1

FD144

FD144–1 **Other**

DOE acknowledges receipt of the commentor's article. DOE acknowledges the commentor's support for siting the plutonium disposition facilities at SRS. Decisions on the siting of surplus plutonium disposition facilities will be based on environmental analyses, as well as technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANHANDLE 2000
JEROME W. JOHNSON ET AL.
PAGE 1 OF 3

PANHANDLE 2000
PO Box 9480 Amarillo, Texas 79105 (806)373-7926

September 8, 1998

DOE Office of Fissile Material Disposition
c/o SPD EIS
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

ATTENTION: Bert Stevenson, NEPA Compliance Officer

Re: Comment on DOE's Draft Surplus Plutonium Disposition Environmental Impact Statement

Dear Mr. Stevenson:

We would like to take this opportunity to comment on DOE's *Draft Surplus Plutonium Disposition Environmental Impact Statement*. As co-chairs of Panhandle 2000, a group of Amarillo-area citizens interested in the environmentally sound retention and expansion of Pantex, we would like to express our support for siting the proposed new pit disassembly and conversion mission contemplated in this Draft PEIS at Pantex.

Throughout DOE's EIS process for pursuing plutonium storage and disposition options, the clearly identified goals have been to provide the highest level of security to minimize theft, diversion, or accidental exposure and to encourage Russia to reciprocate efforts to dispose of its plutonium in like manner. For these reasons, the preferred alternatives chosen in the *Record of Decision for the Storage and Disposition of Weapons-Usable Fissile Materials Environmental Impact Statement* chose a dual track approach of vitrification and MOX fuel fabrication. Viewing plutonium as an asset rather than waste provides the potential for taxpayers to recoup some economic benefit from their investment in the Cold War through use of MOX fuel in commercial reactors. Through this means, we are also encouraging Russia to dispose of their excess plutonium in a way that will provide them parallel economic nonproliferation benefits. 1

The Draft PEIS announced the Savannah River Site as the preferred location for the MOX fuel fabrication facility as well as the plutonium immobilization facility. Additionally, the Draft PEIS lists two alternatives for the siting pit disassembly and conversion. We would like to state for the record that we strongly support

MD168

MD168–1 **Alternatives**

DOE acknowledges the commentors' support for siting the pit conversion facility at Pantex. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner, not to derive economic benefit from the use of MOX fuel. By working in parallel with Russia to reduce stockpiles of excess plutonium, the United States can reduce the chance that weapons-usable nuclear material could fall into the hands of terrorists or rogue states and help ensure that nuclear arms reductions will never be reversed.

Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANHANDLE 2000
JEROME W. JOHNSON ET AL.
PAGE 2 OF 3

the alternative which proposes siting the plutonium disassembly and conversion facility at Pantex. 1

The stated objective of disposing of excess plutonium is to reduce threat of international proliferation, as reaffirmed in President Clinton's 1993 Nonproliferation and Export Control Policy, the 1994 National Academy of Sciences report on plutonium management and disposition, and the January 1997 DOE report on Nonproliferation and Arms Control Assessment. The PEIS has apparently lost sight of this objective. Exposing plutonium to unnecessary transportation and the accompanying risks is inconsistent with this objective, but that is precisely the course of action contemplated by DOE if it chooses to site pit conversion at a site other than Pantex.

The argument for this alternative is compelling: Pantex currently serves DOE and the nation as the primary site for nuclear weapons dismantlement and safekeeping of weapons-ready nuclear materials. For over 40 years, the Pantex Plant has been in the business of taking weapons apart and demilitarizing their components. This mission is a natural and common-sense extension of what is already done at Pantex. Because it has always done this type of work, Pantex has a safe and solid history of strict production operations management, developed through years of experience handling more pits, more often than any other site.

Siting the disassembly and conversion plutonium at Pantex will eliminate the need for unnecessary transportation which poses a legitimate national and international threat. Transportation of pits from Pantex in unconverted form exposes them to potential theft, risk of accident and exposure, and costs associated with additional security measures and packaging. The recent aggression against our embassies abroad only serves to emphasize that we cannot afford to lower our guard against such threats. Indeed, we must be vigilant and mindful of the tremendous potential for harm that would result if classified nuclear materials were to fall into the wrong hands. Pantex has the most modern safeguards and security system, and the nation's top rated guard force. The plant's emergency management system was recognized as the "Standard Setter" after joint assessment by Defense Programs and Nonproliferation and National Security. As a result, classified weapons components located at Pantex are more threat-resistant than anywhere else in the complex. By performing pit disassembly at Pantex and then shipping demilitarized and unclassified plutonium oxide, DOE can eliminate these unnecessary risks. To abandon the record at Pantex and contemplate transfer of the pits to a site and facilities not accustomed to this function would precipitate the needless costs and risks associated with the transport and duplication of workers and facilities. 2

Additionally, DOE cost estimates show that if the choice is made ignore the risks and package pits to transport them across the country, the price tag of 3

MD168

MD168–2 **Nonproliferation**

DOE acknowledges the commentors' support for Pantex and appreciates the input regarding the capabilities at the site. Minimizing transportation risk was one of the considerations in selecting both Pantex and SRS as the preferred sites for the pit conversion facility. Although siting the pit conversion facility at Pantex would reduce the transportation of pits in unconverted forms, the plutonium dioxide that is produced at the facility would still have to be transported to the immobilization and/or MOX facilities.

As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.

MD168–3 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

disassembly and conversion would increase by $70 to $85 million. It is doubtful whether this figure incorporates the considerable training cost that will be incurred to recreate the pit packaging and unpacking expertise that exists today only at Pantex. Furthermore, we are aware of claims being made by proponents of the Savannah River Site that siting disassembly and conversion in South Carolina would result in savings of nearly $1.6 billion. Such claims are unsubstantiated and preposterous considering the total estimated cost of the entire mission, wherever located, equals $920-$980 million. We raise these issues to point out that, while many claims (factual and otherwise) are being made regarding the merits of different sites, one truth about costs remains. Plutonium pits are located at Pantex and moving them anywhere else for a mission that can be performed here creates unnecessary expense in terms of both dollars and the inherent proliferation risk to Texas and our country. 3

We regret that DOE did not attach this same logic for the MOX production facility. If it had, the arguments are clear for co-locating the pit conversion and MOX fuel fabrication facility at the existing pit storage site, the Pantex plant. 4

Finally, polls demonstrate the continued overwhelming support Pantex enjoys from local residents and state and federal elected officials. These surveys indicate that the plant enjoys support of more than 80% among the residents in the Amarillo area. Provided the new missions can be carried out safely and with minimal environmental impact, this support would reduce the potential for delay in proceeding with new disposition efforts. The plant also enjoys strong bi-partisan support of the 32-member strong Texas Congressional Delegation. DOE must have broad-based political support for its plutonium disposition strategy to succeed. Placing pit disassembly at Pantex only strengthens that prospect. 1

For these reasons, Pantex clearly is the safest and best-suited alternative and we respectfully urge DOE to designate it as the preferred alternative site for the pit disassembly and conversion facility.

Yours truly,

Jerry John

Jerome W. Johnson
Co-Chair, Panhandle 2000

Wales Madden Jr.

Wales Madden, Jr.
Co-Chair, Panhandle 2000

MD168

MD168–4 **Alternatives**

DOE acknowledges the commentors' support for collocating the pit conversion and MOX facilities at Pantex.

PANHANDLE AREA NEIGHBORS AND LANDOWNERS
DORIS AND PHILLIP SMITH
PAGE 1 OF 4

September 16, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

Dear Sirs:

As Co-Chairs of the Panhandle Area Neighbors and Landowners (PANAL) Organization, we are writing to voice our concern with the Plutonium Pit Disassembly and Conversion facility which the DOE is considering locating at Pantex. Our organization of agricultural producers, processors, neighbors and community business leaders does not support any type of plutonium processing in this agricultural producing area of Texas.

Our products are sent world wide to feed the hungry and to clothe the peoples of the world - why, under any circumstances, would the DOE even consider placing such a devastating process in the midst of food production? Why would DOE jeopardize the people, land, water, air and the products that have made and continue to be the support for the Texas Panhandle? Why does DOE continue to harrass this community with such horrendous missions for Pantex without even one thought as to the damage which could be reaked on the High Plains of Texas. Do you not understand that we have a strong healthy relationship with the land and we strive constantly to keep this land free of contamination and in a wholesome condition suitable for producing food?

PANAL considers the Plutonium Pit Disassembly and Converersion Facilty (PDCF) to be the most outrageous mission /facilty to be forced on this community. Pantex has never processed plutonium and does not have the massive contamination problems as those sites which have handled this material processing. In the words of Ann Loadholt (Chair of the SRS CAB) *"Concerning pit disassembly...should Pantex be chosen...this decision would create a new plutonium processing site within a system endeavoring to consolidate operations for cost effectiveness, but most importantly, would increase the amount of cleanup that ultimately will be required."* When people from other areas even see the hypocrisy of the siting of these missions at Pantex, why does DOE not see this? Are you just not looking at all the issues or are you blinded by your own stupidity? 1

Pantex is a fraction of the size of other plutonium sites, new environmental risks associated with the processing of plutonium oxide powder, as well as health risks would be incurred by this community due to the close proximity of the people to the site. The unreported air contaminants of radioactive tritium and highly toxic beryllium would be pumped from a smokestack and fall on our Panhandle lands contaminating our products and livestock, thus making them unmarketable. Do you want another Russia on your hands? Their products are so contaminated by the nuclear weapons productions that the people cannot eat them and economic devastation is the result. Is that what DOE is trying to achieve here? Such negative consequences to people and the farmland are much more likely to occur on a small, open, windy site such as Pantex, than at a larger, more secluded site - a site large enough so that the smokestack will belch forth its bile on the site itself and not on the surrounding stakeholders and property.

Why do you think that plutonium processing can be done safely at Pantex when it has never been done safely or without contaminating the environment at any other DOE site? The technologies just are not there - the DOE has gone to great lengths to deceive the public with half truths and lies about new advancements in technologies, the result is increased distrust of DOE by our community of stakeholders. We have witnessed your actions over the past eight years , when we first became involved in this issue. DOE has assured the public of their openness and theory of public involvement, however DOE has failed miserably on both accounts. There is no openness and no effort to engage the public in "meaningful public participation". 2

MD284

MD284–1 **Human Health Risk**

DOE acknowledges the commentors' opposition to siting the pit conversion facility at Pantex. Although Pantex is smaller in overall size in comparison with the other candidate sites, analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor. Section 4.26.3.2 analyzes impacts to the environment (including contamination to the Ogallala aquifer) due to construction and normal operation of a pit conversion facility at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. Appendix J.3 includes an analysis of potential contamination of agricultural products and livestock and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. If the proposed surplus plutonium disposition facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation.

Ingestion doses at Pantex were assessed for eight different food categories: leafy vegetables, root vegetables, fruits, grains, milk, meat, poultry, and eggs. Public doses incurred from the uptake of these foodstuffs were determined to be well below Federal, State, and local regulatory limits; therefore, potential radiological impacts to local prime farmlands would be essentially nonexistent.

While it is true that the pit conversion facility is the first consolidated facility for accomplishing this mission on a large scale, the processes that would be used in this facility are not entirely new. Many of these processes are in use at LANL and LLNL. In addition, DOE has recently started a pit disassembly and conversion demonstration project at LANL, where processes will be further developed and tested.

As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD284–2 General SPD EIS and NEPA Process

DOE acknowledges the commentors' views. The analyses in Chapter 4 of Volume I show that construction and normal operation of either the pit conversion facility or the MOX facility at Pantex would have no major impacts on human health or the environment.

The comment period for the SPD Draft EIS was from July 17 through September 16, 1998. During that time, DOE convened five public hearings, including one in Amarillo, Texas, to obtain oral and written comments from the public. These hearings were open to all individuals and organizations, and their format was intended to encourage public discussion and interaction. All comments were given equal consideration and responded to.

PANHANDLE AREA NEIGHBORS AND LANDOWNERS
DORIS AND PHILLIP SMITH
PAGE 3 OF 4

The siting of the PDCF over the Ogallala Aquifer, our source of water, is repugnant with DOE assertions of protecting the environment. Placing plutonium processing over the water supply of the Texas Panhandle and eleven other cities and towns further south is unacceptable. Pantex has already been the source of heavy contamination to the water source both beneath the site and offsite to the east on adjacent private porperty. To cleanup the aquifer is impssible, adding plutonium processing and associated wastes to the problem will only compound the contamination issue. What do you propose to prevent this further contamination to the Ogallala Aquifer from happening? What proven and demonstrated technologies do you claim will keep the Ogallala Aquifer from being contaminated? 3

Our community has been saddled with storage of plutonium pits in old, World War II bunkers which are not suitable for the storage of the most deadly material in the world. There are innumerable problems associated with the storage which have not been corrected - since the DOE has not accomplished this mission of safely storing the plutonium pits, then how in the world do you think you can safely process this material? We are tired of your claims, assertions and promises, just leave the Texas Panhandle alone, take care of the problems you now have at Pantex and do not dump anymore missions on this small site. 4

As the agricultural community which surrounds the Pantex site - we beg you to please use common sense in your decision of siting these new missions. We are laboring to produce food to feed and sustain the world, while you are producing weapons of mass destruction to kill and mame the world, this dichotomy has to end.

With the Cold War over, DOE is facing the time when this maddness could all be stopped - do you have the courage and the intregity to be truthful to the American taxpayers and say ..this is the end, we will not waste more of your tax dollars - there will be no more weapons , no more processing - we are stopping...?

Thank you for the opportunity to comment.

Sincerely,

Doris and Phillip Smith,Co-Chairs
Panhandle Area Neighbors and Landowners

MD284

MD284–3 **Water Resources**

DOE acknowledges the commentors' concerns regarding potential contamination of the Ogallala aquifer. As described in Section 4.17.2.2, wastes would be managed in accordance with current site practices. No radioactive or hazardous wastes would be disposed of at Pantex. Wastes would be treated and stored in accordance with all applicable regulations and permits. In addition, plutonium moves extremely slowly through soils and groundwater. In the unlikely event of an accident, plutonium would be contained in surface soils and remediated before it could travel into the Ogallala aquifer.

The remainder of this comment is addressed in response MD284–1.

MD284–4 **DOE Policy**

To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed surplus plutonium disposition facilities in compliance with today's strict environmental, safety, and health requirements.

DOE acknowledges the commentors' concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed; addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner.

PANTEX
TIM FLOWERS
PAGE 1 OF 1

I am a worker at Pantex and have been there for 17 years now and I wanted to say that I very much support the Surplus Plutonium Disposition Draft Environmental Impact Statement or commonly know as the Pit Disassembly at Pantex. Thank you. Tim Flowers 1

WD018

WD018–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

I feel that Pantex is the best location for the pit disassembly and conversion facility. We are centrally located in the U.S. and we are the final disassembly point for the weapons; so the pits are already here. I have been with this company for seventeen years and it is very safety oriented. Also the citizens of Amarillo trust Pantex because of their long standing safety record. Thank you for considering our Pantex plant for this important job. Sincerely, Jim Harbin 1

WD001

WD001–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PEDIGREW, HAL
PAGE 1 OF 1

Yes, my name is Hal Pedigrew. I live at 5501 Ranchview Drive in Amarillo. The area code is 79124 and I would like to get a copy of that documentation. I'd also like to voice my opinion that I would like to have that facility put anywhere else in the United States but here. Thank you. 1

PD016

PD016–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC, 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

I do not support plutonium processing at the Pantex Plant. In the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, the Department of Energy prudently decided against locating one plutonium processing facility (MOX fuel fabrication) at the Pantex Plant. For the following additional reasons, a Plutonium Pit Disassembly and Conversion facility also should not be located at Pantex: 1

Pantex Should Not Become the Next Rocky Flats

Pantex has never processed plutonium. The Pantex Superfund site has so far apparently escaped the type of radioactive contamination found at plutonium processing sites like Rocky Flats in Colorado and Hanford in Washington.

Risks That Are Unknown Are Too High

The Pantex Plant occupies an area that is a fraction of the size of other plutonium sites.

SIZE MATTERS: A Comparison of the Area of the Four Candidate Sites (Square Miles)

Pantex	Savannah River Site	Idaho National Engineering Lab.	Hanford
23	309	890	560

2

The technologies proposed in the Plutonium Pit Disassembly and Conversion Facility are undemonstrated and unproven. It is unacceptable to have plutonium operations above the Ogallala Aquifer and only one mile from where people live and work in a vibrant agricultural producing area. The Pantex legacy already includes heavy contamination in a perched layer of groundwater less than one hundred feet above the Ogallala Aquifer. This pollution extends from under the Pantex Plant to adjacent private property and the real impacts remain unknown. The risk of any additional groundwater pollution is unacceptable in an agricultural region.

Common sense dictates that negative consequences to people and farmland from nuclear accidents are far more likely in a small, open, windy location like Pantex. The Department of Energy has acknowledged that the most visually unappealing feature of the plutonium facilities will be their smokestacks. Visual blight will be a minor inconvenience compared to the air pollutants--many of them radioactive--expected to escape into the atmosphere daily through smokestack filters. Routine air emissions of tritium, plutonium, americium, and beryllium constitute unacceptable new hazards to the Texas Panhandle. 3

MD114

MD114–1 **Alternatives**

DOE acknowledges the commentors' opposition to siting the proposed surplus plutonium disposition facilities at Pantex. Analyses in Chapter 4 of Volume I indicate that impacts of operating the proposed facilities on health, safety, and the environment at Pantex would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed facilities in compliance with today's strict environmental, safety, and health requirements. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD114–2 **Human Health Risk**

Although Pantex is smaller in overall size in comparison with the other candidate sites, analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor (e.g., see Section 4.6).

While it is true that the pit conversion facility is the first consolidated facility for accomplishing this mission on a large scale, the processes that would be used in this facility are not entirely new. Many of these processes are in use at LANL and LLNL. In addition, DOE has recently started a pit disassembly and conversion demonstration project at LANL, where processes will be further developed and tested.

Section 4.26.3.2 analyzes impacts to the environment (including contamination to the Ogallala aquifer) due to construction and normal operation of a pit conversion facility at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. Appendix J.3 includes an analysis of potential contamination of agricultural products and

livestock and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. If the proposed surplus plutonium disposition facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation. This analysis indicates that impacts of operating the pit conversion facility on agricultural products, livestock, and human health at Pantex would likely be minor.

MD114–3 **Human Health Risk**

It is DOE policy to operate in compliance with all applicable air quality requirements and to protect human health and the environment. DOE takes into consideration pollution reduction techniques to minimize air releases when designing, constructing, and operating its facilities. It also considers aesthetic and scenic resources in the design, location, construction, and operation of facilities. Potential concentrations of air pollutants at Pantex for the various alternatives have been estimated, considering appropriate local meteorology and other data associated with the area. Because the releases from the pit conversion and MOX facilities would be very small (see Appendix J.3.1.4), estimates of resultant radiological health risks are small. As indicated in Section 4.17.2.4, the maximum possible dose delivered to a member of the public during normal operations of the MOX and pit conversion facilities at Pantex would be 0.068 mrem/yr, 0.02 percent of the dose that individual would receive annually from natural background radiation. The estimated dose to the public from radiological emissions (e.g., amercium, tritium, and plutonium) would be 0.077 person-rem/yr which would result in an increase of 2.9×10^{-3} LCFs over the 10-year operating life of the pit conversion facility. Any new facilities that might be built would be within existing site boundaries, and would be matched aesthetically with the current plant to limit potential visual impacts.

There is Valid, Strong Criticism of Safety in the Storage of Plutonium at Pantex

Since Pantex became the nation's long-term storage location for up to 20,000 plutonium pits, promises to improve safety conditions have not happened. The U.S. Government Accounting Office and the Defense Nuclear Facilities Safety Board have issued reports critical of plutonium storage safety at Pantex. Fifty million taxpayer dollars were spent on a failed plutonium pit container program (the AT-400A) and the plan to move over 10,000 pits into a safer remodeled building (Building 12-66) has also failed.

When it comes to plutonium pit storage problems, Panhandle residents are back to square one. The plutonium remains in old, unsuitable, corroding storage containers and in 35-55 year old "bunkers" that the Department of Energy promised were for "temporary" use. Plutonium that is supposed to be stored in a stable environment now sits in the bunkers--all but three without air conditioning--even as the Texas Panhandle experiences a spell of more than 40 consecutive days of 90+ degree temperatures, and more than 20 days this summer with thermometers registering 100+ degrees. If the Department of Energy cannot accomplish the job of safely storing Pantex plutonium in the most stable environment, there is no reason to accept its unsubstantiated assurances to safely process deadly plutonium powders at Pantex. 4

Thank you for this opportunity to comment.

Sincerely:

Darwin Pluhar
Jennifer Pluhar

Please do not process plutonium at Pantex! Our water from the Ogallala Aquifer is the life blood of our nation's bread basket! 35% of the U.S. supply of beef is produced in the Texas Panhandle. Our crops, our livestock, and we depend on that water! No to Plutonium Processing! 5

MD114

MD114–4 **DOE Policy**

DOE acknowledges the commentors' concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed; addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

MD114–5 **Human Health Risk**

This comment is addressed in responses MD114–1 and MD114–2.

POTTER COUNTY
HONORABLE ARTHUR WARE ET AL.
PAGE 1 OF 2

County of Potter
State of Texas
Amarillo Texas

ARTHUR WARE
POTTER COUNTY JUDGE

August 25, 1998

DOE Office of Fissile Material Disposition
c/o SPD EIS
U.S. Department of Energy
P. O. Box 23786
Washington, DC 20026-3786
ATTENTION: Mr. Bert Stevenson, NEPA Compliance Officer

Re: DOE's Draft Surplus Plutonium Disposition Environment Impact Statement

Dear Mr. Stevenson:

First and foremost, we are adamant that any current and future functions at Pantex be conducted in a safe and environmentally sound manner. Our first priority is to ensure that expansion at Pantex does not impair the health or safety of area residents or have an adverse effect on the environment. These goals serve as a prerequisite to any current or future activities at Pantex. 1

We are aware that DOE has selected the Savannah River Site (SRS) as the preferred alternative for the MOX fuel fabrication facility and is considering SRS, along with Pantex, as the location for the disassembly/conversion mission.

We wish to focus my comments on the selection of Pantex as the preferred site for locating the plutonium pit disassembly and conversion facility. We are concerned that locating the conversion mission at a site other than Pantex would not only increase the hazards of dealing with plutonium but would also ignore the facts that make Pantex the site most capable of ensuring that disposition goals are met with the utmost attention to economic and safety considerations. 2

MD122

MD122–1 **Alternatives**

According to the analyses reflected in Sections 4.6 through 4.8, environmental impacts of the proposed action on Pantex under any alternative would likely be minor. DOE is committed to ensuring that public health and safety are protected wherever the proposed surplus plutonium disposition facilities are located.

MD122–2 **Alternatives**

DOE acknowledges the commentors' support for siting the pit conversion facility at Pantex. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure.. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

When considering the proliferation risks involved in unnecessarily transporting a large number of classified plutonium pits across the country from Pantex, it makes budgetary and policy sense to site disposition functions where storage already exists. First, due to its cheaper labor costs and utility rates, and water and land availability, Pantex clearly is the most cost-effective site over the life of the program than any other site under consideration. Second, transportation of plutonium in non-classified form (after disassembly and conversion at Pantex) to the SRS is far preferable to the perils that would be incurred by shipping plutonium in a weapons-ready form. Pantex has the necessary safety, security, and surveillance capabilities to accommodate an expanded role. Third, it is in the best interests of the United States to engage Russia in bilateral demilitarization and inspections independent of the politically contentious MOX fuel fabrication process. It will also be much easier to track converted plutonium pits for IAEA and international inspections if these activities are undertaken at the site of original pit storage. 2

The Pantex plant enjoys tremendous public and bipartisan political support for new missions and could provide them at the lowest additional costs to the taxpayers. To accomplish its disposition goals, DOE must have strong, broad-based political support. Bringing in the support of Texas Senators and Congressmen will help ensure that DOE disposition initiatives succeed.

Bases upon these reasons, we respectfully urge DOE to designate Pantex as the site for the pit assembly and conversion facility.

Sincerely,

Arthur Ware
County Judge

JOHN STRADLEY,
COMMISSIONER, PRECINCT 1

MANNY PEREZ,
COMMISSIONER, PRECINCT 2

STRICK WATKINS,
COMMISSIONER PRECINCT 3

MD122

PROFFITT, GARY
PAGE 1 OF 1

I am very much in favor of having the pit disassembly and conversion at Pantex where it will be done right the first time. 1

WD009

WD009–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

August 10, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition c/o SPDEIS
Box 23786
Washington, DC 20026-3786

REF: Location of Pit Disassembly and Conversion Facility

As an employee at the Pantex Plant in Amarillo, Texas, and a long term resident of the Amarillo, Texas, I want to see the pit conversion work done at Pantex.

This is not just a personal issue. The real consideration should be safety, and of the two possible sites, Pantex is the safer facility. This can easily be confirmed by reviewing existing records for both facilities. At times it has almost seemed like Pantex was overlooked for additional weapons-related work because we are such a clean site.

The safety record is directly attributable to the efforts of plant employees, who have worked very hard through the years to meet or exceed requirements. Even in the years before the creation of the various oversight agencies such as OSHA, the plant functioned safely. The technical skills of the employees who do hands on weapon work is another reason for the excellent record.

The fact that Texas is not as strong politically -- we don't have aggressive PACs or Strom Thurmond fighting for us -- should not be the major deciding point. As a matter of fact, maybe politics should be left out of it altogether. 1

The Pantex Plant has provided jobs for my family since 1980, and I hope that it will continue to provide employment for me and many others in the future. The Pantex Plant now has thousands of pits stored. Why risk shipping these items to another location? Why increase the cost to do the job?

I sincerely hope that the DOE will look at all issues with an open mind with the major consideration being safety. The second and third considerations should be the technical skill of the employees, and the last consideration should be cost. If these things are considered without PAC or other political influence, the only logical choice is for the pit conversion to be done at the Pantex Plant.

Respectfully submitted,

Don Ray

Don Ray

MD024

MD024–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. DOE believes that all the candidate sites are suitable from an operational, community support, and safety standpoint.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

REAM, JOE
PAGE 1 OF 1

1901 PHILADELPHIA ST.
AMARILLO, TEXAS 79103
AUGUST 10, 1998

U.S. DEPARTMENT OF ENERGY
OFFICE OF FISSILE MATERIALS DISPOSITION
MD-4 FORRESTAL BUILDING
1000 INDEPENDENCE AVE.,SW
WASHINGTON, D.C. 20585

DEAR SIRS:

AS A CITIZEN OF AMARILLO, WE URGE YOU TO LOCATE THE PIT DISASSEMBLY AND CONVERSION FACILITY AT THE PANTEX PLANT FOR ECONOMICAL AND SAFETY REASONS.

PANTEX ALREADY HAS ADEQUATE STORAGE SPACE FOR THE CONVERTED PLUTONIUM THAT WOULD BE VERY EXPENSIVE TO CONSTRUCT ELSE WHERE AND WILL NOT ENTAIL TRANSPORTING THE 'PITS' ACROSS THE COUNTRY, WHICH IS COSTLY AND SUSCEPTABLE TO TRANSPORTATION ACCIDENTS.

PANTEX PLANT EMPLOYEES HAVE MORE EXPERIENCE HANDLING PLUTONIUM PITS THAN ANY OTHER D.O.E. SITE AND HAS AN OUTSTANDING SAFETY RECORD. ALSO PANTEX ALREADY HAS TRAINED TECHNICAL PERSONNEL THAT ARE CERTIFIED TO PERFORM THE 'GLOVEBOX' WORK REQUIRED FOR THIS TYPE WORK. 1

SECURITY AT THE PANTEX PLANT IS SECOND TO NONE COMPARED TO ALL THE OTHER DEPARTMENT OF ENEGERY FACILITIES.

THE PANTEX PLANT ALSO HAS THE SUPPORT OF THE RESIDENTS OF THE COMMUNITY AND THE LOCAL AND STATE ELECTED OFFICIALS ALONG WITH THE TEXAS CONGRESSIONAL DELEGATION.

AGAIN, WE SINCERELY URGE YOU TO LOCATE THE PIT DISASSEMBLY AND CONVERSION FACILITY AT THE PANTEX PLANT.

SINCERELY YOURS,

JOE REAM

JR/1

FD150

FD150–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AUGUST 11, 1998

U.S. DEPARTMENT OF ENERGY
OFFICE OF FISSLE MATERIALS DISPOSITION
MD-4 FORRESTAL BUILDING
1000 INDEPENDENCE AVE.,SW
WASHINGTON, DC 20585

DEAR SIRS:

I AM A LONG TIME RESIDENT OF AMARILLO AND FULLY SUPPORT YOUR LOCATING THE PIT DISASSEMBLY AND CONVERSION FACILITY AT THE PANTEX PLANT LOCATED NEAR AMARILLO, TEXAS. 1

SINCERELY,

Oleta Ream

OLETA REAM
1901 PHILADELPHIA
AMARILLO, TEXAS 79103

FD232

FD232–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

ROGERS, ERIN
PAGE 1 OF 3

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC, 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

I do not support plutonium processing at the Pantex Plant. In the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, the Department of Energy prudently decided against locating one plutonium processing facility (MOX fuel fabrication) at the Pantex Plant. For the following additional reasons, a Plutonium Pit Disassembly and Conversion facility also should not be located at Pantex: 1

Pantex Should Not Become the Next Rocky Flats

Pantex has never processed plutonium. The Pantex Superfund site has so far apparently escaped the type of radioactive contamination found at plutonium processing sites like Rocky Flats in Colorado and Hanford in Washington.

Risks That Are Unknown Are Too High

The Pantex Plant occupies an area that is a fraction of the size of other plutonium sites.

SIZE MATTERS: A Comparison of the Area of the Four Candidate Sites (Square Miles)			
Pantex	**Savannah River Site**	**Idaho National Engineering Lab.**	**Hanford**
23	**309**	**890**	**560**

2

The technologies proposed in the Plutonium Pit Disassembly and Conversion Facility are undemonstrated and unproven. It is unacceptable to have plutonium operations above the Ogallala Aquifer and only one mile from where people live and work in a vibrant agricultural producing area. The Pantex legacy already includes heavy contamination in a perched layer of groundwater less than one hundred feet above the Ogallala Aquifer. This pollution extends from under the Pantex Plant to adjacent private property and the real impacts remain unknown. The risk of any additional groundwater pollution is unacceptable in an agricultural region.

Common sense dictates that negative consequences to people and farmland from nuclear accidents are far more likely in a small, open, windy location like Pantex. The Department of Energy has acknowledged that the most visually unappealing feature of the plutonium facilities will be their smokestacks. Visual blight will be a minor inconvenience compared to the air pollutants--many of them radioactive--expected to escape into the atmosphere daily through smokestack filters. Routine air emissions of tritium, plutonium, americium, and beryllium constitute unacceptable new hazards to the Texas Panhandle. 3

MD063

MD063–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. As described in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of any of the proposed activities during routine operations at any of the candidate sites would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed surplus plutonium disposition facilities in compliance with today's strict environmental, safety, and health requirements. Decisions on the surplus plutonium disposition program at Pantex will be based upon environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD063–2 **Human Health Risk**

Although Pantex is smaller in overall size in comparison with the other candidate sites, analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor (e.g., see Section 4.6).

While it is true that the pit conversion facility is the first consolidated facility for accomplishing this mission on a large scale, the processes that would be used in this facility are not entirely new. Many of these processes are in use at LANL and LLNL. In addition, DOE has recently started a pit disassembly and conversion demonstration project at LANL, where processes will be further developed and tested.

Section 4.26.3.2 analyzes impacts to the environment (including contamination to the Ogallala aquifer) due to construction and normal operation of a pit conversion facility at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. Appendix J.3

includes an analysis of potential contamination of agricultural products and livestock and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. If the proposed surplus plutonium disposition facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation. This analysis indicates that impacts of operating the pit conversion facility on agricultural products, livestock, and human health at Pantex would likely be minor.

MD063–3 **Human Health Risk**

It is DOE policy to operate in compliance with all applicable air quality requirements and to protect human health and the environment. DOE takes into consideration pollution reduction techniques to minimize air releases when designing, constructing, and operating its facilities. It also considers aesthetic and scenic resources in the design, location, construction, and operation of facilities. Potential concentrations of air pollutants at Pantex for the various alternatives have been estimated, considering appropriate local meteorology and other data associated with the area. Because the releases from the pit conversion and MOX facilities would be very small (see Appendix J.3.1.4), estimates of resultant radiological health risks are small. As indicated in Section 4.17.2.4, the maximum possible dose delivered to a member of the public during normal operations of the MOX and pit conversion facilities at Pantex would be 0.077 mrem/yr, 0.02 percent of the dose that individual would receive annually from natural background radiation. The estimated dose to the public from radiological emissions (e.g., amercium, tritium, and plutonium) would be 0.58 person-rem/yr which would result in an increase of 2.9×10^{-3} LCFs over the 10-year operating life of the pit conversion facility. Any new facilities that might be built would be within existing site boundaries, and would be matched aesthetically with the current plant to limit potential visual impacts.

ROGERS, ERIN
PAGE 3 OF 3

There is Valid, Strong Criticism of Safety in the Storage of Plutonium at Pantex

Since Pantex became the nation's long-term storage location for up to 20,000 plutonium pits, promises to improve safety conditions have not happened. The U.S. Government Accounting Office and the Defense Nuclear Facilities Safety Board have issued reports critical of plutonium storage safety at Pantex. Fifty million taxpayer dollars were spent on a failed plutonium pit container program (the AT-400A) and the plan to move over 10,000 pits into a safer remodeled building (Building 12-66) has also failed. 4

When it comes to plutonium pit storage problems, Panhandle residents are back to square one. The plutonium remains in old, unsuitable, corroding storage containers and in 35-55 year old "bunkers" that the Department of Energy promised were for "temporary" use. Plutonium that is supposed to be stored in a stable environment now sits in the bunkers--all but three without air conditioning--even as the Texas Panhandle experiences a spell of more than 40 consecutive days of 90+ degree temperatures, and more than 20 days this summer with thermometers registering 100+ degrees. If the Department of Energy cannot accomplish the job of safely storing Pantex plutonium in the most stable environment, there is no reason to accept its unsubstantiated assurances to safely process deadly plutonium powders at Pantex.

Thank you for this opportunity to comment.

Sincerely:

Erin Rogers

Don't risk the Ogallala for your short-sighted money-making schemes! Your greed + disregard for human life and the health of the environment SICKENS me. 5

Erin Rogers

MD063

MD063–4 **DOE Policy**

DOE acknowledges the commentor's concern regarding storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed; addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

MD063–5 **DOE Policy**

DOE is committed to public and worker safety during the construction, operation, and deactivation of the proposed surplus plutonium disposition facilities, and would implement appropriate controls and procedures to ensure compliance with all applicable Federal, State, and local laws, rules, regulations, and requirements.

The remainder of this comment is addressed in response MD063–2.

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC, 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

In the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, the Department of Energy proposes to build new plutonium processing facilities and dispose of 55 tons of "surplus" plutonium. I ask that the following comments reflecting my concerns and reservations regarding these proposals be incorporated into the decisions made for the plutonium disposition program.

Immobilize

The objective of plutonium disposition is to make weapons-usable plutonium as inaccessible for reuse in nuclear weapons as the plutonium in irradiated nuclear fuel, and to do so in a timely and safe manner. For the following reasons the Department of Energy should choose to immobilize all surplus plutonium and consider the possibility of doing this at more than one location:

- Immobilizing all plutonium is a safer option because it involves less handling, processing, and transporting of plutonium and other radioactive materials, and is less expensive because it involves fewer new facilities and avoids the costs of subsidizing the nuclear industry. These same factors would allow disposition to occur in a much more timely manner; 1
- According to the Department of Energy's own studies, the "ceramification can-in-canister" approach to immobilization results in a waste product that is more resistant to theft, diversion, and reuse than irradiated mixed oxide (MOX) fuel;
- The immobilization approach does not involve increasing the risk to persons living near nuclear reactors because it avoids burning--for the first time ever--large amounts of weapons-grade plutonium.

If delays arise in the immobilization program, the Department of Energy should insure that:

- Tons of presently unstable plutonium oxide scheduled for immobilization are put in a safer, more stable form suitable for storage, inventory, and international inspection; 2
- The objective of interim demilitarization of currently stable forms of plutonium, such as plutonium in pits, must be the minimal alteration of its current form necessary for safe storage, inventory, and international inspection.

No To MOX

The ill-conceived mixed oxide (MOX) fuel option should be rejected because there is no rational justification to convert stable plutonium to less stable, more dangerous plutonium oxide powder for use in MOX fuel, and then subsidize the nuclear industry to irradiate the fuel in aging nuclear reactors. Now that it appears obvious that producing plutonium oxide powder suitable for use in MOX fuel will require liquid acid plutonium processing, the MOX option is a proven threat to human health and the environment. 3

The United States' rationale that it must choose the MOX option to appease Russia is unsubstantiated and flawed in several respects:

- There is little support for a plutonium fuel economy in Russia, where people voting in public referendums have overwhelmingly rejected new nuclear developments;

MD064

MD064–1 **Immobilization**

DOE acknowledges the commentor's support for the immobilization approach to surplus plutonium disposition. However, DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Multiple immobilization facilities would be very costly and time-consuming to implement, and therefore were not considered as an option in the SPD EIS. With only 50 t (55 tons) of surplus plutonium to disposition, it would not be practical to construct and operate more than one immobilization facility, even if the decision were made to immobilize all the surplus plutonium.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. NAS identified that the Spent Fuel Standard could be met through disposition by either the immobilization or MOX approach. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

NAS is currently conducting studies to confirm the ability of the ceramic can-in-canister immobilization approach to meet the Spent Fuel Standard.

This SPD EIS analyzes the potential environmental impacts associated with implementing the proposed surplus plutonium disposition activities at the candidate sites. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, demonstrate that the activities would likely have minor impacts on the health, safety and environment at any of the candidate sites, including transportation impacts. Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents.

MD064–2 **DOE Policy**

Surplus plutonium dioxide would be stabilized in conformance with DNFSB Recommendation 94–1 prior to being immobilized under the surplus plutonium disposition program. As discussed in Section 2.4, secure storage and monitoring provisions, including international inspection, and other safeguards will be integral components of the proposed facilities.

DOE is committed to the safe, secure storage of these pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. Evaluation of repackaging Pantex pits into a more robust container is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

MD064–3 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the

United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

The addition of the plutonium-polishing process was analyzed and a description of the potential environmental impacts was added to the impact sections presented for the MOX facility in Chapter 4 of Volume I. As indicated by the analyses, the addition of this process is not expected to materially affect human health of the population living within 80 km (50 mi) of the candidate sites. For example, the annual dose associated with operating the MOX facility is expected to increase by between 0.017 and 0.18 person-rem/yr for the population living within 80 km (50 mi) of the candidate sites.

The remainder of this comment is addressed in response MD064–1.

ROGERS, ERIN
PAGE 4 OF 6

- The argument that the Russian government opposes immobilization because the plutonium is more easily retrieved is undermined by the fact that irradiated MOX fuel is easier to re-use in nuclear weapons than the ceramification can-in-canister disposition approach;

- The United States should not be encouraging Russia to develop MOX capability due to the uncertainties produced by the U.S. underwriting costs of a Russian infrastructure to reprocess plutonium;

- Russia's choice of technology should not determine the U.S. choice. The governments themselves have recognized this, as in the United States-Russian Joint Plutonium Disposition study in 1996, which found that, "*The United States and Russia need not use the same plutonium disposition technology. Indeed, given the very different economic circumstances, nuclear infrastructures, and fuel cycle policies in the two countries, it is likely that the best approaches will be different in the two countries.*" 3

Already, politically powerful voices are suggesting that United States policy regarding plutonium be re-examined. By establishing a new level of plutonium processing infrastructure which encourages plutonium commerce, U.S. non-proliferation policy is clearly undermined.

Inform People of the Real Hazards, Risks, and Uncertainties

The Department of Energy has not fulfilled its legal obligation to fully inform people of the real risks, hazards, uncertainties and long-term implications of processing tons of plutonium powder that is hazardous to human health at the scale of micrograms. This latest voluminous, and largely unreadable, environmental document does not even contain the most basic information about hazards, such as the expected quantities of radioactive air pollutants. Instead, the public is forced to follow a paper maze if the information is available at all. 4

The Department of Energy must admit that the real hazards and risks are largely unknown, and that uncertainty is the only constant at this time. There is only one mixed oxide (MOX) fuel plant currently operating at the capacity proposed by this document--100 tons of MOX fuel fabricated per year--and that facility uses reactor-grade plutonium. 5 No MOX fuel from weapons-grade plutonium has ever been fabricated or used on an industrial scale, and no weapons-grade plutonium has ever been immobilized on an industrial scale. The plutonium pit disassembly and conversion plant would be a first-of-its-kind facility utilizing unproven technologies that are controversial even within the nuclear establishment. 6

To compound the uncertainties, the Department of Energy plutonium disposition plan is not a model for success. Under the existing proposals, the Department of Energy would design facilities requiring unproven technologies while the technology demonstration and testing is ongoing, and begin facility construction before finishing their design. The Department of Energy has followed this model of development before and the result has always been cost overruns, delays, unexpected negative impacts on human health and the environment, and massive waste of taxpayer dollars. 7

Thank you for this opportunity to comment.

Sincerely,

Erin Rogers

We don't need more radioactive waste! We do not need more nuclear power. There is nowhere to put the waste we have. No to MOX- No to further subsidization of the nuclear power industry! This is crazy. 8

MD064

MD064–4 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). It is intended as a source of environmental information for the DOE decisionmakers and the public. The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. As with any EIS, technical information is included to the extent that it is required to understand those actions and impacts. Other data were added in the course of the EIS development—for example, expected radiological release quantities, including airborne releases, in Appendix J. Additional technical information concerning the proposed facilities is given in various data reports reflected in the list of references for Chapter 2 of Volume I. These referenced materials are available in DOE reading rooms.

MD064–5 **MOX Approach**

The commentor is correct that MOX fuel is not widely produced; however, the process is similar to production of LEU fuel. In fact, after the uranium and plutonium oxide powders are blended, the MOX fuel fabrication process is essentially identical to LEU fuel fabrication. While weapons-grade plutonium is currently used in MOX fuel, its behavior in fuel is essentially the same as that of non-weapons origin plutonium, and so does not present a situation different from MOX fuel experience to date. In addition, a limited number of MOX fuel assemblies would be irradiated and tested in accordance with NRC requirements to verify acceptability prior to fabricating the fuel on a larger scale for insertion into the reactors. NRC will also license the MOX facility under 10 CFR 70, and be responsible for issuing operating license amendments under 10 CFR 50 for the domestic, commercial reactors that have been selected to irradiate the MOX fuel. There are always uncertainties involved with construction projects and startup of new facilities and processes. However, DOE has considered the uncertainties in its evaluations and determined that MOX fuel fabrication for use in commercial reactors is a viable option to surplus plutonium disposition.

MD064–6 **Pit Disassembly and Conversion**

While it is true that the pit conversion facility is the first consolidated facility for accomplishing this mission on a large scale, the processes that would be used in this facility are not entirely new. Many of these processes are in use at LANL and LLNL. However, to ensure successful transition to full-scale operation, DOE is testing these components as an integrated system at LANL. This pit disassembly and conversion demonstration is focusing on equipment design and process development and will provide information for fine-tuning the process and operational parameters prior to pit conversion facility operation. While this demonstration could continue for up to 4 years, the information from the demonstration would be generated, gathered, and be available on a continuous basis throughout the facility design phase. This demonstration project and other R&D projects are described in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), which is available on the MD Web site at http://www.doe-md.com.

MD064–7 **Alternatives**

DOE acknowledges the commentor's concern over potential shortcomings of the surplus plutonium disposition program. While it is true that the disposition of large quantities of plutonium is unprecedented, the various disposition alternatives are not. Several countries, including Russia and the United States, have experience with immobilizing high-level wastes and in use of the can-in-canister approach to that end. Using a ceramic rather than a glass matrix has been found to offer distinct advantages in the areas of proliferation resistance, repository durability, worker radiation exposure during processing, and cost-effectiveness.

Commercial reactors in the United States are capable of safely using MOX fuel. The MOX technology is used in Europe, and therefore does not require extensive research and development for implementation in the United States. The R&D effort would be concentrated on fabricating samples of MOX fuel and conducting limited experiments and tests on those samples to assess fuel performance. The main objectives of this effort by DOE are to ensure that the plutonium and uranium feed materials will produce acceptable MOX

fuel and to examine key issues relative to the performance of MOX fuel in commercial reactors.

MD064–8 **Waste Management**

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

The remainder of this comment is addressed in response MD064–1.

I am concerned about the environment especially the water of the panhandle, since a lot of people drink it. 1

Pantex seems to have a good record for safe handling of dangerous materials. The economy of the panhandle is important also, therefore I am in favor of the expansion of Pantex to recycle Pu. 2

WD012

WD012–1 **Water Resources**

DOE acknowledges the commentor's environmental concerns. Section 4.26.3.2 describes the potential effects of the maximum impact alternative on water resources at Pantex. These analyses indicate that the impacts of construction and normal operation of the pit conversion and MOX facilities on the Ogallala aquifer at Pantex would likely be minor.

WD012–2 **DOE Policy**

DOE acknowledges the commentor's support of future missions at Pantex. However, none of the missions contemplated involved the recycling or reprocessing of plutonium. U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SADESKY, RAY
PAGE 1 OF 1

I strongly recomment that the Pantex Site is selected as the best site for the for the Pit Disassembly/Disposition process, for these reasons:

1. The site has exclusive and considerable experience in weapons disassembly. This experience translates into an improved safety envelope.

2. This site has no known radiological contamination of facilities. 1

3. This site already has a secure area with well trained security force.

4. The required infrastructure only lacks procedural refinements to accomodate the new mission.

5. This site enjoys a very supportive climate with its major stakeholders, including the local population, local and state lawmakers and regional environmental regulators.

Thank you. Ray Sadesky

WD002

WD002–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

511 Avenue K
Hereford, TX 79045

August 14, 1998

ATTENTION: DRAFT SPD-EIS
U. S. Department of Energy
Office of Fissile Materials Disposition
P. O. Box 23786
WASHINGTON DC 20026-3786

Gentlemen;

We Texans want to protect out water, air, and soil from radioactive pollutants. 1

We do not want plutonium processing in the Texas Panhandle.

And we do not want military plutonium turned into MOX fuel. 2

I would appreciate your considering these matters.

Sincerely yours,

Margaret Schultz

Margaret Schultz

MD057

MD057–1 **Alternatives**

DOE acknowledges the commentor's opposition to plutonium processing in the Texas Panhandle. This SPD EIS analyzes the potential environmental impacts associated with implementing the proposed activities at the candidate sites. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, demonstrate that the activities would likely have minor impacts on any of those sites, including Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD057–2 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Pursuing both the immobilization and MOX approaches provides important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

SEEWALD, WILLIAM H.
PAGE 1 OF 1

William Hughes Seewald

14 September 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

Subject: Surplus Plutonium Disposition Draft Environmental Impact Statement

Dear Madams and Sirs:

I enclose two letters herein that lay out some principles and objections to which I subscribe relative to the above referenced NEPA document.

I would also like to add two points that I wish to be considered in addition:

1. Pantex, as a site that has never processed plutonium before, should not be considered for the new plutonium processing missions if the Department is to honor a previous commitment not to introduce such risks to sites not already radiologically contaminated due to previous processing missions. The Department of Energy owes the people of the Texas Panhandle the respect of honoring that sensible commitment, notwithstanding efforts on the part of some local interests to confuse issues of economic development and good public policy. 1
2. It strains credibility that the scoping and analysis for the siting of these new processing facilitates do not include as central criteria a site's previous experience in handling and processing plutonium as well as weighing the significance of any existing infrastructure that would not have to be replicated elsewhere. It seems absolutely self evident that to fail to do so leaves a NEPA document so flawed as to require significant overhaul. 2

Thank you for the opportunity to comment on these proposals.

Sincerely,

William H. Seewald

enc.

806-353-8486 Phone 353-9109 Fax ••• P.O. Box 10090 ~ Amarillo, Texas 79116

MD198

MD198–1 **Alternatives**

DOE acknowledges the commentor's concern that contamination may be introduced at sites that do not currently have plutonium-processing missions. This SPD EIS analyzes impacts of the environment from construction and normal operation of the pit conversion facility. This facility would be located in a new building at either Pantex or SRS and, regardless of the site location, would generate the same level of contamination and require the same amount of D&D. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD198–2 **General SPD EIS and NEPA Process**

As discussed in Sections 1.6 factors used in site selection for the preferred alternative included site infrastructure, mission, and staff expertise. Pantex was selected as a candidate site for the pit conversion facility in part from comments received during the scoping period for the SPD Draft EIS. DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively).

Hello, my name is Mary Shennum. I'm from Amarillo, Texas and I have requested materials in the past. I just wish to comment that I would like to say that I would be against any processing of plutonium here in the Panhandle. This is an agricultural region and our agriculture, our agriculture success is based upon our reputation here, as well as the reality of the difficulty of handling plutonium. I lived in Denver when plutonium was being processed at Rocky Flats and the citizenry grew to understand that it was just so difficult to handle and store there. And I'm just against any processing here. I think it's too dangerous. I think, I'd wish that there could be a place where there were operations already in place to work on these things. It's just a dangerous substance and amount of substances and we would rather not have it here in Amarillo. Thank you so much for your consideration of these comments. Thank you. 1

PD060

PD060–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the pit conversion and MOX facilities at Pantex. Incident-free (normal) releases of radioactivity from the proposed surplus plutonium disposition facilities to the food production chain are explained for each site in Appendix J. Current and future operations at any of the candidate sites should not impact the soil used for agriculture and farming in any of the regions adjacent to these sites. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SHENNUM, MARY
PAGE 1 OF 1

Hello, my name is Mary Shennum. I'm in Amarillo Texas and I have another comment here on the processing of plutonium here in the Panhandle. We have a small area compared to some of the other areas that are being considered for storage of plutonium and we really don't want this processing here. It's a sensitive region. The non-success of agriculture in this area would affect the whole country. And we feel that's important. Also, as far as the producing of the MOX fuel, I think some people have said, and I would tend to agree with it, that the process itself is not quite well researched. It's, we don't really know all the implications of what might happen in processing this fuel. Handling the plutonium powder here is not something we wish to do and we think it should be looked at more closely. There are hazards that have not been recognized. Immobilizing the material seems to be a better option. It would be less dangerous and have some pluses because it would also decrease the risk of having, ever having this substance being used for weapons by someone that we didn't want to use them. Thanks for the opportunity to comment. Thank you very much. 1

PD066

PD066–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition at Pantex. MOX fuel fabrication is not a new technology; it has been used in Europe for many years. DOE has visited some of these European plants and will use any pertinent experience in the development of its own plant, if MOX is chosen as an option. Both the immobilization and MOX fuel approach meet the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SMITH, CAROL
PAGE 1 OF 1

Hello, this is Carol Smith and I think it would be a good thing for Pantex to have the plutonium disposition. And so that's my comment. Thank you. 1

PD023

PD023–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

SMITH, CHUCK
PAGE 1 OF 1

My name is Chuck Smith. This concerns the additional work at the Pantex Plant in Amarillo, Texas. I'm for that work. I think Pantex can do that work well. Thank you very much. Bye. 1

PD021

PD021–1 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC, 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

I do not support plutonium processing at the Pantex Plant. In the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, the Department of Energy prudently decided against locating one plutonium processing facility (MOX fuel fabrication) at the Pantex Plant. For the following additional reasons, a Plutonium Pit Disassembly and Conversion facility also should not be located at Pantex: 1

Pantex Should Not Become the Next Rocky Flats

Pantex has never processed plutonium. The Pantex Superfund site has so far apparently escaped the type of radioactive contamination found at plutonium processing sites like Rocky Flats in Colorado and Hanford in Washington.

Risks That Are Unknown Are Too High

The Pantex Plant occupies an area that is a fraction of the size of other plutonium sites.

SIZE MATTERS: A Comparison of the Area of the Four Candidate Sites (Square Miles)			
Pantex	Savannah River Site	Idaho National Engineering Lab.	Hanford
23	309	890	560

2

The technologies proposed in the Plutonium Pit Disassembly and Conversion Facility are undemonstrated and unproven. It is unacceptable to have plutonium operations above the Ogallala Aquifer and only one mile from where people live and work in a vibrant agricultural-producing area. The Pantex legacy already includes heavy contamination in a perched layer of groundwater less than one hundred feet above the Ogallala Aquifer. This pollution extends from under the Pantex Plant to adjacent private property and the real impacts remain unknown. The risk of any additional groundwater pollution is unacceptable in an agricultural region.

Common sense dictates that negative consequences to people and farmland from nuclear accidents are far more likely in a small, open, windy location like Pantex. The Department of Energy has acknowledged that the most visually unappealing feature of the plutonium facilities will be their smokestacks. Visual blight will be a minor inconvenience compared to the air pollutants--many of them radioactive--expected to escape into the atmosphere daily through smokestack filters. Routine air emissions of tritium, plutonium, americium, and beryllium constitute unacceptable new hazards to the Texas Panhandle. 3

MD102

MD102–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. As described in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of any of the proposed activities during routine operations at any of the candidate sites would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed surplus plutonium disposition facilities in compliance with today's strict environmental, safety, and health requirements. Decisions on the surplus plutonium disposition program at Pantex will be based upon environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD102–2 **Human Health Risk**

Although Pantex is smaller in overall size in comparison with the other candidate sites, analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor (e.g., see Section 4.6).

While it is true that the pit conversion facility is the first consolidated facility for accomplishing this mission on a large scale, the processes that would be used in this facility are not entirely new. Many of these processes are in use at LANL and LLNL. In addition, DOE has recently started a pit disassembly and conversion demonstration project at LANL, where processes will be further developed and tested.

Section 4.26.3.2 analyzes impacts to the environment (including contamination to the Ogallala aquifer) due to construction and normal operation of a pit conversion facility at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. Appendix J.3 includes an analysis of potential contamination of agricultural products and

livestock and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. If the proposed surplus plutonium disposition facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation. This analysis indicates that impacts of operating the pit conversion facility on agricultural products, livestock, and human health at Pantex would likely be minor.

MD102–3 **Human Health Risk**

It is DOE policy to operate in compliance with all applicable air quality requirements and to protect human health and the environment. DOE takes into consideration pollution reduction techniques to minimize air releases when designing, constructing, and operating its facilities. It also considers aesthetic and scenic resources in the design, location, construction, and operation of facilities. Potential concentrations of air pollutants at Pantex for the various alternatives have been estimated, considering appropriate local meteorology and other data associated with the area. Because the releases from the pit conversion and MOX facilities would be very small (see Appendix J.3.1.4), estimates of resultant radiological health risks are small. As indicated in Section 4.17.2.4, the maximum possible dose delivered to a member of the public during normal operations of the MOX and pit conversion facilities at Pantex would be 0.077 mrem/yr, 0.02 percent of the dose that individual would receive annually from natural background radiation. The estimated dose to the public from radiological emissions (e.g., amercium, tritium, and plutonium) would be 0.58 person-rem/yr which would result in an increase of 2.9×10^{-3} LCFs over the 10-year operating life of the pit conversion facility. Any new facilities that might be built would be within existing site boundaries, and would be matched aesthetically with the current plant to limit potential visual impacts.

There is Valid, Strong Criticism of Safety in the Storage of Plutonium at Pantex

Since Pantex became the nation's long-term storage location for up to 20,000 plutonium pits, promises to improve safety conditions have not happened. The U.S. Government Accounting Office and the Defense Nuclear Facilities Safety Board have issued reports critical of plutonium storage safety at Pantex. Fifty million taxpayer dollars were spent on a failed plutonium pit container program (the AT-400A) and the plan to move over 10,000 pits into a safer remodeled building (Building 12-66) has also failed.

When it comes to plutonium pit storage problems, Panhandle residents are back to square one. The plutonium remains in old, unsuitable, corroding storage containers and in 35-55 year old "bunkers" that the Department of Energy promised were for "temporary" use. Plutonium that is supposed to be stored in a stable environment now sits in the bunkers--all but three without air conditioning--even as the Texas Panhandle experiences a spell of more than 40 consecutive days of 90+ degree temperatures, and more than 20 days this summer with thermometers registering 100+ degrees. If the Department of Energy cannot accomplish the job of safely storing Pantex plutonium in the most stable environment, there is no reason to accept its unsubstantiated assurances to safely process deadly plutonium powders at Pantex. 4

Thank you for this opportunity to comment.

Sincerely:

Please dont contaminate our Ogallala Aquifer. Please dont contaminate our air. 5

Let Savannah have the MOX. They are prepared and they want it.

Thank You

Ernestine Smith, M.D.
1216 S. Austin St.
Amarillo Tx 79102-1403

MD102

MD102–4 **DOE Policy**

DOE acknowledges the commentor's concern regarding storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Containers* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Component* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed; addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

MD102–5 **DOE Policy**

DOE acknowledges the commentor's support for siting the MOX facility at SRS. As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise.

The remainder of this comment is addressed in responses MD102–1 and MD102–2.

SMITH, JIM D.
PAGE 1 OF 1

Yes, my name is Jim D. Smith. I live in the Texas Panhandle. Been here all my life, 68 years. I would like to voice opposition to the Pantex operations at Amarillo, Texas. You want public input, so here is some input. I know the Chamber of Commerce in Amarillo and the AEDC and all these people are gung-ho for this plant, but I'm going to tell you, most of the people that live out in the areas, rural areas of the Panhandle are not for this plant, the continuation of this plant, and certainly not for an increase operations out there such as this pit disassembly or whatever you call it. 1
We live in the, a area where there is 3 million head of cattle and the feed lots, this Pantex Plant is located at the end of the runway of the Amarillo International Airport. All the storage is above ground. This is, this is an accident just waiting to happen. I really feel that that plant should be closed and the mess should be cleaned up and the operation should be sent elsewhere. My address is Box, excuse me, my address is HC2, Box 250, Kress, Texas. Zip is 79052. My phone number is (806) 684-2631. Thank you for letting me express my opinion.

PD022

PD022–1 **Facility Accidents**

DOE acknowledges the commentor's opposition to siting the pit conversion facility at Pantex. Accident risk is an important consideration in the decision of whether, and if so, how and where, to conduct the surplus plutonium disposition program. There is accident risk associated with pit conversion operations at Pantex, just as there is accident risk associated with any operations at any site. The analysis in this SPD EIS endeavored to clarify those risks on both an absolute and relative basis so that the wisest course of action can be identified and taken. Chapter 4 of Volume I summarizes the impacts of accidents due to aircraft crashes at Pantex (e.g., see Table 4–60). The frequency of such an accident is judged to be beyond extremely unlikely meaning there is less than 1 chance in 1 million per year that the accident would occur. Detailed presentation of the analysis is provided in Appendix K.1.5.1. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

United States Department of Energy

Comment Form

NAME: (Optional) Sam J. Sottile
ADDRESS: P. O. Box 276, Bushland, TX 79012-0276
TELEPHONE: (806) 356-6269
E-MAIL: sjsottile@juno.com

I wanted to convey the support of my family and myself for DOE's selection of PANTEX to receive the Pit Disassembly and Conversion Facility (PD&CF) mission.

My family attended one of the public meetings here in Amarillo, Texas. We can not tell you how much we appreciated the opportunity to learn more about the overall concepts that are being perused by the DOE.

I personally have been working in the nuclear weapons field for nearly thirty years. Twenty two and a half years in the United States Navy as a Weapons Technician and five years at PANTEX.

Enjoying what I do for a living is a very important part of my own personal mission statement. I really do enjoy disassembling, modifying, and assembling this vital portion of our nation's defense. I preform these tasks safely, and with the utmost attention to detail. Our nation, DOE, the American taxpayers, the people of the state of Texas, my fellow workers, and my own family are my customers. My customers deserve that I put 110% effort into my job. I have all the confidence in the world that the highly trained and experienced workforce of the Mason and Hanger Corp. can preform the PD&CF mission safely and with the utmost respect for our environment.....that's right, we live here in the community also! 1

I knew the positive reputation and acceptance of the PANTEX plant from the business, community, and our elected officials was great, but I was very gratified to hear speaker after speaker laud the "Good Neighbors" they have in the people of the PANTEX plant.

My hope and prayers are that DOE will select the PANTEX plant for the Pit Disassembly and Conversion Facility mission!

Thank you for this opportunity to make these comments.

FD200

FD200–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

STAND of Amarillo, Inc.
Don Moniak
Page 1 of 15

STAND of Amarillo, Inc.

August 12, 1998
STAND COMMENT # 1

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

Attached are a series of comments submitted by STAND of Amarillo, Inc. pertaining to the *Surplus Plutonium Disposition Draft Environmental Impact Statement* (SPDEIS). These documents were referenced at the Amarillo, TX public hearing on August 11, 1998:

1. Comments on NEPA
2. Comments on locating plutonium processing at Pantex
3. Comments on immobilization and MOX
4. STAND of Amarillo Fact Sheet 98-04 with April 9, 1998 news release
5. News releases from August 6, 1998 and August 10, 1998
6. News article from August 11, 1998
7. Portions of the shredded Draft SPDEIS

These comments will be supplemented in the future.

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc.

cc: U.S. Secretary of Energy William Richardson
cc: State of Texas Governor George W. Bush, Jr.
cc: Congressman Mac Thornberry
cc: State of Texas Attorney General Daniel Morales
cc: Ms. Carol Borgstrom, Office of NEPA Policy and Assistance

(806) 358-2622 7105 W. 34th Ave. Suite E - Amarillo, TX 79109 FAX (806) 355-3837

FD175

The National Environmental Policy Act

The National Environmental Policy Act (NEPA) is our basic national charter for the protection of the environment. NEPA requires all Federal agencies to "utilize a systematic, interdisciplinary approach" in planning and decision making of any actions that may have an impact on the environment; insure that high quality "environmental information is available to public officials and citizens before decisions are made and before actions are taken"; and insure substantial and meaningful public involvement in the planning and decision process. 1

The Department of Energy's *Surplus Plutonium Disposition Draft Environmental Impact Statement* (Draft SPDEIS) is in clear violation of the letter and spirit of the National Environmental Policy Act. Following is a list of just a few of the clear violations of this important environmental law.

NEPA requires agencies to identify and analyze significant effects

DOE failed to identify and address beryllium air emissions in the Draft SPDEIS. The *Design-Only Conceptual Design Report for the Pit Disassembly and Conversion Facility* (Los Alamos National Laboratory, 1997) described the PDCF as a beryllium operation and addressed the possible need for an air permit. In its 1994 *Environmental Checklist for ARIES*, Los Alamos National Laboratory cited "expected emissions" of beryllium for a very small test project. 2

DOE failed to identify radioactive air emissions in the Draft SPDEIS. On page J-4 of the Draft SPDEIS DOE wrote that, "source term data for radiological releases, stack heights, and release locations are provided in the data reports for the pit conversion, immobilization, and MOX facilities." The data reports are not provided to the public, but are placed in reading rooms. n other words, the Draft SPDEIS does not provide any data on something as basic as expected quantities of radioactive air pollutants. 3

DOE did not analyze the impact of creating a new plutonium processing site (Pantex). DOE has identified this impact as significant in other NEPA documents. In its Programmatic Environmental Impact Statement for Stockpile Stewardship and Management, (1996), DOE wrote, ***"Plutonium would not be introduced into a site that does not have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current capabilities."*** 4

NEPA requires agencies to evaluate all reasonable alternatives

DOE did not identify or evaluate the "metals-only option" for plutonium pit disassembly and conversion. The "metals only option was reported in the *Technical Risk Assessment for the Department of Energy Pit Disassembly and Conversion Facility Final Report* (Los Alamos National Laboratory, 1997) as the option with the least technical risk. 5

Compiled by STAND of Amarillo

FD175

FD175–1 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively).

FD175–2 **Air Quality and Noise**

The 1994 analysis performed by LANL referred to the possibility of airborne releases of beryllium, a hazardous air pollutant, from pit disassembly and conversion. Subsequent analysis from LANL indicates that there would not be any airborne releases of beryllium (*Pit Disassembly and Conversion Facility, Environmental Impact Statement Data Report—Pantex Plant*, LA-UR-97-2909, June 1998). Because the beryllium is expected to remain in metal form at all times, the health hazards are minimized. The beryllium would be present in large pieces and cuttings created when the pit was bisected. These cuttings would be too large to become airborne. There would be no grinding; thus, there would not be any pieces of beryllium small enough to become airborne. Because the pieces and cuttings would be contaminated with trace levels of radioactive materials, they would primarily be disposed of as TRU waste and is included in the waste projections in this SPD EIS.

Section 2.4.1.1 was revised to discuss beryllium and its presence in the pit conversion facility.

FD175–3 **Air Quality and Noise**

Appendix G was revised to include the stack parameters for each of the proposed surplus plutonium disposition facilities, and Appendix J was revised to include their expected radiological release quantities.

FD175–4 **DOE Policy**

The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) (DOE/EIS-0236, September 1996) states that the pit fabrication mission would not be introduced into a site that does not have an existing plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium

operations into sites without current plutonium capabilities. The SSM PEIS states further that an important element of the site selection strategy is to maximize the use of existing infrastructure and facilities as the nuclear weapons complex becomes smaller and more efficient in the 21st century; thus, no new facilities were to be built to accommodate stockpile management missions. Accordingly, DOE considered as reasonable only those sites with existing infrastructure capable of supporting a pit fabrication mission. Although Pantex has the infrastructure to carry out its current weapons assembly and disassembly mission and nonintrusive pit reuse program, it was not considered a viable alternative for the pit fabrication mission because it did not possess sufficient capability and infrastructure to meet the SSM PEIS siting assumption stated above. Among the operations that were considered in developing siting alternatives for pit fabrication in the SSM PEIS were plutonium foundry and mechanical processes, including casting, shaping, machining, and bonding; a plutonium-processing capability for extracting and purifying plutonium to a reusable form either from pits or residues; and assembly operations involving seal welding and postassembly processing.

When comparing the site selection strategy for pit disassembly and conversion with that used for the pit fabrication mission, the siting criteria in the SSM PEIS have little or no bearing on siting criteria used in this SPD EIS. Pit disassembly and conversion do not require the foundry and mechanical processes discussed in the SSM PEIS and can be accomplished in a stand-alone facility. Also, the SSM PEIS siting assumptions include a requirement to use existing facilities, whereas ,the pit conversion facility would be a new structure no matter where it is located.

The analyses conducted for this SPD EIS indicate that potential environmental and human health impacts at Pantex would not be major. Results of the analysis are presented by alternative in Chapter 4 of Volume I. Detailed information on the potential impacts on human health at Pantex is presented in Appendix J.3. As shown in these sections, normal operation of the proposed facilities at Pantex would be well within limits prescribed by Federal, State, and local laws and regulations.

FD175–5 **Pit Disassembly and Conversion**

NEPA requires agencies to evaluate a range of reasonable alternatives. In the ROD for the *Storage and Disposition PEIS*, DOE identified two approaches for plutonium disposition: immobilization and conversion into MOX fuel for use in existing domestic, commercial reactors. Both approaches call for the use of plutonium dioxide as feed material. To become suitable feed material, the plutonium pits would have to be converted to oxide. Therefore, the metals-only option is beyond the scope of this SPD EIS; it was eliminated from consideration in the ROD for the *Storage and Disposition PEIS.*

STAND OF AMARILLO, INC.
DON MONIAK
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DOE did not evaluate "plutonium polishing"---liquid acid plutonium polishing-- as a reasonable alternative for producing plutonium oxide powder suitable for Mixed Oxide (MOX) fuel use. DOE clearly considers liquid acid plutonium processing to be a reasonable alternative. In early June, DOE amended its *Request for Proposals for MOX Fuel Fabrication and Irradiation Services* to read: ***"The Offeror shall indicate whether or not its technical approach incorporates a plutonium oxide polishing step."*** 6

NEPA requires early implementation and public involvement

NEPA requires agencies to reduce delays and "integrate the NEPA process into early planning,." and DOE's policy is to "apply the NEPA review process early in the planning stages for DOE proposals." (10CFR1021.210.a)

DOE has excluded nuclear reactor communities from the public involvement process. DOE intends to burn Mixed Oxide (MOX) fuel in nuclear reactors but is allowing the nuclear industry to provide the site specific analysis for this proposed federal action. In the Draft SPDEIS, DOE has stated that, "*environmental impact analysis relating to specific reactors will be included in the SPD Final EIS,*" although these analyses are scheduled to be made by Consortiums in their proposals to fabricate and irradiate Mixed Oxide (MOX) fuel. No hearings have been held or are being planned in communities where utilities have expressed an interest in burning MOX fuel. 7

NEPA requires agencies meaningful and substantial public involvement

DOE did not adequately consider public input to the scope of the SPDEIS. During the 1997 Scoping for the Surplus Plutonium Disposition Environmental Impact Statement, hundreds of individuals and groups submitted comments to DOE to: 8

- Involve nuclear reactor communities in the NEPA process and do site-specific analysis of nuclear reactor sites; 7
- Provide environmental, safety and health information from the European mixed oxide (MOX) fuel industry; 8
- Fully analyze the differences between plutonium pit conversion for use in immobilization versus use in mixed oxide (MOX) fuel; 5
- Analyze "aqueous" plutonium processing as a reasonable alternative for plutonium pit conversion. 6
- Provide environmental impact data in the actual environmental impact statement, not in reference documents. 3

These scoping considerations were not undertaken by the Department of Energy. 8

The intent of NEPA is not bigger documents, it is better documents.

The Draft SPDEIS is 1300 pages long, yet it does not contain basic information, it does contain redundant and unnecessary paperwork, and it does not provide high quality information that is easily read by the general public. 9

FD175

FD175–6 Plutonium Polishing and Aqueous Processing

At the time DOE issued the SPD Draft EIS, it believed the gallium content in the plutonium dioxide feed specifications for MOX fuel could be reached using the dry, thermal gallium removal method included in the pit conversion process. However, in response to public interest on this topic and to ensure adequate NEPA review in the event that the gallium specification could not be met with the thermal process, an evaluation of the potential environmental impacts of including a small-scale aqueous process (referred to as plutonium polishing) as part of either the pit conversion or MOX facility was presented in Appendix N of the SPD Draft EIS. On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

FD175–7 General SPD EIS and NEPA Process

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

FD175–8 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concerns regarding public involvement. As discussed in the response to FD175–7, nuclear reactor communities had the opportunity to comment. In the Environmental Critique and Environmental Synopsis, DOE used information that DCS provided on its European MOX fuel experience in evaluating changes required to the proposed MOX facility. The results of the critique were made available to the public in the Environmental Synopsis in accordance with 10 CFR 1021.216.

FD175–9 **General SPD EIS and NEPA Process**

DOE has worked carefully to keep the size of this SPD EIS to a minimum, and yet to make it sufficiently comprehensive to ensure that the decisionmaker and the public are well informed on the potential environmental impacts of siting the proposed surplus plutonium disposition facilities. However, the number and complexity of reasonable alternatives required to meet DOE's needs compel a very large document. DOE has also worked carefully to eliminate duplicate information. Nevertheless, a certain amount of repetition has been necessary to assist the reader—that is, to prevent the reader from having to move between various sections to exhaust the information on a particular topic. DOE has prepared a short summary of the SPD EIS and a guide on how to quickly locate specific information therein.

STAND OF AMARILLO, INC.
DON MONIAK
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U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC, 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

I do not support plutonium processing at the Pantex Plant. In the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, the Department of Energy prudently decided against locating one plutonium processing facility (MOX fuel fabrication) at the Pantex Plant. For the following additional reasons, a Plutonium Pit Disassembly and Conversion facility also should not be located at Pantex:

Pantex Should Not Become the Next Rocky Flats

Pantex has never processed plutonium. The Pantex Superfund site has so far apparently escaped the type of radioactive contamination found at plutonium processing sites like Rocky Flats in Colorado and Hanford in Washington.

Risks That Are Unknown Are Too High

The Pantex Plant occupies an area that is a fraction of the size of other plutonium sites.

SIZE MATTERS: A Comparison of the Area of the Four Candidate Sites (Square Miles)

Pantex	Savannah River Site	Idaho National Engineering Lab.	Hanford
23	309	890	560

10

The technologies proposed in the Plutonium Pit Disassembly and Conversion Facility are undemonstrated and unproven. It is unacceptable to have plutonium operations above the Ogallala Aquifer and only one mile from where people live and work in a vibrant agricultural producing area. The Pantex legacy already includes heavy contamination in a perched layer of groundwater less than one hundred feet above the Ogallala Aquifer. This pollution extends from under the Pantex Plant to adjacent private property and the real impacts remain unknown. The risk of any additional groundwater pollution is unacceptable in an agricultural region.

Common sense dictates that negative consequences to people and farmland from nuclear accidents are far more likely in a small, open, windy location like Pantex. The Department of Energy has acknowledged that the most visually unappealing feature of the plutonium facilities will be their smokestacks. Visual blight will be a minor inconvenience compared to the air pollutants--many of them radioactive--expected to escape into the atmosphere daily through smokestack filters. Routine air emissions of tritium, plutonium, americium, and beryllium constitute unacceptable new hazards to the Texas Panhandle.

FD175

FD175–10 **Alternatives**

This comment is addressed in responses to the campaign, *Letter Expressing Reasons for Not Supporting Plutonium Processing at the Pantex Plant.*

There is Valid, Strong Criticism of Safety in the Storage of Plutonium at Pantex

Since Pantex became the nation's long-term storage location for up to 20,000 plutonium pits, promises to improve safety conditions have not happened. The U.S. Government Accounting Office and the Defense Nuclear Facilities Safety Board have issued reports critical of plutonium storage safety at Pantex. Fifty million taxpayer dollars were spent on a failed plutonium pit container program (the AT-400A) and the plan to move over 10,000 pits into a safer remodeled building (Building 12-66) has also failed.

When it comes to plutonium pit storage problems, Panhandle residents are back to square one. The plutonium remains in old, unsuitable, corroding storage containers and in 35-55 year old "bunkers" that the Department of Energy promised were for "temporary" use. Plutonium that is supposed to be stored in a stable environment now sits in the bunkers--all but three without air conditioning--even as the Texas Panhandle experiences a spell of more than 40 consecutive days of 90+ degree temperatures, and more than 20 days this summer with thermometers registering 100+ degrees. If the Department of Energy cannot accomplish the job of safely storing Pantex plutonium in the most stable environment, there is no reason to accept its unsubstantiated assurances to safely process deadly plutonium powders at Pantex. 10

Thank you for this opportunity to comment.

Sincerely:

FD175

STAND OF AMARILLO, INC.
DON MONIAK
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U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC, 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

In the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, the Department of Energy proposes to build new plutonium processing facilities and dispose of 55 tons of "surplus" plutonium. I ask that the following comments reflecting my concerns and reservations regarding these proposals be incorporated into the decisions made for the plutonium disposition program.

Immobilize

The objective of plutonium disposition is to make weapons-usable plutonium as inaccessible for reuse in nuclear weapons as the plutonium in irradiated nuclear fuel, and to do so in a timely and safe manner. For the following reasons the Department of Energy should choose to immobilize all surplus plutonium and consider the possibility of doing this at more than one location:

- Immobilizing all plutonium is a safer option because it involves less handling, processing, and transporting of plutonium and other radioactive materials, and is less expensive because it involves fewer new facilities and avoids the costs of subsidizing the nuclear industry. These same factors would allow disposition to occur in a much more timely manner;
- According to the Department of Energy's own studies, the "ceramification can-in-canister" approach to immobilization results in a waste product that is more resistant to theft, diversion, and reuse than irradiated mixed oxide (MOX) fuel;
- The immobilization approach does not involve increasing the risk to persons living near nuclear reactors because it avoids burning--for the first time ever--large amounts of weapons-grade plutonium. 11

If delays arise in the immobilization program, the Department of Energy should insure that:

- ns of presently unstable plutonium oxide scheduled for immobilization are put in a safer, more stable form suitable for storage, inventory, and international inspection;
- The objective of interim demilitarization of currently stable forms of plutonium, such as plutonium in pits, must be the minimal alteration of its current form necessary for safe storage, inventory, and international inspection.

No To MOX

The ill-conceived mixed oxide (MOX) fuel option should be rejected because there is no rational justification to convert stable plutonium to less stable, more dangerous plutonium oxide powder for use in MOX fuel, and then subsidize the nuclear industry to irradiate the fuel in aging nuclear reactors. Now that it appears obvious that producing plutonium oxide powder suitable for use in MOX fuel will require liquid acid plutonium processing, the MOX option is a proven threat to human health and the environment.

The United States' rationale that it must choose the MOX option to appease Russia is unsubstantiated and flawed in several respects:

- There is little support for a plutonium fuel economy in Russia, where people voting in public referendums have overwhelmingly rejected new nuclear developments;

FD175

FD175–11 **Alternatives**

This comment is addressed in responses to the campaign, *Letter Expressing Support for Immobilizing All Surplus Plutonium and Rejection of the Mixed Oxide Fuel Option.*

- The argument that the Russian government opposes immobilization because the plutonium is more easily retrieved is undermined by the fact that irradiated MOX fuel is easier to re-use in nuclear weapons than the ceramification can-in-canister disposition approach;

- The United States should not be encouraging Russia to develop MOX capability due to the uncertainties produced by the U.S. underwriting costs of a Russian infrastructure to reprocess plutonium;

- Russia's choice of technology should not determine the U.S. choice. The governments themselves have recognized this, as in the United States-Russian Joint Plutonium Disposition study in 1996, which found that, "*The United States and Russia need not use the same plutonium disposition technology. Indeed, given the very different economic circumstances, nuclear infrastructures, and fuel cycle policies in the two countries, it is likely that the best approaches will be different in the two countries.*"

Already, politically powerful voices are suggesting that United States policy regarding plutonium be re-examined. By establishing a new level of plutonium processing infrastructure which encourages plutonium commerce, U.S. non-proliferation policy is clearly undermined.

Inform People of the Real Hazards, Risks, and Uncertainties

The Department of Energy has not fulfilled its legal obligation to fully inform people of the real risks, hazards, uncertainties and long-term implications of processing tons of plutonium powder that is hazardous to human health at the scale of micrograms. This latest voluminous, and largely unreadable, environmental document does not even contain the most basic information about hazards, such as the expected quantities of radioactive air pollutants. Instead, the public is forced to follow a paper maze if the information is available at all. 11

The Department of Energy must admit that the real hazards and risks are largely unknown, and that uncertainty is the only constant at this time. There is only one mixed oxide (MOX) fuel plant currently operating at the capacity proposed by this document--100 tons of MOX fuel fabricated per year--and that facility uses reactor-grade plutonium. No MOX fuel from weapons-grade plutonium has ever been fabricated or used on an industrial scale, and no weapons-grade plutonium has ever been immobilized on an industrial scale. The plutonium pit disassembly and conversion plant would be a first-of-its-kind facility utilizing unproven technologies that are controversial even within the nuclear establishment.

To compound the uncertainties, the Department of Energy plutonium disposition plan is not a model for success. Under the existing proposals, the Department of Energy would design facilities requiring unproven technologies while the technology demonstration and testing is ongoing, and begin facility construction before finishing their design. The Department of Energy has followed this model of development before and the result has always been cost overruns, delays, unexpected negative impacts on human health and the environment, and massive waste of taxpayer dollars.

Thank you for this opportunity to comment.

Sincerely:

STAND OF AMARILLO, INC.
DON MONIAK
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STAND of Amarillo, Inc.

FOR IMMEDIATE RELEASE: APRIL 9, 1998

NEWS RELEASE******NEWS RELEASE**

NRC SCRUTINIZES MOX PROGRAM

"SHIFTING SOIL" AND CONFUSION CHARACTERIZE DOE EFFORTS

The Nuclear Regulatory Commission (NRC) issued several stern warnings to the Department of Energy (DOE) during an April 3, 1998 public meeting in which DOE briefed the commission on its Mixed Oxide (MOX) fuel program. NRC Chairperson Shirley Jackson admonished DOE, "Stability at the highest policy levels within DOE...is something that we absolutely must have." Jackson's remarks finalized the briefing that yielded repeated indications that DOE's MOX program appears to lack integrated and coherent leadership or strategy.

Director of DOE's Office of Fissile Materials Disposition, Howard Canter, indicated the regulatory framework is poorly defined. Jackson replied at one point that "the soil seems to be shifting...and so the real question that naturally occurs is how firm is DOE with the strategies and plans that you have presented today?"

Pantex is one of four candidate sites for plutonium processing operations, and its supporters have used NRC regulation as a selling point in trying to minimize the dangers associated with these new missions at the plant. Serious concerns for the Panhandle arise since this regulation doesn't currently exist and proposals are neither clear nor defined at this point.

12

The fact is that DOE remains self-regulated in their handling of plutonium. "Our experience is that DOE does whatever it wants to do, and public input is just a charade. I'm not sure they will ever be willing to heed any advice from the Nuclear Regulatory Commission either," according to Trish Neusch, Operations Director for STAND of Amarillo, whose family lives and farms less than 2 miles from the proposed plutonium processing facility.

Don Moniak, Program Director for STAND of Amarillo, adds, "While it is encouraging to see the NRC put the plutonium disposition program under such heavy scrutiny, we hope Congress and the Texas delegation begin to take notice and slash MOX funding accordingly. DOE needs better leadership and a sense of direction before they waste any more taxpayer dollars."

The April 3, 1998 NRC meeting transcript is available in its entirety on the World Wide Web at:

http://www.nrc.gov/NRC/COMMISSION/TRANSCRIPTS/19980403a.html

For More Information Contact:

Don Moniak, STAND of Amarillo, Inc. 806-358-2622

(806) 358-2622 7105 W. 34th Ave. Suite E - Amarillo, TX 79109 FAX (806) 355-3837

FD175

FD175–12 **General SPD EIS and NEPA Process**

DOE acknowledges the attached news releases, fact sheet, and newspaper article.

POSITIONS AND STATEMENTS
PLUTONIUM PROCESSING AND MIXED OXIDE (MOX) FUEL

"We oppose the processing, reprocessing and the production of mixed oxide fuel (MOX) in areas where there is possibility or risk of pollution and contamination of agricultural land, air, and groundwater."

State Policies of the Texas Farm Bureau. 1998. Pages 36-37, Section 137, Lines 24-28

American Farm Bureau Federation Policies for 1998, Page 112, Section 121, Lines 38-41

"The Party recognizes the value of alternative energy and supports continued private research and development of such sources, but we oppose the federal government using hazardous waste as an alternative energy source, such as the processing and/or reprocessing of plutonium and uranium for making Mixed Oxide fuel in agricultural areas and above major water sources."

Texas Republican State Party 1998 Platform for "Alternative Energy Sources"

"Since the manufacture of nuclear reactor fuel rods has usually led to environmental contamination of land, air, and water, and since the Pantex Plant near Amarillo, Texas is located over the Ogallala Aquifer, the country's largest aquifer, and in the midst of one of the country's largest grain-and-cattle-producing regions, the Democratic Party of Texas opposes the U.S. Department of Energy plan to produce Mixed Oxide (MOX) fuel from plutonium and uranium at the Pantex Plant, or any other form of plutonium processing."

Texas Democratic State Party 1998 Platform

"A consortium has been formed between Bechtel, BNFL International, and Westinghouse. GE chose not to participate. GE will not receive, store, process, transport, or take title to any material in any stage of the MOX process. I think you have other people to deal with on this one and not GE. Thank you very much."

Statement by General Electric Corporation Chairman of the Board Robert Welch at annual General Electric shareholders meeting, April 1998

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STAND of Amarillo, Inc. Fact Sheet #98-4
7105 W. 34th Ave, Suite E, Amarillo, TX 79109 806-358-2622 stand@arn.net

FD175

STAND OF AMARILLO, INC.
DON MONIAK
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STAND of Amarillo, Inc.

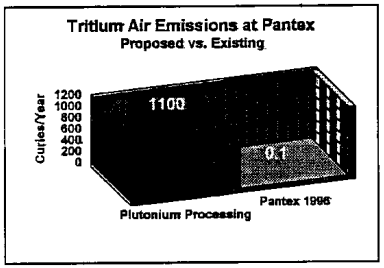
FOR IMMEDIATE RELEASE: August 5, 1998

NEWS RELEASE*******NEWS RELEASE**

TRITIUM EMISSIONS WOULD JUMP 10,000 TIMES WITH PLUTONIUM PROCESSING AT PANTEX

According to a Department of Energy document, high levels of routine air emissions of gaseous, radioactive tritium would characterize operations at a Plutonium Pit Disassembly and Conversion Facility (PDCF) Los Alamos National Laboratory scientists estimated that 1,100 curies a year of gaseous tritium would be released through a smokestack about 115 feet high. The source of the tritium would be the "disassembly and conversion of pits containing tritium"[1] in the "Special Recovery Line," an additional process that was not previously reported.

Pantex and the Savannah River Site plant in South Carolina are "equally preferred" candidate sites for locating the Plutonium pit processing facility—a first-of-its-kind plutonium processing plant that would utilize unproven technologies: If located at Pantex, the PDCF would emit 10,000 times more hazardous, radioactive tritium gas than are presently released under routine existing Pantex operations (0.1 curies/year in 1995 and 1996).



Panhandle Area Neighbors And Landowners (PANAL) member Jeri Osborne stated, "that is a lot of radioactive air pollution considering the winds we have around here. There are several of us living and farming along this north-northwest Pantex boundary, including a bunch of children. We've said all along that plutonium processing is a threat to human health and area agriculture, and this just confirms our position yet again." 12

"The Department of Energy brags about the number of jobs a plutonium plant might create but chooses to hide the severe health hazards plutonium operations would create," added Don Moniak from Serious Texans Against Nuclear Dumping.

For More Information Contact
Don Moniak, 806-358-2622

[1] Pit Disassembly and Conversion Facility, Environmental Impact Statement Data Report–Pantex Site, LA-UR-97-2909. Page 68.

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SAVE TEXAS AGRICULTURE AND RESOURCES
7105 W. 34th Street
Amarillo, Texas 79109
(806) 358-2622

FOR IMMEDIATE RELEASE: August 10, 1998
ATTENTION: ASSIGNMENT EDITORS

MEDIA ADVISORY ******MEDIA ADVISORY

Media Conference
Courtyard Area of the Radisson Inn, I-40 and Lakeside
Amarillo, Texas
2 P.M., Monday, August 10

LOCAL GROUPS TO SHRED DEPARTMENT OF ENERGY'S ENVIRONMENTAL IMPACT STATEMENT

Local Panhandle area citizens and grassroots organizations will meet with the media to discuss their grave concerns with the Department of Energy's proposals to begin processing plutonium at the Pantex Plant. A public hearing being held in Amarillo on Tuesday, August 11th is an important opportunity for Texas Panhandle residents to remind the government that the lure of a few hundred jobs is not worth becoming the next Rocky Flats. A copy of the *Surplus Plutonium Disposition Draft Environmental Impact Statement* will be sent through a shredder to send the Department of Energy the message that the document is in clear violation of the National Environmental Policy Act. Some of the clear violations include: 12

- **Failure to evaluate all reasonable plutonium processing alternatives;**
- **Omission of environmental impacts such as radioactive air emissions;**
- **Exclusion of nuclear reactor communities from the public involvement process;**
- **A claim that repackaging plutonium pits at Pantex into shipping containers would add $70,000,000 in operating costs to a plutonium pit disassembly and conversion facility at a site other than Pantex.**

"We are greatly disturbed that the government chose not to tell people how much radioactive debris will be deposited on our agricultural land and its products," said Doris Smith of Panhandle Area Neighbors and Landowners (PANAL).

"Pantex is a site with no plutonium processing experience and compared to other DOE sites it is clean of radioactive contamination. Yet these considerations remain absent in the analysis," said Mavis Belisle of the Peace Farm.

"The Department of Energy already said it would repackage plutonium pits in new storage and shipping containers as part of its storage program. The failure to implement a promised safety improvement program should not function as a criteria for locating a more dangerous operation at Pantex." said Don Moniak from Serious Texans Against Nuclear Dumping (STAND).

CONTACTS: Don Moniak 806-358-2622 Mavis Belisle 806-335-1715 Doris Smith 806-335-1050

STAND of Amarillo • PANAL • the Peace Farm • POWER of Hereford • Texas Nuclear Waste Task Force

FD175

Amarillo Daily News Tuesday, August 11, 1998 9A

STAND: Report omits data

By GREG ROHLOFF
Globe-News Business Writer

Opponents of a possible plutonium pit disassembly plant at Pantex said Monday that the Department of Energy failed to include all the pertinent information in its draft environmental impact statement.

The DOE will conduct hearings from 1 to 4 p.m. and 6 to 9 p.m. today at the Radisson Inn, Interstate 40 and Lakeside, on the possible location of a pit disassembly plant. Additionally, the DOE will collect written comments on the proposal through Sept. 16.

U.S. Rep. Mac Thornberry, R-Clarendon, will testify on why he believes Pantex is the best choice for the plant. Thornberry is a member of the House National Security Committee, which oversees Pantex and the nation's nuclear weapons complex.

Pantex is one of two preferred sites, according to DOE documents. The other is the Savannah River Site in western South Carolina.

Don Moniak, executive director of Serious Texans Against Nuclear Dumping, said the DOE's environmental impact statement downplays the potential radiation exposure.

Radiation exposure is measured in standard units called rems; DOE regulations allow up to 5 rems yearly, according to Andre Cygelman, director of material and immobilization of the office of fissile materials disposition for DOE.

The document states an average yearly exposure of about 500 millirems; a millirem is one-thousandth of a rem.

Moniak said Pantex's current level of allowable radiation exposure is 800 millirems.

A report analyzing the staffing needs of a pit disassembly plant prepared by Los Alamos National Laboratory estimates that some workers on the operating floor could be exposed to as much as 1 rem. The average for all floor workers is 810 millirems.

Moniak said the DOE environmental impact statement writers apparently arrived at the 500 millirems figure by including managers and clerical workers who would not be in contact with the pits.

Cygelman and Bert Stevenson, director of outreach for the office of fissile materials disposition, said they had no knowledge of the source of the higher figures quoted by Moniak.

Cygelman said the 500 millirems was a goal for a disassembly plant.

Doris Smith of the Panhandle Area Neighbors and Landowners, another group opposed to expanding Pantex's mission, said the draft document understates the potential exposure to tritium, a toxic liquid that has reached a perched aquifer above the Ogallala aquifer, a principle source of water for the region.

She cited a June 1 report on the Pit Disassembly and Conversion Facility that 1,100 curies of tritium would be released into the atmosphere.

Cygelman insisted that the figures in the draft environmental impact statement were accurate, and that workers would face little exposure to tritium while handling the plutonium pits in glove boxes.

Mavis Belisle of the Peace Farm questioned the accuracy of figures listed for beryllium, noting that the Oak Ridge, Tenn., plant has had environmental problems because of beryllium.

Cygelman and Stevenson said they were uncertain of the analysis of beryllium exposure.

Moniak, Smith and Belisle shredded a copy of the statement, reducing it to a pile of paper strips.

"We do not believe it is legally valid or scientifically valid at this time," Moniak said.

Moniak called for a new statement that would be shorter and more concise than the current document's 1,300 pages.

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STAND OF AMARILLO, INC.
DON MONIAK
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STAND of Amarillo, Inc.

August 24, 1998
STAND COMMENT # 2
Surplus Plutonium Disposition Draft Environmental Impact Statement
(Draft SPDEIS)

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

RE: *ARIES Source Term Fact Sheet* (LALP-97-24, Rev. 3, April 24, 1998).

On page 3, paragraph two, tne report states that, "A significant number of pits processed by the ARIES facility will contain tritium. None of these pits were selected as part of the ARIES pilot demonstration because of the difficulties associated with handling tritium."

- Does the Department of Energy know how many pits contain tritium?
- Exactly what exact difficulties are associated with handling tritium, why are these difficulties not reported in the Draft SPDEIS, and will DOE detail these difficulties in the Final SPDEIS? 1
- What would be the consequences if pits containing tritium were sent through the proposed plutonium pyroprocessing modules?
- Is DOE considering processing pits with tritium at an even or uneven rate?

On page 3, paragraph two, the report also states that, "Decisions regarding the presence of tritium will be made before processing pits in the ARIES facility. These decisions may be based upon prior knowledge or upon a sampling strategy for detecting tritium. A strategy for detecting tritium in pits was devised while planning for the reconfiguration of the nuclear stockpile complex."

- When will DOE make these decisions regarding the presence of tritium?
- Where in the Draft SPDEIS is there an analysis and/or reporting of the requirements for detecting tritium? 2
- Was the tritium detection strategy ever reported in a public document? Was this strategy ever implemented?
- What is the risk of not detecting tritium in a pit that does contain tritium?

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FD145

FD145–1 **Pit Disassembly and Conversion**

Section 2.4.1.2 was revised to expand the discussion of tritium and operation of the Special Recovery Line. DOE knows how many pits contain tritium. The actual number and types of pits containing tritium are classified. Pits with tritium would be handled in the Special Recovery Line. Tritium is removed from the pit and either captured for use or oxidized to tritiated water and captured for disposal as LLW. The tritium included in the waste estimates and emissions were bounded and analyzed in this SPD EIS. The presence of tritium would be confirmed when the pit is unpacked from the shipping container and would also be obvious when the pit is bisected. Tritium would be separated from the pit components in the Special Recovery Line, and all parts would be surveyed for tritium before being moved for further processing. These steps would reduce the probability of pyroprocessing of plutonium contaminated with tritium to a level that is not considered credible. However, if it were to happen the tritium would be volatilized and escape through the facility's ventilation system since HEPA filters cannot capture tritium. The resulting tritium release to the atmosphere would be of smaller consequence than the design-basis accident already presented in this SPD EIS for a tritium release at the pit conversion facility during a glovebox fire because this accident includes tritium contaminated parts from multiple pits being affected. The processing schedule for specific pits has not been finalized. The tritium at risk in the SPD EIS accident analysis and the tritium emissions to the atmosphere are conservative estimates that bound the potential environmental impacts of pit disassembly and conversion operations.

FD145–2 **Pit Disassembly and Conversion**

Section 2.4.1.2 was revised to include a description of the processes of verifying the contents of pit shipments and the requirement to survey incoming pits for tritium contamination. The method for determining the types of pits that are contaminated with tritium is classified.

The remainder of this comment is addressed in response FD145–1.

On page 3, paragraph one, the report states, "Because of their construction, some pit types will require capabilities in addition to those tested in the ARIES pilot demonstration. Number and types of pits to be processed in a facility may not be defined until the final implementation of weapons reduction treaties."

- Are there any other pit types besides those containing tritium that require extra capabilities? 3
- Is DOE considering all potential pit types in the PDCF?

On page 2 in the fourth paragraph, the report states that the initial demonstration project involved only seven pit types that "were generally representative of the larger stockpile and relatively straightforward in their construction so there would be no special complications in the ARIES pilot demonstration."

- What special complications are anticipated in the larger-scale plutonium pit disassembly and conversion demonstration and full scale facility? 4
- Where are these special complications reported to the public in the Draft SPDEIS? Will DOE report these special complications in the Final SPDEIS?
- Are the original seven pit types selected for the demonstration "bonded" pits?

On page two of the report is a table showing the potential impurities in the plutonium in plutonium pits.

- Where was this list of impurities reported in the Draft SPDEIS?
- In what end product will these impurities appear? DOE should give a detailed description of whether the impurities will become part of the air pollutant stream, the mixed-waste stream, or the 5
- If the impurities are converted to air pollutants, who will regulate these air emissions?

STAND of Amarillo believes the *ARIES Source Term Fact Sheet* should be added as an Appendix to the Final SPDIES, and is attaching a copy for inclusion.

These comments will be supplemented in the future.

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc.

FD145

FD145–3 **Pit Disassembly and Conversion**

Some pit types have unique features beyond those issues associated with the presence of tritium that may require special handling tools, cutting tools, or procedures. DOE is considering all potential pit types in the pit conversion facility and would actually disassemble up to 250 representative pits during the pit disassembly and conversion demonstration currently being conducted at LANL.

FD145–4 **Pit Disassembly and Conversion**

The pit disassembly and conversion demonstration was expanded to include all pit types in order to avoid potential special complications in a full-scale pit conversion facility. Specifics of the special complications related to the disassembly of some pits discussed in the LANL fact sheet are classified. The environmental impacts resulting from the disassembly of all of the pit types that could be dispositioned through the pit conversion facility were addressed in the analysis presented in Chapter 4 of Volume I. The original seven pit types selected for the demonstration were bonded pits.

FD145–5 **Pit Disassembly and Conversion**

Information presented in the ARIES fact sheet referred to by the commentor was considered in this SPD EIS. Section 2.4.1 was revised to acknowledge the presence of potential impurities in the pits to be dismantled. Appendix H was revised to discuss the inclusion of these impurities in the LLW and TRU waste streams. All gaseous effluent streams coming from the facility would be thoroughly scrubbed or filtered to reduce the amount of undesirable particulates and pollutants. Air leaving gloveboxes in the process line would be filtered through three stages of HEPA filters. By the time any of the impurities joined the facility's exhaust stream, they would likely be in the subparts-per-billion range. Any impurities that were converted to air pollutants would be subject to Federal, State, and local air quality regulations. Some impurities may remain with the plutonium which would be passed through the plutonium-polishing process in the MOX facility as described in the revised Section 2.4.3. In instances of the material being sent directly to the immobilization facility, as in Alternatives 11 and 12, the plutonium could be fed directly into the process. The ARIES demonstration project was analyzed in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), which is available on the MD Web site at http://www.doe-md.com.

ARIES Source Term

Description

At the end of the Cold War, the United States maintained a large, diverse stockpile of more than 20,000 nuclear weapons (Stockpile Management Preferred Alternatives Report, February 1996). In 1995, the Department of Defense published the Nuclear Posture Review (NPR, 1995), the results of a 10-month comprehensive review to determine the role of nuclear weapons in US security. The report recognized that the security environment had changed dramatically since the end of the Cold War and recommended large reductions in the nuclear weapons stockpile. However, it also recognized the current instability and uncertainty in countries that still control a nuclear arsenal and recommended maintaining a much smaller, enduring nuclear stockpile in the eventuality of disruptions in relationships with these countries. The recommended size of the enduring stockpile was assumed to be 3,500 nuclear warheads, the number permitted after achieving full reductions called for in the ratified Strategic Arms Reduction Treaty (START) I and in the currently unratified START II. Thus, in the foreseeable future, more than 16,500 nuclear weapons could be dismantled in the United States.

A portion of these excess weapons have already been removed from the active stockpile. Plutonium from the pits of these decommissioned nuclear weapons is part of the 38.2 metric tons of weapons-usable plutonium declared excess to national security needs as part of the Department of Energy (DOE) Openness Initiative (Openness Press Conference Fact Sheet, February 6, 1996). The disposition of excess plutonium from the pits of dismantled weapons, the retirement stockpile, is the responsibility of the Department of Energy Office of Fissile Material Disposition (DOE-MD). To comply with Presidential Directive (Clinton, September 23, 1993), plutonium must be extracted from pits by the Advanced Recovery Integrated Extraction System (ARIES) or some other process to make it available for international accountability without transferring weapons design information.

The strategic reserve contains nuclear weapons that have not been retired but are not part of the enduring stockpile. As weapon dismantlement and other programs continue to be reviewed, plutonium in some of the weapons from the strategic reserve may also be declared excess to national security needs and offered for international inspection. These pits will also require processing by ARIES, or a process with similar capabilities.

The total number of pits, and the corresponding quantities of plutonium in weapons in the retirement stockpile, the strategic reserve, and the enduring stockpile may be found in the classified report "Selection of Pits for Integrated Demonstration of ARIES," (Brough et. al., 1996).

Preliminary schedules for surplus weapons-usable plutonium disposition estimate 10 years of operation for the pit conversion process (DOE-MD-003, July 17, 1996).

STAND OF AMARILLO, INC.
DON MONIAK
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Description cont.

There are roughly 40 different pit types. Pits can be generically characterized as nested shells of materials in different configurations and constructed by different methods. Elements of construction that may be found in pits processed by ARIES include the following: vanadium, erbium, titanium, chromium, boron (enriched in ^{10}B), aluminum, stainless steel, tritium (^{3}H), beryllium, plutonium, uranium (^{235}U enriched and depleted), and gallium. Maximum concentrations of impurities in plutonium are as follows.

Element	Concentration (PPM)	Element	Concentration (PPM)
Aluminum	*	Nickel	**
Americium	200	Neptunium	100
Boron	50	Lead	100
Beryllium	3	Silicon	*
Carbon	200	Tin	100
Calcium	500	Tantalum	100
Cadmium	10	Thorium	100
Chromium	100	Titanium	100
Copper	100	Uranium	100
Iron	**	Tungsten	200
Gallium	*	Zinc	100
Magnesium	500	Tritium	10 mCi/kg
Manganese	100		

*For Ga, Al, and Si, the limit is 4 (ppm Ga) +10 (ppm Al) + 10 (ppm Si) < 1300 ppm.
**Fe + Ni < 400 ppm

Relation to the Study

Detailed knowledge of the rate of throughput and the physical and chemical nature of the pits are required to do detailed design work on an ARIES facility.

Status

The ARIES pilot demonstration will process 50 pits consisting of seven design types. This selection was made entirely from pit types currently in the retirement stockpile. Selection criteria were established to select types that were generally representative of the larger stockpile and relatively straightforward in their construction so there would be no special complications in the ARIES pilot demonstration (Brough et al., 1996).

The report by Brough et al., 1996, includes a generalized summation and categorization of all the pit types in the nuclear stockpile. There are however, detailed descriptions only for the seven types that will be processed in the ARIES pilot demonstration.

FD145

Issues

A facility will be required to process all pit types declared excess to national defense needs. A classified report similar to the one by Brough et al., 1996, containing information about all pit types to be processed will be required. Because of their construction, some pit types will require capabilities in addition to those tested in the ARIES pilot demonstration. Number and types of pits to be processed in a facility may not be defined until the final implementation of weapons reduction treaties.

A significant number of pits processed by the ARIES facility will contain tritium. None of these pits were selected as part of the ARIES pilot demonstration because of the difficulties associated with handling tritium. Decisions regarding the presence of tritium will be made before processing pits in the ARIES facility. These decisions may be based upon prior knowledge or upon a sampling strategy for detecting tritium. A strategy for detecting tritium in pits was devised while planning for the reconfiguration of the nuclear stockpile complex. Tritium-containing pits will be sent to a special tritium recovery module. Processes for disassembling tritium-bearing pits are being developed at Los Alamos. When development is completed, these processes must be included in the ARIES facility design and construction.

Options

Before final decisions are made regarding the number and type of pits to be converted, working assumptions can be constrained on the low side by the requirements to process the current retirement stockpile. On the high side, system requirements can be defined by all pits that will not be part of the enduring stockpile.

Implementation

Space and equipment needs for the ARIES facility will be defined by the number and types of pits that will be processed and by the period of time allocated to process them.

References

Department of Energy, "Stockpile Management Preferred Alternatives Report, in Support of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement," draft (February 1996).

Department of Defense, "Nuclear Posture Review," in the Annual Defense Report, ISBN 0-16-048573-8 (1995).

Department of Energy Office of Congressional, Public, and Intergovernmental Affairs Openness Press Conference Fact Sheets, "Department of Energy Declassifies Location and Forms of Weapons-Grade Plutonium and Highly Enriched Uranium Inventory Excess To National Security Needs" (February 6, 1996).

President Bill Clinton, "US Nonproliferation and Export Control Policy," Presidential Decision Directive-13 (September 23, 1993).

Winslow S. Brough, Dewey S. Ravenscroft, and Wendel Brown, "Selection of Pits for Integrated Demonstration of ARIES," Los Alamos National Laboratory report CLY96-0010 (1996).

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DON MONIAK
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References cont. Department of Energy Office of Fissile Materials Disposition, "Technical Summary Report for Surplus Weapons-Usable Plutonium Disposition," DOE-MD-003, Rev. 0 (July 17, 1996) Figures 5-1–5-7.

FD145

STAND of Amarillo, Inc.
Don Moniak
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STAND of Amarillo, Inc.

August 4, 1998
STAND COMMENT # 3
Surplus Plutonium Disposition Draft Environmental Impact Statement
(Draft SPDEIS)

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

RE: Plutonium Pit Disassembly and Conversion and Beryllium-Clad Plutonium Pits

On page 2-14 of the Draft SPDEIS is a "depiction" of a plutonium pit (Figure 2-6) that illustrates a pit with a stainless steel case. In the November, 1997 Defense Nuclear Facilities Safety Board (DNFSB) Technical Report 18: *Review of the Safety of Storing Plutonium Pits at Pantex*, there are frequent references to "beryllium-clad" plutonium pits.

- Why are plutonium pits not depicted with beryllium cladding?
- In the Final SPD-EIS, DOE should define the differences in processes, waste streams, and health hazards expected from processing beryllium-clad pits versus stainless-steel-clad pits. 1
- Since beryllium clad pits are more susceptible to corrosion from chlorine and moisture, what measures will be taken to insure these pits are intact upon arrival at the PDCF?

Also on page 2-14, it states that gallium is "alloyed" with plutonium in pits and must be removed if the PDCF product is plutonium powder for use in MOX fuel.

- Does the gallium have to be removed if the PDCF product is plutonium powder for use in the immobilization facility? 2
- What other impurities that are listed on page 2 of the ARIES fact sheet are "alloyed" with plutonium and are a concern for either disposition option?

These comments will be supplemented in the future.

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc.

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FD146

FD146–1 Alternatives

Section 2.4.1 was revised to include a discussion of beryllium as a potential impurity, as well as the reasons why beryllium processing would not be an issue at the pit conversion facility. Figure 2.6 was revised to change the term "stainless steel case" to "outer case"; it is not meant to portray all the variations in pit design and construction. Irrespective of the cladding material, the process would be the same for dismantling and converting all pits. As discussed in Section 2.4.1.2, the main criterion in determining how the pits would be dismantled depends on the presence of tritium, not beryllium. Because the beryllium is expected to remain in metal form at all times, the health hazards are minimized. The beryllium would be present in large pieces and cuttings created when the pit was bisected. These cuttings would be too large to become airborne. There would be no grinding; thus, there would not be any pieces of beryllium small enough to become airborne. Because the pieces and cuttings would be contaminated with trace levels of radioactive materials, they would primarily be disposed of as TRU waste and is included in the waste projections in this SPD EIS.

FD146–2 Plutonium Polishing and Aqueous Processing

Gallium and other impurities would not have to be removed if the plutonium dioxide from the pit conversion facility were to be used in the immobilization facility. Technically, the term "alloyed" refers to materials purposely added to metals to cause a change in physical characteristics. From this point of view, the elements other than gallium in the referenced table are deemed impurities. The levels given in the table are maximums; actual levels are being established based on review of archival data and sampling and analysis associated with ongoing R&D efforts. DOE has included plutonium polishing as a component of the MOX facility to ensure adequate gallium and impurity removal from the plutonium dioxide. Section 2.4.3 and the hybrid alternatives analyses in Chapter 4 of Volume I were revised to include a discussion of plutonium polishing.

Section 2.4.1 was revised to acknowledge the presence of potential impurities in the pits to be dismantled.

STAND OF AMARILLO, INC.
DON MONIAK
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STAND of Amarillo, Inc.

September 15, 1998

STAND COMMENT # 4
Surplus Plutonium Disposition Draft Environmental Impact Statement (Draft SPDEIS)
Re: Plutonium Pit Disassembly and Conversion Demonstration Project

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

There are conflicting objectives being reported for the plutonium pit disassembly and conversion demonstration project. On the one hand, the demonstration project research and development contractors at Los Alamos National Laboratory describe the project as being essential for designing the plutonium pit disassembly and conversion facility (PDCF):

- On Page 2 of the ARIES Fact Sheet, it states in reference to the Pilot Demonstration Program at Los Alamos that, "detailed knowledge of the rate of throughput and the physical and chemical nature of the pits are required to do detailed design work on an ARIES facility."

  At the MOX Industry Conference in Atlanta on May 21, 1998, demonstration project personnel stated that the data from the ARIES demonstration is "needed to support PDCF design."

On the other hand, DOE has characterized the demonstration project as more of a supplement to the design work: 1

- On Page 1-11 of the Draft SPDEIS, DOE wrote that the demonstration project, "would help 'fine tune' the operational parameters of the pit conversion facility."

- In the Plutonium Pit Disassembly and Conversion Environmental Assessment Pre-Approval Review, DOE wrote that the resulting experience from the proposed demonstration project would "be applied to expedite the design of the production disassembly and conversion facility should it be decided to construct this facility in the SPD EIS ROD."

What is the exact purpose of the demonstration project? There does not seem to be a consistent set of objectives being reported.

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FD302

FD302–1 **Pit Demonstration EA**

DOE believes that the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998) clearly sets forth the basic objectives of this demonstration, as follows: demonstrate the feasibility of the pit disassembly and conversion processes; test various processes for the different parts of the pit disassembly and conversion process to optimize procedures and parameters and reduce dose to workers (as the number of pits to be dismantled would significantly increase); develop processes, procedures, and equipment for the disassembly of all types of surplus pits; and demonstrate that the plutonium metal from pits of varying types can be consistently converted to an oxide form that is suitable for use as feed for immobilization and MOX fuel fabrication.

As the EA also reflects, the resulting experience from this demonstration would be used to supplement information developed to support the design of the full-scale conversion facility should DOE decide to construct that facility. It was never DOE's intention that this demonstration would be the only source of information relevant to the design work for a full-scale pit conversion facility. DOE does not believe that the examples provided by the commentor to support the position that there are conflicting objectives on this demonstration contradict DOE's position on the use of information from the demonstration, but simply use different but compatible words to describe that process.

How can DOE propose to design and construct a facility before detailed information from the demonstration project is available? One of the "Lessons Learned" from plutonium pit storage was that, "in order to obtain cost avoidance and remain on schedule, it is important to identify all requirements prior to design."[1]

At what point will DOE decide whether the technologies it is proposing to use are feasible at an industrial scale? 2

DOE should determine what the requirements are for the pit disassembly and conversion facility before it endeavors to build the facility.

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc.

FD302

FD302–2 **Pit Demonstration EA**

DOE is not proposing to design and construct a full-scale pit conversion facility before information from the pit disassembly and conversion demonstration is available. Should DOE decide to build a full-scale pit conversion facility, the tentative schedule reflects that construction would begin sometime in 2001. Facility design, however, would take place during approximately 1999-2001. The demonstration would focus on equipment design and process development. Because the demonstration could continue for up to 4 years, information transfer conducive to fine-tuning of the operational parameters of a pit conversion facility can be provided continually throughout the facility design phase. Also, because the information from the demonstration would be used to supplement other information developed to support the design of a full-scale pit conversion facility, it would not be necessary for the demonstration to be completed before beginning facility design and initial construction. These processes can be carried on simultaneously. While DOE believes that a full-scale pit conversion facility is feasible, it would not build such a facility until it has been determined that the proposed technologies and required capabilities it is proposing are clearly shown to be feasible. The pit disassembly and conversion demonstration will play a significant role in this process.

STAND OF AMARILLO, INC.
DON MONIAK
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STAND of Amarillo, Inc.

September 15, 1998

STAND COMMENT # 5
Surplus Plutonium Disposition Draft Environmental Impact Statement (Draft SPDEIS)
Re: Alternatives for Plutonium pit disassembly and conversion

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

The Draft SPDEIS does not contain, as required by NEPA, a discussion or analysis of the reasonable alternatives that are available to disassemble plutonium pits and convert plutonium metal to a declassified form suitable for both long-term disposition and international inspections and safeguards.

In related NEPA documents, DOE has never evaluated the range of options available for disassembling plutonium pits and converting the plutonium in the pits to meet storage and disposition objectives. Instead, DOE chose a plutonium pit disassembly and conversion process (ARIES) that was not originally designed to produce materials suitable for disposition technologies, and which the MOX Industry considers a controversial technology. By pursuing this approach to plutonium pit disassembly and conversion, DOE has been in violation of NEPA for failing to conduct an analysis of the full range of alternatives for demilitarizing plutonium pits and converting plutonium to a form suitable for long-term storage and/or disposition.

In the SPDEIS, DOE must: 1

1. *Analyze the full range of technological options that are available to disassemble plutonium pits and convert plutonium metal to a declassified form suitable for both long-term disposition and international inspections and safeguards.*

2. *Analyze the range of technical options that have been addressed in other DOE and contractor analyses.* In its Technical Risk Assessment (TRA)[1] for the PDCF, DOE contractors evaluated three options for plutonium pit disassembly and conversion:

- The Baseline Option which would require processing of whole pits at the PDCF but not pit parts and plutonium not associated with pits; production of both metal and oxide by the PDCF; and the only contaminants of concern for MOX fuel that would be removed is gallium.

[1] Kidinger, John, ARES Corporation, John Darby and Desmond Stack, Los Alamos National Laboratory. 1997. Technical Risk Assessment for the Department of Energy Pit Disassembly and Conversion Facility Final Report. September, 1997. LA-UR-97-2236.

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FD303

FD303–1 **Alternatives**

DOE determined that aqueous processing was not a reasonable alternative for pit conversion because current aqueous processes using existing facilities would produce significant amounts of waste, and aqueous processing would complicate international safeguard regimes. Dry processing was analyzed in the *Storage and Disposition PEIS* and this SPD EIS.

Processing pits and clean metal plutonium in the pit conversion facility is analyzed in this EIS. This analysis bounds all of the variations of starting materials listed in the comment that could be processed in the pit conversion facility. This statement is based on two facts. First, the amount of clean metal that would be processed in the pit conversion facility is small compared with the amount of material coming from pits. Second, DOE is not proposing to process pit parts or other plutonium not associated with pits in the pit conversion facility. These materials would be converted to an oxide form in the conversion area of the immobilization facility. DOE is not including the plutonium-polishing process (a small-scale aqueous process) as part of the pit conversion facility; that process would be part of the MOX facility. DOE would use only dry processes in the pit conversion facility. For this reason, the thermal process for removing gallium may not be needed in the pit conversion facility (see revised Section 2.4.1.2). Section 2.4.3 was revised to include a description of the plutonium-polishing process that would be used in the MOX facility. Plutonium dioxide is the starting form for the disposition of surplus plutonium for either the immobilization or MOX approach. This EIS analyzes the environmental impacts of converting surplus pits into plutonium dioxide that can be used in either the immobilization or MOX facility. No additional aqueous processing would be necessary to prepare the plutonium dioxide for immobilization.

- The MOX Grade Oxide Option which would require processing of all plutonium pits and plutonium not associated with pits; production of both metal and oxide; production of plutonium oxide that will be of MOX fuel quality that will involve removing other contaminants such as americium-241; and processing to stabilize and recover materials from classified internal parts. This option appears to most closely resemble the Design-Only Conceptual Design Concept for the PDCF and the presentations made by LANL personnel at the MOX industry conference in Atlanta.

- The Metal-Only Option in which only "nonproblem pits will be processed and the product will be metal only, with no oxide produced."

Both the MOX and Baseline Options, as well as the conversion process for the immobilization facility, involve the use of the HYDOX process, even though the Technical Risk Assessment reported, "significant disagreement among technical persons as to whether HYDOX is required and whether or not HYDOX is the preferred technique when producing plutonium oxide." The report further stated that, "many of the pits, perhaps as many as 80%, can bypass the hydride/dehydride (conversion to metal) module as the plutonium metal can be mechanically separated from the pits."

3. *Analyze the various options involved with "aqueous" processing*, also known as reprocessing and "chemical purification," that DOE has repeatedly left open as an option to thermal processes. At the May 20-21, 1998 MOX Industry Conference in Atlanta, considerable objections were raised to the proposed plutonium conversion processes by members of consortiums seeking to design, construct, and operate a MOX fuel fabrication facility. DOE has repeatedly cited aqueous processes as an option to produce MOX fuel feedstock if the proposed thermal processes are not demonstrated to be feasible to meet this objective. At the Atlanta MOX conference, LANL personnel identified "aqueous derived oxide" as another "near future" source of plutonium oxide. 1

More recently, DOE allowed consortiums bidding to construct and operate a MOX fuel fabrication facility to add a "plutonium polishing facility." A plutonium polishing facility would be added to the MOX fuel plant and where plutonium metal or oxide produced at the PDCF "can be dissolved...in nitric acid with the minimal usage of hydrofluoric acid, and its complexing agent, aluminum nitrate."[2]

In the Draft SPDEIS, DOE analyzed aqueous processing only as a "contingency." This is an insufficient analysis, as DOE clearly considers the "polishing" process to be a reasonable, and even likely alternative. By identifying liquid acid plutonium pit processing only as a contingency, DOE also skewed the analysis in favor of the MOX option.

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[2] Draft Data Report for Generic Site Add-On Facility for Plutonium Polishing, 1998, Oak Ridge National Laboratory

FD303

STAND OF AMARILLO, INC.
DON MONIAK
PAGE 3 OF 3

4. *Identify and analyze the range of alternatives for a final product from plutonium pit disassembly and conversion.*

DOE should identify and analyze the different requirements--in terms of activities, hazards, impacts, and risks--between the various plutonium end-products that could result from plutonium pit disassembly and conversion. For example, the alternative of gallium removal is not discussed in the context of immobilization. The various end products DOE should analyze include:

- plutonium oxide suitable for use in Mixed Oxide (MOX) fuel;
- plutonium oxide suitable for use in the Ceramification Can-In-Canister variant of immobilization;
- plutonium oxide suitable for both storage and disposition;
- plutonium metal and/or oxide suitable for storage;
- plutonium metal suitable for storage while awaiting conversion for disposition.

1

Specifically, DOE must identify whether dry plutonium conversion processes being proposed for the immobilization facility will produce a suitable product for the immobilization technology, or whether aqueous processing is also necessary for immobilization.

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc.

FD303

STAND of Amarillo, Inc.

September 15, 1998

STAND COMMENT # 6
Surplus Plutonium Disposition Draft Environmental Impact Statement (Draft SPDEIS)
Re: Use All Available Information

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

DOE must incorporate all available information about plutonium disassembly and conversion processes into its NEPA process and documents. The public should be fully informed as to what is actually being proposed, the actual range of impacts and risks from proposed activities, and the technical uncertainties involved with the proposed plutonium processing technologies. Since the January 1997 decision on the Storage and Disposition PEIS, DOE has made considerable changes that are not reflected in the Record of Decision, and is obligated to use this opportunity to address those changes and provide to the public a clear picture of its proposed actions and ongoing activities. 1

DOE is already implementing a procurement process for the design, construction, and possible operation of a full scale plutonium pit disassembly facility. DOE already has accepted bids for the Architecture and Engineering services for designing the facility. Procurement solicitations are not pursued casually due to the high costs to industry to compile bid packages. The information pertaining to procurement must be of high quality to avoid lengthy and costly litigation.

However, for all parts of the plutonium disposition program, the information pertaining to procurement is often very different from the information presented in DOE's NEPA documents. Two documents related to the procurement process that are uncited and not referenced in the PDCD-EA, yet provide considerably more accurate and comprehensive information are:

- Los Alamos National Laboratory and Fluor Daniel, Inc. 1997. *Design-Only Conceptual Design Report for the Pit Disassembly and Conversion Facility*. Project No. 99-D-141. Prepared for the DOE Office of Fissile Materials Disposition. December 12, 1997. (PDCF Design Report) 2

The general design diagrams of the PDCF (Figures 2-7 to 2-9, Pages 2-16 to 2-18) reported in the Draft SPDEIS are considerably different than the design diagrams in the Design Report. DOE should explain these differences in the SPDEIS.

- Kidinger, John, ARES Corporation, John Darby and Desmond Stack, Los Alamos National Laboratory. 1997 Technical Risk Assessment for the Department of Energy Pit Disassembly and Conversion Facility Final Report. September, 1997 LA-UR-97-2236.

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FD304

FD304–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's remarks concerning the completeness of this SPD EIS, public information, technical uncertainties, and changes since the January 1997 ROD on the *Storage and Disposition PEIS.* DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). It is intended as a source of environmental information for the DOE decisionmakers and the public. The primary objective of this EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. As with any EIS, technical information is included to the extent that it is required to understand those actions and impacts. Plutonium-processing technologies proposed by DOE are discussed in Sections 2.4.12 and 2.4.3.2. Disposition facilities analyzed in this EIS are consistent with the decision made in the *Storage and Disposition PEIS* ROD as amended.

FD304–2 **Pit Disassembly and Conversion**

DOE has accepted qualification bids only for the design of the facility and agrees that information pertaining to procurement must be of high quality. Qualification bids are relatively inexpensive to prepare. Neither of the two documents cited by the commentor was used in preparing the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998). The information presented in those two documents is not specific to the demonstration as it would be set up within TA–55 at LANL. While those documents contain information beyond the scope of this EA, the information may be of interest to the public. Therefore, both documents were referenced in the final EA as sources of additional information.

There are differences in the design diagrams because this SPD EIS presents a more conservative view than the Design-Only Conceptual Design Report, which was a preliminary effort, to establish a bounding condition for analysis of environmental impact.

STAND OF AMARILLO, INC.
DON MONIAK
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The TRA exemplifies of how DOE technical documents drafted for internal distribution are generally coherent, clear, concise, and comprehensive. In contrast, documents written for public distribution--such as the SPDEIS--are generally incoherent, confusing, vague, redundant, and incomplete.

- DOE must incorporate the findings of the Technical Risk Assessment into the Final EIS, and could include it as a separate appendix. 3
- DOE should incorporate the recommendations of the TRA into the final SPDEIS and discuss to what extent the findings in the TRA were incorporated into the Draft SPDEIS.

The TRA provides additional support for removing Pantex as a plutonium processing candidate site. The strongest recommendation made by the TRA (Page 69) is that, "it is recommended that the site selection process for the PDCF strongly consider the existing site capabilities and experience in those areas." It is not evident that DOE has considered the capabilities and experience of the candidate sites during the SPDEIS process.

The TRA team (Page 74) reached the same conclusions as the general public, that "the site-selection process for the PDCF now in progress includes a very limited evaluation of attributes." Yet, DOE forged its evaluation to fit the desired decision, rather than an openly and honestly evaluate reasonable and realistic criteria that would guide a decision for the public good.

In general, the TRA's lowest risk rankings correspond to those processes that DOE has identified as site selection criteria, and the highest risk rankings correspond to processes that DOE has not identified as site selection criteria. 4

- The TRA's lowest risk ranking was assigned to the "Safeguards and Security System," yet DOE is identifying safeguards and security as a key evaluation criteria.
- Pit shipments were not identified by the TRA as a critical risk, whereas plutonium product shipping made the critical risk list. DOE reversed this risk ranking in the Draft SPDEIS.
- Radiation monitoring and dosimetry, relatively minor programs at Pantex, are listed as a high risk factor in the TRA. Radiation accident potential is listed as high risk factor for key PDCF components such as HYDOX, Gallium Removal, and chemical purification.

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc.

FD304

FD304–3 **Pit Disassembly and Conversion**

Technical risk assessments are important in that they enable the decisionmaker to make an informed decision. The TRA addresses technical, cost, and schedule risks of the proposed pit conversion facility. Findings and recommendations presented in the TRA have been taken into consideration in developing the proposed pit disassembly and conversion process, and research is ongoing to minimize the risk factors that have been identified.

This SPD EIS characterizes the bounding environmental impacts of the pit disassembly and conversion operations. Insofar as the technical risks expressed in the TRA affect these environmental impacts, they are reflected in this EIS.

FD304–4 **Alternatives**

Section 2.3.1 of the SPD Draft EIS explained that a range of 23 reasonable alternatives remained after evaluating over 64 options against three screening criteria: worker and public exposure to radiation, proliferation concerns due to transportation of materials, and infrastructure cost. These 23 reasonable alternatives were evaluated in the SPD Draft EIS. After the Draft was issued, DOE eliminated as unreasonable the 8 alternatives that would involve use of portions of Building 221–F with a new annex at SRS for plutonium conversion and immobilization, thereby reducing the number of reasonable alternatives to the 15 that are analyzed in the SPD Final EIS. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for the proposed surplus plutonium disposition facilities. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, demonstrate that the activities would not have major impacts on any of the candidate sites.

While the findings of the TRA were considered as discussed in response FD304–3, other siting considerations were also used as discussed above. Where there are differences between the findings in the TRA and the data used in this EIS, efforts have been made to use the latest data.

As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. In determining its preference, DOE also considered the transportation requirements for each alternative. All the candidate sites were considered to have adequate safeguards and security systems in place, as well as the capability to perform the necessary radiation monitoring and dosimetry. Potential accidents for the three proposed surplus plutonium disposition facilities at all of the DOE candidate sites are analyzed in Chapter 4 of Volume I and Appendix K. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

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DON MONIAK
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STAND of Amarillo, Inc.

September 15, 1998

STAND COMMENT # 7
Surplus Plutonium Disposition Draft Environmental Impact Statement (Draft SPDEIS)
Re: Analyzing Significant Impacts

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

There will be significant direct and cumulative effects of the preferred alternatives in the Draft SPDEIS that have not been properly analyzed in by DOE.

A. The most significant direct effects of the proposed action will be air emissions of radioactive and nonradioactive materials.

According to the Draft SPDEIS, routine releases of tritium at the Pit disassembly and conversion facility (PDCF) during normal operations are expected to be as high as 1100 curies per year. For Pantex, this would constitute a significant impact. During current missions and operations, a similar impact would only occur only in the event of an accident. The proposed allowable and routine tritium releases would be more than 10,000 times higher than the releases from routine operations at Pantex today. 1

DOE also failed to report known sources of air pollution that will result from the proposed action. Most importantly, DOE neglected to identify and address beryllium air emissions. The PDCF *Design-Only Conceptual Design Report* states that, "the National Emissions Standards for Hazardous Air pollutants (NESHAP's) are applicable to the PDCF, specifically regulating emissions from beryllium and radionuclides to the ambient air" and that "an application for approval of construction or modification of an existing source is mandatory for the owner or operator of a beryllium or radionuclide operations." Clearly, the design documents identify the PDCF as a beryllium operation. 2

In its 1994 Environmental Checklist for ARIES, LANL wrote that, "Beryllium is handled in the PDCF as relatively large pieces. The pit cutting operations will make beryllium chips and turnings, but these are relatively large particles not easily entrained." However, the ARIES EC also contained the statement that, "the expected emissions are within the quantity allowed under the current beryllium permit for TA-55-4."[1]

[1]U.S. DOE 1994. Memorandum from M. Diana Webb, NEPA Compliance Officer to Jeff Robbins, NEPA Compliance Officer. Re: DOE Environmental Checklist.

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FD305

FD305–1 **Human Health Risk**

The bounding alternative would be locating the pit conversion and MOX facilities at Pantex (see Alternative 9). About 0.000104 Ci/yr of plutonium and americium and 1,100 Ci/yr of tritium, total, would be released to the atmosphere from these facilities. In 1996, the airborne releases from Pantex operations were 1.6×10^{-17} Ci of thorium 232, 0.000146 Ci of uranium 238, and 0.103 Ci of tritium (*1996 Environmental Report for Pantex Plant*, DOE/AL/65030-9704, May 1997). While the commentor is correct in stating that plutonium processing would result in radiation releases greater than those from current operations, including a tritium release 10,000 times greater, the doses and resulting adverse health effects associated with the increased releases would be very small. The dose to the MEI from these facilities would be increased by 0.068 mrem/yr, and the dose to the population living within 80 km (50 mi) of Pantex in 2010 would be increased by 0.59 person-rem/yr. For 10 years of normal operation, the increased risk of an LCF to the MEI would be 3.4×10^{-7}, and the increased number of LCFs to the 80-km (50-mi) population would be 0.003.

FD305–2 **Air Quality and Noise**

The 1994 analysis performed by LANL referred to the possibility of airborne releases of beryllium, a hazardous air pollutant, from pit disassembly and conversion. Subsequent analysis from LANL indicates that there would not be any airborne releases of beryllium (*Pit Disassembly and Conversion Facility, Environmental Impact Statement Data Report—Pantex Plant*, LA-UR-97-2909, June 1998). Because the beryllium is expected to remain in metal form at all times, the health hazards are minimized. The beryllium would be present in large pieces and cuttings created when the pit was bisected. These cuttings would be too large to become airborne. There would be no grinding; thus, there would not be any pieces of beryllium small enough to become airborne. Because the pieces and cuttings would be contaminated with trace levels of radioactive materials, they would primarily be disposed of as TRU waste and is included in the waste projections in this SPD EIS.

Section 2.4.1.1 was revised to discuss beryllium and its presence in the pit conversion facility.

C. The most significant cumulative effect is the introduction of plutonium processing missions to a DOE site that has never conducted these missions. In the Stockpile Stewardship and Management PEIS (1996), DOE reported that, "plutonium would not be introduced into a site that does not currently have a plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing operations into sites without current plutonium capabilities."

DOE identifies Pantex in numerous documents, including the Draft SPDEIS, as not having existing plutonium processing capabilities. DOE must analyze the high cost and complexity of introducing plutonium operations to Pantex, including, but not limited to developing the infrastructure required to a successful implementation of this mission–that adequately protects workers, the community, and the environment. 3

In addition, DOE must analyze the long-term cumulative effects of building new Category I nuclear facilities. These facilities will, in all likelihood, be used for subsequent plutonium missions, so the analyses for building and operating new plutonium facilities must take into account the probability of subsequent missions, including the environmental remediation that will follow.

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc.

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FD305

FD305–3 **Alternatives**

The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) (DOE/EIS-0236, September 1996) states that the pit fabrication mission would not be introduced into a site that does not have an existing plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities. The SSM PEIS states further that an important element of the site selection strategy is to maximize the use of existing infrastructure and facilities as the nuclear weapons complex becomes smaller and more efficient in the 21st century; thus, no new facilities were to be built to accommodate stockpile management missions. Accordingly, DOE considered as reasonable only those sites with existing infrastructure capable of supporting a pit fabrication mission. Although Pantex has the infrastructure to carry out its current weapons assembly and disassembly mission and nonintrusive pit reuse program, it was not considered a viable alternative for the pit fabrication mission because it did not possess sufficient capability and infrastructure to meet the SSM PEIS siting assumption stated above. Among the operations that were considered in developing siting alternatives for pit fabrication in the SSM PEIS were plutonium foundry and mechanical processes, including casting, shaping, machining, and bonding; a plutonium-processing capability for extracting and purifying plutonium to a reusable form either from pits or residues; and assembly operations involving seal welding and postassembly processing.

When comparing the site selection strategy for pit disassembly and conversion with that used for the pit fabrication mission, the siting criteria in the SSM PEIS have little or no bearing on siting criteria used in this SPD EIS. Pit disassembly and conversion do not require the foundry and mechanical processes discussed in the SSM PEIS and can be accomplished in a stand-alone facility Also, the SSM PEIS siting assumptions include a requirement to use existing facilities, whereas, the pit conversion facility would be a new structure no matter where it is located.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support*

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DON MONIAK
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of Site Selection for Surplus Weapons-Usable Plutonium Disposition (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

D&D is discussed in Section 4.31. DOE will evaluate options for D&D or reuse of the proposed facilities at the end of the surplus plutonium disposition program. At that time, DOE will perform engineering evaluations, environmental studies, and further NEPA review to assess the consequences of different courses of action, including projected waste generation quantities.

STAND of Amarillo, Inc.
Don Moniak
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STAND of Amarillo, Inc.

September 15, 1998

STAND COMMENT # 8
Surplus Plutonium Disposition Draft Environmental Impact Statement **(Draft SPDEIS)**
Re: Insufficient Analysis of Groundwater Impacts

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management.

DOE must conduct a full analysis to address increased tritium contamination in regional groundwater resources at all candidate sites. STAND's primary concern is the Ogallala aquifer--regionally critical to both urban and rural areas--and other groundwater resources at Pantex. Because tritium concentrations in groundwater throughout the U.S. physically reflects historical DOE activities, DOE has much experience to reference. DOE must use this experience and report effects of tritium releases of past activities and, at a minimum, clearly identify pathways for tritium through the environment. 1

In the Draft SPDEIS DOE wrote that, "the Storage and Disposition PEIS concluded that the facility would not have any impact on groundwater quality. There are no new data available to indicate that this conclusion should be revisited." Indeed, significant new data are available to the public and this conclusion is absolutely inaccurate. Most significant is the operation of a Special Recovery line in the PDCF which would result in airborne emissions of 1,100 curies per year of gaseous tritium. These emissions represent a 10,000 fold increase over existing levels at Pantex

For a PDCF, DOE has indicated that, "the most severe consequences of a design basis accident...would be associated with a tritium release." (Page 4-89). The tritium release would involve "a major glovebox fire is assumed to heat multiple parts contaminated with up to 20 grams of tritium and convert it all to tritiated water vapor....resulting in a release of 20 grams through the stack to the atmosphere." This accident would release nearly 200,000 curies of tritium to the atmosphere. The risk of this accident occurring ranges from 1 in 10,000 to 1 in 1,000,000. The wide range of this risk estimate indicates great uncertainty in DOE's estimates. 2

When DOE was rationalizing plutonium pit storage at Pantex, it conducted a study evaluating the risks of contaminating the Ogallala aquifer with plutonium. This same approach is necessary for the design basis accident for the PDCF.

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc

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FD306

FD306–1 **Human Health Risk**

DOE acknowledges that the estimated gaseous tritium release of 1,100 Ci/yr from the pit conversion facility would result in a tritium release 10,000 times greater than existing levels at Pantex. However, these releases to the air would have no impact on groundwater quality during normal operations. The doses and resulting adverse health effects (via the inhalation and ingestion pathways) associated with this increased release would be very small. The dose to the MEI would be increased by 0.062 mrem/yr, and the dose to the population living within 80 km (50 mi) of Pantex in 2010 would be increased by 0.58 person-rem/yr. For 10 years of normal operation, the increased risk of an LCF to the MEI would be 3.1×10^{-7}, and the increased number of LCFs to the 80-km (50-mi) population would be 0.0029.

FD306–2 **Facility Accidents**

The assessment of consequences of the accidental tritium release is consistent with the methodology used in the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE/EIS-0161, October 1995). Unlike plutonium, oxidized tritium (i.e., water vapor) does not significantly deposit on the ground for subsequent percolation into the local groundwater except in cases of rain or dew. Pantex has a relatively arid climate, so the chance of these weather conditions at the time of an accident is slight.

Moreover, even if it were to happen, Section 4.6.1.2 of the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996) indicates that actual movement of contaminated groundwater off the site would require about 10 to 20 years, and may take as long as 50 or more years to move a contaminant plume off the site using the most current test data. The half-life of tritium is 12 years; therefore, the actual quantity of any hypothetical contamination would be reduced by a factor of roughly 2 to 16 by the time it moved off the site. Because of these considerations, health consequences as a result of contamination of the Ogallala aquifer were not considered to be characteristic of a tritium release accident. Appendix K.1.4.2 was revised to include a discussion of the treatment of groundwater accidentally contaminated by tritium.

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DON MONIAK
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STAND of Amarillo, Inc.

September 28, 1998

STAND COMMENT # 09
Surplus Plutonium Disposition Draft Environmental Impact Statement (Draft SPDEIS)
Re: Insufficient Analysis of Visual Impacts of New Plutonium Facilities

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

The Draft SPDEIS contains an insufficient and inconsistent analysis of the visual impacts of locating new plutonium facilities at Pantex. STAND believes that constructing and operating plutonium disposition facility or facilities in Zone 4 at Pantex would constitute an obvious, dramatic landscape change and thus have a negative impact on the visual quality of the area.

The Department of Energy must conduct a rigorous analysis--applying consistent methodology and criteria--of the effects on visual quality from new plutonium facilities at Pantex. The analysis must include an assessment of the effects on surrounding private property values created by major landscape changes. DOE must conduct an analysis of the changes in visual quality from constructing and operating plutonium facilities in Zone 4 at Pantex. A simple comparison of existing conditions in Zone 4 versus proposed conditions in Zone 4 shows a obvious change in the visual character. 1

Zone 4 Existing

No smokestack
No manufacturing or processing facilities
Storage facilities 14-16 feet high

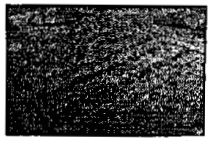

Figure 1: Aerial View of Zone 4 Storage Area at Pantex.
(Credit: Robert Del Tredici)

Zone 4 Proposed

115-foot high smokestack at PDCF
Two storied plutonium processing facilities
Storage facilities would remain

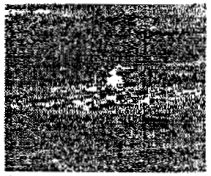

Figure 2: Aerial View of Industrial Area at INEEL.
(Credit: INEEL)

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FD334

FD334–1 **Land Use and Visual Resources**

On the basis of public comment and to correct inaccuracies, the Land Use and Visual Resources sections of Chapter 4 of Volume I for all the candidate sites were reviewed and revised, as appropriate, to ensure consistency in the analyses of the candidate sites. Specifically, Section 4.26.3.5.2 was revised to clarify that the proposed surplus plutonium disposition facilities would be the tallest and largest facilities in Zone 4 and would be visible from U.S. Route 60.

As a point of clarification, the "smokestack" referenced in connection with pit conversion facility is not intended to discharge smoke under normal operating conditions. It would be used to transport air from the building to the outside via the building's ventilation system. The expected emissions from this stack are characterized in Appendixes G and J.

STAND OF AMARILLO, INC.
DON MONIAK
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STAND Comment #9, Page 2 of 3

In the Draft SPDEIS, DOE neglected to consider the unique nature of the Pantex area. On clear high-pressure days, tall smokestacks are visible more than 15 miles away on the Southern High Plains. The Amarillo skyline is visible from Pantex--17 miles away.

In Section 4.26 of the Draft SPDEIS--"additional environmental resource analyses"--visual resources are discussed but not analyzed. For all "additional resources" DOE concluded (page 4-1) that there would be "minimal or no impacts at the candidate sites regardless of the disposition alternative being considered." The environmental consequences were derived by, "comparing facility characteristics and requirements from Chapter 2 and Appendix E with affected environmental information from Chapter 3." 1

The environmental information in Chapter 3 is inaccurate in terms of the Pantex visual resources assessment. Zone 4 at Pantex is not visible from U.S. Highway 60. The environmental information also does not present an accurate portrayal of the existing conditions in Zone 4.

As a result, for each candidate site DOE erroneously wrote (Section 4.26) that new facilities "would remain consistent with the industrialized character of the landscape and the current Visual Resource Management . designation." The impacts on visual resources are inaccurately presented as equal despite wide variation in topographical features, distance from proposed facilities to site boundary and private property, existing character of the proposed facility locations, and vegetation cover. 2

DOE did not conduct a consistent analysis for Pantex. Instead, it used very different criteria for assessing Pantex as compared to other sites, and then presented the impacts as equal.
The following issues should be addressed and DOE should admit that there are clear distinctions between the four sites.

1. Pantex was analyzed for existing overall site conditions, not specific areas where proposed facilities would be located. DOE wrote (Page 4-328) that, "in height and size, the proposed facilities would be similar to buildings in other industrialized areas of the site." This is an inaccurate statement, as there are no facilities with smokestacks at Pantex, no Category I nuclear facilities, and no manufacturing buildings in Zone 4. 3

In contrast, DOE wrote that, "in height and size, the proposed facilities would be similar to existing buildings" in the specific areas, such as 400 at Hanford, INTEC at INEEL, and F-Area at SRS. These specific areas are already characterized by heavy industrialization where smokestacks are the highest and most dominant visual feature.

2. DOE described the tallest structures at Pantex as water towers, whereas the tallest structures at Hanford, INEEL, and SRS were described as smokestacks generally over 200 feet high. These features correspond to the existing heavy industrial character of the proposed locations at other sites. By contrast, the Zone 12 industrial area at Pantex is barely visible from the north end of the Pantex plant, and even the Zone 4 bunkers are not readily noticeable. A 115 foot smokestack 4

FD334

FD334–2 **Land Use and Visual Resources**

To correct an inaccurate visual description of Zone 4, Section 3.4.10.2.2 was revised to state that the existing facilities in Zone 4 are not visible from the intersection of U.S. Route 60 and Texas FM 2373. Section 4.26.3.5.2 was revised to clarify that new structures and the stack associated with the proposed pit conversion facility would be visible from parts of U.S. Route 60.

FD334–3 **Land Use and Visual Resources**

Existing tall structures at Pantex include the 60-m (197-ft) meteorological tower located in the northeast portion of the site and the new water tower with a height of 44 m (145 ft) in Zone 11. Other tall structures are associated with the twin stacks of the steam plant with a height of 20 m (65 ft). There are currently no tall structures in Zone 4.

FD334–4 **Land Use and Visual Resources**

DOE acknowledges the commentor's conclusion that the descriptions of Hanford, INEEL, and SRS suggest existing heavy industrial character of those sites and the general lack of such features at Pantex, especially in regard to the addition of a 35 m (115 ft) smokestack, that would be readily visible and interrupt the current light industrial and agricultural landscape. As discussed in response FD334-1, Section 4.26.3.5.2 was revised to clarify that the proposed facilities would be the tallest and largest facilities in Zone 4.

STAND OF AMARILLO, INC.
DON MONIAK
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would be very noticeable and would interrupt what is essentially a mixed landscape of very light industrial (Zone 4 storage) and agricultural.

3. By neglecting to consider the differences in vegetative cover and topography for the four sites, DOE arrived at the amusing conclusion that while impacts at SRS would be minimal because facilities would be invisible, highly visible facilities at Pantex would have no impact on visual quality. 4

For the SRS analysis, DOE wrote that "facilities are generally not visible off the site because the views are limited by rolling terrain and heavy vegetation." At the other three sites, the views are not limited by vegetation, as they are all in open grassland or shrub-steppe environments. Distance and topography is a limiting factor at Hanford, as the 200 Area "cannot be seen from Columbia River or State Route 240." (Page 3-43, 3-44).

The contrast between these sites and Pantex is obvious. The distance from the proposed facilities to the private property boundary at Pantex would only be 1.1 miles and uninterrupted by topography or vegetative cover. DOE cannot legitimately claim that a 115 foot tall smokestack (such as that required for a PDCF) would not have a negative impact on the aesthetic values of the area and thus a negative impact on adjacent private property values 5

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc.

FD334

FD334–5 **Land Use and Visual Resources**

For the purpose of determining the radiation dose to the public and the onsite workers from normal operations, the stack associated with the proposed pit conversion facility was estimated to be 35 m (115 ft) high, in fact, the exact height of the stack would be determined during the design and permitting process and may be less than 35 m (115 ft). While a stack with a height of 35 m (115 ft) would be taller than existing facilities in Zone 4, it would not be the tallest structure at Pantex (as discussed in response FD334–3) or within the immediate viewshed of Pantex. There are many grain elevators in the area that are larger than the proposed stack in terms of width and depth and are as tall or taller in terms of height. Because the land around Pantex is largely agricultural, its value should not be impacted by the industrial nature of Pantex but by the perceived quality of the surrounding land in terms such as crop yield factors. As discussed in Section 3.4.10.1.1, because of the presence of the airport and other industry around Pantex, Amarillo's comprehensive land-use plan encourages compatible use rather than residential use for the area surrounding the plant so its impact on property values is limited.

STAND of Amarillo, Inc.

September 28, 1998

STAND COMMENT #10
Surplus Plutonium Disposition Draft Environmental Impact Statement (Draft SPDEIS)
Re: Plutonium Pit Composition and RCRA

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

On page 2-10 of the Draft SPDEIS, DOE defined "clean metal" as "pure plutonium metal generally with less than 100 parts per million of any given impurity...The only major chemical impurities are gallium and radioactive decay products such as americium, neptunium, or uranium. Examples of pure metal items include.. finished machined weapon components." However, according to the ARIES Fact Sheet (See STAND Comment #2), up to 22 impurities in addition to gallium, americium, neptunium, and uranium may be found in plutonium pits: 1

Element	Maximum Concentration
Aluminum	not provided
Beryllium	3 parts per million (ppm)
Boron	50 ppm
Carbon	200 ppm
Cadmium	10 ppm
Calcium	500 ppm
Chromium	100 ppm
Copper	100 ppm
Erbium	not provided
Iron	< 400 ppm
Magnesium	500 ppm
Manganese	100 ppm
Lead	100 ppm
Nickel	< 400 ppm
Tin	100 ppm
Tantalum	100 ppm
Thorium	100 ppm
Titanium	100 ppm
Tungsten	200 ppm
Vanadium	not provided
Zinc	100 ppm
Tritium	10 mCi/kg

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FD335

FD335–1 **Pit Disassembly and Conversion**

None of the plutonium from the pits is considered impure metal. Any impurities that would prevent the plutonium dioxide from meeting MOX fuel specifications would be removed at the MOX facility. Section 2.4.1 was revised to acknowledge the presence of potential impurities in the pits to be dismantled.

STAND OF AMARILLO, INC.
DON MONIAK
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According to DOE's own information, several impurities may exist at levels above 100 parts per million in plutonium pits. Is there some pit plutonium that can be classified as "impure" metal? Why are these other materials not considered major impurities? 2

To what level do these impurities have to be removed during plutonium pit conversion? What differences exist between impurities reduction for MOX versus immobilization?

Several of these impurities are classified as hazardous metals under RCRA (Resource Conservation and Recovery Act). Will waste contaminated with hazardous metals be subject to RCRA regulations?

If not, how is DOE planing to process impure plutonium that contains hazardous metals such as lead, beryllium, cadmium, and chromium without having the resulting wastes be part of a mixed TRU waste or MLLW stream? For example, on Page H-38 of the Draft SPDEIS, DOE wrote that "lean-lined gloves are likely to be managed as mixed TRU waste." Yet, DOE does not identify the hazardous metals within plutonium pits at any point in the Draft SPDEIS as being part of the processing waste stream. 3

This is notable because on Page H-39 DOE does cite one impurity--tritium--as being part of the LLW stream. Yet, DOE does not provide information on how other pit impurities are categorized within the waste streams.

In the final SPDEIS, DOE must discuss and analyze the pit impurities in the waste stream.

Sincerely

Don Moniak
Program Director
STAND of Amarillo, Inc.

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FD335–2 **Pit Disassembly and Conversion**

Gallium and other impurities would not have to be removed if the plutonium dioxide from the pit conversion facility were going to be used in the immobilization facility. For MOX fuel fabrication, the degree of removal of impurities would depend on the MOX fuel specification. The pit conversion facility is no longer being analyzed as a possible location for the plutonium-polishing process. DOE has included plutonium polishing as a component of the MOX facility to ensure adequate gallium and impurity removal from the plutonium dioxide. Section 2.4.3 and the hybrid alternatives analyses in Chapter 4 of Volume I were revised to include a discussion of plutonium polishing.

FD335–3 **Waste Management**

Any waste determined to be hazardous waste would be managed as required by RCRA and other applicable laws and regulations. The waste quantities presented in Appendix H and the Waste Management sections of Chapter 4 of Volume I include estimates of hazardous and mixed waste generation. The contaminants cited in the comment are present in the pit plutonium at only very low levels, and, with the exception of tritium, should largely remain entrained in the plutonium.

Appendix H was revised to discuss the inclusion of the impurities in the LLW and TRU waste streams. The beryllium would be present in large pieces and cuttings created when the pit was bisected. These cuttings would be too large to become airborne. There would be no grinding; thus, there would not be any pieces of beryllium small enough to become airborne. Because the pieces and cuttings would be contaminated with trace levels of radioactive materials, they would primarily be disposed of as TRU waste and is included in the waste projections in this SPD EIS. Section 2.4.1.1 was revised to discuss beryllium and its presence in the pit conversion facility.

STAND of Amarillo, Inc.

September 28, 1998

STAND COMMENT #11
Surplus Plutonium Disposition Draft Environmental Impact Statement (Draft SPDEIS)
Re: Scoping Comments

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

According to the National Environmental Policy Act (NEPA), the "scoping" process for Environmental Impact Statements are intended for "identifying the significant issues related to a proposed action" (40CFR1501.7) in order to "determine the scope and the significant issues to be analyzed in depth in the environmental impact statement" (40CFR1501.7.(a).(2)).

During the scoping process for the SPDEIS, DOE received numerous comments but was very selective when incorporating these comments. Two examples illustrate DOE's tendency to incorporate comments from business interests within DOE's sphere of economic influence while ignoring comments from most stakeholder groups: 1

- The inclusion of the Fast Flux Test Facility as a "contingency" for burning MOX fuel;
- The inclusion of Pantex as a plutonium processor under all possible alternatives.

In June 1997 and August 1997, STAND of Amarillo submitted comments on the scope of the SPDEIS. STAND is resubmitting the majority of these comments (*original comments in italics*) as part of the public record for the Final SPDEIS and is requesting that DOE address and incorporate these comments into the Final SPDEIS.

I. During the scoping period, STAND wrote, in regard to the RAND report *The Waste Heat Implications of Alternative Methods for Disposing Surplus Weapons Plutonium: Direct Disposal vs. MOX Burning in LWR's:*

"This report is another indication of the serious flaws in past analyses concerning the MOX fuel option. This report must be fully considered and addressed within the EIS. DOE should identify all necessary changes to the Programmatic Environmental Impact Statement for the Storage and Disposition of Weapons-Usable Fissile Materials (S&D PEIS), or within the SPDEIS, that will be necessary as a result of this report." 2

DOE did not address these changes in the Draft SPDEIS. On pages 4-378 and 4-379, DOE reviewed its Generic Reactor analysis in the Final Storage and Disposition PEIS. The RAND report was not cited in this analysis. Because DOE did not provide a comparative analysis of the

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FD336–1 **General SPD EIS and NEPA Process**

For this SPD EIS, scoping comments were invited from all interested individuals and organizations. Those comments that identified issues related to the proposed action and not already destined for inclusion in this EIS prompted appropriate changes to the document. Comments that had to be addressed in other venues, did not relate to the disposition of surplus plutonium, or represented statements of opinion were considered but did not affect the scope of this EIS. A discussion of those issues identified from written and oral comments received during the scoping period for this EIS is provided as Section 1.4. Individual responses to the commentor's resubmitted scoping comments are provided below.

FD336–2 **General SPD EIS and NEPA Process**

The RAND study cited by the commentor analyzed a repository design that is very different from the NWPA repository design being analyzed by DOE. Moreover, the information in the study does not directly pertain to the disposition of surplus plutonium, and thus, was not used in the preparation of this SPD EIS. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the

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MOX vs. Immobilization end-product, the Draft SPDEIS violates the NEPA requirement (40CFR1502.14.(b)) to "devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative results." 2

II. STAND wrote, in regard to DOE's *Program Acquisition Strategy For Obtaining Mixed Oxide Fuel Fabrication and Irradiation Services* (PAS):

A. "The PAS appears to be entirely incompatible with the SPDEIS, and raises issues that are not within the scope of the PEIS, or should be within the scope of this EIS and not an Acquisition Strategy."

During the SPDEIS process, DOE moved from the PAS procurement stage to development and release of a *Request for Proposals for MOX fuel Fabrication and Irradiation Services (MOX RFP).* Before DOE even decides to pursue the MOX option, it intends to award a contract to one of three consortiums that recently submitted bids. These three consortiums now have a vested financial interest to insure that the MOX option will be pursued. 3

This is a clear violation of the NEPA requirement (40CFR1506.1.(b)) that agencies, "will not prejudice the ultimate decision of the program" with interim actions, as "interim action prejudices the ultimate decision on the program when it tends to determine subsequent development or limit alternatives." Proceeding with the MOX RFP has limited the full-immobilization alternative.

C. "The issues that DOE should address, as they pertain to the relationship of the SPDEIS and the PAS include:

What is the relationship of this PAS to the SPDEIS? DOE must clearly state how this PAS will impact the siting decision."

In reference to the MOX RFP, DOE stated in the Draft SPDEIS that, "environmental impact analysis relating to specific reactors will be included in the SPD Final EIS," although these analyses are scheduled to be made by MOX consortiums in their proposals. During the 1997 Scoping for the SPDEIS, DOE was repeatedly asked to involve nuclear reactor communities in the NEPA process. DOE ignored these scoping comments while moving forward on an exclusionary MOX procurement process designed to select MOX reactor sites. 4

DOE cannot justify soliciting public comment for the site selection process for plutonium processing facilities, while excluding public involvement in selecting plutonium irradiation facilities.

C. "Where will DOE analyze the environmental consequences and risks involved with the transportation and conversion of government furnished depleted uranium to uranium dioxide? The PAS identifies this action as a consortium responsibility, but provides no evident route for analyzing this action." 5

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potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

Section 2.18 provides a summary of impacts of the construction and normal operation of the proposed surplus plutonium disposition facilities that will allow reviewers to compare the various alternatives. Section 4.30 also includes a comparison of the incremental impacts, per metric ton of plutonium dioxide, of reapportioning materials from the MOX facility to the immobilization facility, including such factors as changes in the amount of waste generated and the associated human health risks.

FD336–3 **MOX RFP**

DOE's NEPA implementing regulations in 10 CFR 1021 contain a specific provision, Section 216, which allows contracts to be let contingent on completion of the NEPA process, in this case the SPD EIS ROD. This section requires DOE to phase contract work in a way that will allow the NEPA review process to be completed in advance of a go/no-go decision. In the case of this SPD EIS, the go/no-go decision will be determined by which alternative is selected by the decisionmaker. In accordance with 10 CFR 1021.216, DOE prepared and provided an Environmental Critique to the source selection team. The Environmental Critique evaluated impacts of the offer in the competitive range and was considered in awarding the contract. DOE also prepared a publicly available Environmental Synopsis on the basis of the Environmental Critique, as discussed in response FD336–2. As stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are made and announced in the SPD EIS ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before the ROD is issued, and options that would allow

construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach.

FD336–4 **MOX RFP**

The Program Acquisition Strategy, referred to by the commentor, has no relationship to the site selection process being followed in this SPD EIS. The selected team has agreed to work at any site chosen by DOE.

The remainder of this comment is addressed in that portion of response FD336–2 regarding opportunities for public comment on reactor-specific information.

FD336–5 **Feedstock**

The transportation requirements and risks associated with converting depleted uranium hexafluoride to uranium dioxide were included in the SPD Draft EIS and are included in this SPD EIS as shown in Tables L–2 through L–4. Section 4.30.3 was revised to include a discussion of the potential environmental impacts of uranium conversion. Environmental impacts of the conversion of depleted uranium hexafluoride to depleted uranium dioxide are based on impacts discussed in DOE's *Final Programmatic Environmental Impact Statement for Alternative Strategies for Long-Term Management and Use of Depleted Uranium Hexafluoride* (DOE/EIS-0269, April 1999).

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In the Draft SPDEIS, DOE analyzed transportation of depleted uranium, but not conversion of uranium hexafluoride to uranium oxide. In the Final SPDEIS DOE must provide information on this latter requirement, as well as a comparative analysis for the uranium conversion requirements for MOX versus immobilization. 5

D. "What are the effects of producing gallium free plutonium dioxide for MOX fuel fabrication, as stated on page A-7 of the PAS? Where will this action be analyzed?"

In the Draft SPDEIS, DOE only addressed gallium free plutonium dioxide in terms of the "plutonium polishing contingency." In the Final SPDEIS, DOE must provide a comparative analysis of the effects of producing gallium free plutonium dioxide for MOX. 6

III. During scoping, STAND requested that "*DOE incorporate the following viewpoints into the SPDEIS*:

A. "Both alternatives for disposition-- MOX fuel fabrication and irradiation, and immobilization--involve technologies which have never been conducted on an industrial scale with weapons grade plutonium. 7

Both immobilization and MOX pose significant risks to public and environmental health. Both alternatives involve processing tons of plutonium, one of the most dangerous elements known, as well as an array of other toxic materials."

DOE neglected to address the past impacts of plutonium processing, and instead presented a Draft SPDEIS that identifies a set of goals rather than expected impacts, and which serves more as a project justification than an environmental impact statement. 8

B. "Both operations would add to the accumulation of transuranic waste for which DOE has no approved permanent disposal facility. The ones that are proposed are problematic and the SPDEIS should consider and analyze contingency plans for alternative storage and disposal sites, including the option of on-site storage and disposal."

No contingency to either WIPP or Yucca Mountain was identified in the Draft SPDEIS. In the final SPDEIS, DOE must identify and analyze on-site storage contingencies for dealing with the full range of expected TRU and High-Level Waste to be created by its proposed action. 9

IV. During scoping, STAND wrote:

"The SPDEIS is tiered to the Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Impact Statement (S&D PEIS). The S&D PEIS is a legally and scientifically insufficient document for the following reasons: 10

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FD336–6 Plutonium Polishing and Aqueous Processing

Appendix N of the SPD Draft EIS discusses the environmental impacts of adding a small plutonium-polishing process into either the pit conversion or MOX facility as a contingency. On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal (e.g., gallium) from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

FD336–7 Alternatives

Although no domestic, commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily accommodate a partial MOX core. The fabrication of MOX fuel and its use in commercial reactors have been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium. The environmental, safety, and health consequences of the MOX approach, as well as the production and disposal of any waste, are addressed in this SPD EIS. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and the commercial reactors selected to use MOX fuel to ensure adequate margins of safety. While plutonium from warheads may never have been used in MOX fuel, its behavior in fuel is essentially the same as that of non-weapons-origin plutonium, and so does not present a situation different from MOX fuel experience to date. Although immobilization of weapons-usable surplus plutonium in a ceramic or glass form has not been demonstrated on an industrial scale, there exists a growing experience base and ongoing research and development activities related to the use of these technologies for immobilizing HLW. This experience is being adapted and applied to address the surplus plutonium disposition program.

FD336–8 **General SPD EIS and NEPA Process**

As noted in Section 1.1, this SPD EIS analyzes potential environmental consequences of alternative strategies for the disposition of a nominal 50 t (55 tons) of surplus weapons-grade plutonium. The overall goal as stated in Section 1.2 is to reduce the threat of nuclear weapons proliferation by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Potential environmental impacts of the proposed actions are discussed at length in Chapter 4 of Volume I and summarized in Section 2.18. The past impacts of plutonium processing are not a result of the proposed action and are beyond the scope of this EIS.

FD336–9 **Repositories**

The management of TRU waste generated by the proposed surplus plutonium disposition facilities is evaluated in this SPD EIS.DOE alternatives for TRU waste management are evaluated in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). WIPP began receiving shipments of TRU waste for permanent disposal on March 26, 1999. As described in Appendix F.8.1, and the Waste Management sections of Chapter 4 of Volume I, it is conservatively assumed that TRU waste would be stored at the candidate sites until 2016, at which time it would be shipped to WIPP in accordance with DOE's plans. Expected TRU waste generated by the proposed facilities is included in the *WIPP Disposal Phase Final Supplemental EIS* cumulative impacts estimates, as well as in *The National TRU Waste Management Plan* (DOE/NTF-96-1204, December 1997).

This SPD EIS, for the purposes of analysis, assumes that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As discussed in response FD336–2, DOE is preparing a separate EIS. The MOX spent fuel is included in the Yucca Mountain inventory and is being analyzed in that EIS.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

The WM PEIS includes an analysis of the impacts of the long-term storage of 21,600 canisters of vitrified HLW at Hanford and the storage of 4,912 canisters at SRS. The WM PEIS included as part of its cumulative impacts an estimate of HLW generated by the proposed surplus plutonium disposition facilities. As described in Section 2.4.4.2 of this SPD EIS, the surplus plutonium disposition program could result in the generation of up to 395 additional HLW canisters of immobilized plutonium at Hanford or SRS.

FD336–10 General SPD EIS and NEPA Process

DOE does not agree that the *Storage and Disposition PEIS* is a fundamentally flawed document. This SPD EIS references and is tiered from the *Storage and Disposition PEIS* in accordance with applicable provisions of 40 CFR 1502.20.

DOE determined that aqueous processing was not a reasonable alternative for pit conversion under the terms of NEPA because current aqueous processes using existing facilities would produce significant amounts of waste, and aqueous processing would complicate international safeguard regimes. Dry processing was analyzed in the *Storage and Disposition PEIS* and this SPD EIS.

DOE is not including the plutonium-polishing process (a small-scale aqueous process) as part of the pit conversion facility; that process would be part of the MOX facility. DOE would use only dry processes in the pit conversion facility. Section 2.4.3 was revised to include a description of the plutonium-polishing process that would be used in the MOX facility. For this reason, the thermal process for removing gallium may not be needed in the pit

conversion facility (see revised Section 2.4.1.2). Plutonium dioxide is the starting form for the disposition of surplus plutonium for either the immobilization or MOX approach. This EIS analyzes the environmental impacts of converting surplus pits into plutonium dioxide that can be used in either the immobilization or MOX facility. No additional aqueous processing would be necessary to prepare the plutonium dioxide for immobilization.

Section 3.1 defines the ROI for human health risks to the general public from exposure to airborne contaminant emissions as an area within an 80-km (50-mi) radius of the proposed surplus plutonium disposition facilities. The analyses in Appendix J consider the potential contamination of agricultural products, livestock, and fish, and consumption of these products by persons living within an 80-km (50-mi) radius of the candidate sites. The analyses of doses consider bioaccumulation of radioactivity in grain crops, forage, and animals (and the resultant effects on ingestion doses to humans), and all potential dose pathways including direct ingestion, inhalation, external ground exposure, and plume immersion. These analyses indicate that the potential impacts of operating the pit conversion, immobilization, and MOX facilities on agricultural products, livestock, and human health at any of the sites would likely be minor. Section 4.26 and Appendix J were revised to discuss potential impacts of radioactive emissions on agriculture and the Columbia River.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

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- *A lack of reasonable alternatives for plutonium pit disassembly/conversion activities;*
- *A lack of a credible cumulative impacts assessment due to the lack of analyses on reasonable, though undesirable, aqueous processes for pit conversion and MOX fuel fabrication;*
- *Failure to incorporate known information prior into the process, such as gallium reduction;*
- *Failure to analyze and report the impacts from proposed activities on the regional economic activities such as Texas Panhandle agriculture and Columbia River fisheries;*
- *Failure to report the full cost of the MOX option."*

10

In the Draft SPDEIS, DOE failed to address these Storage and Disposition PEIS limitations. How can DOE tier the SPDEIS to a fundamentally flawed document?

V. STAND wrote in its scoping comments, in regard to general NEPA requirements:

"The Department of Energy is obligated under NEPA to, "use all practical means, consistent with other essential considerations of national policy" to protect the environment for future generations, assure for all Americans safe, healthful, productive surroundings, preserve our natural heritage, and enhance the quality of renewable resources.

To do this, NEPA requires that DOE identify and analyze "presently unquantified environmental amenities and values" to provide "appropriate consideration in decision making along with economic and technical considerations." The amenities and values that should be identified and analyzed in this EIS, and for which there was an inadequate analysis in the S&D PEIS, include clean water, soil, and air and the productive farmlands and fisheries a high quality environment supports.

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DOE should view its mandate, under NEPA, to assess the relationship between the proposed activities and "the maintenance and long term enhancement of long term productivity in terms of existing economic activities such as agriculture and fisheries. In the PEIS, many commenters wrote that the analysis on the Texas Panhandle Agricultural economy was deeply flawed. STAND agrees with this assessment and requests DOE to analyze impacts of proposed activities on all effected natural resource related economies.

NEPA also requires DOE to assess the environmental impact and adverse environmental effects of its proposed activities on identified amenities and values. In the PEIS, DOE took the approach of analyzing the impacts of proposed activities during normal operations while only assessing the probability of accidents occurring. This strategy is insufficient. STAND is

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FD336–11 **Facility Accidents**

The potential agriculture impacts of the proposed surplus plutonium disposition facilities are described in the Geology and Soils portions of Section 4.26. In the Water Resources portions of Section 4.26, the impacts on surface water (including fisheries) and groundwater have also been described. All activities would be limited to each of the candidate sites, and any impacts to the surrounding areas would be within Federal, State, and local regulatory limits.

As shown in the Facility Accidents sections of Chapter 4 of Volume I and in Appendix K, DOE addresses the environmental and human health consequences of the full range of accidents scenarios for all the alternatives. Similarly, the Transportation sections of Chapter 4, and Appendix L discuss the consequences of transportation accidents.

Because of the very low probability of accidents of the magnitude needed to impact natural-resource-related economies, the consequences would be difficult to calculate with any reasonable degree of accuracy. In the unlikely event of an accident, crops may be contaminated which could affect an agricultural based economy. DOE would thoroughly investigate potentially affected areas and determine the need for interdiction or other specific actions.

The remainder of the comment is addressed in response FD336–10.

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requesting that DOE conduct an analysis of the environmental and human health consequences of the full range of accident scenarios. Only by doing this can people make informed choices and decisions."

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In the Draft SPDEIS, DOE did not address these issues. In the Final SPDEIS, DOE must address probable impacts on natural resource economies.

VI. During the scoping period, STAND wrote, in regard to expected contamination:

"Plutonium processing facilities will result in environmental contamination. The issue is not whether this contamination will be above or below regulatory limits, because regulatory limits can change over time. The unaddressed question to-date is what amounts of contamination and waste will be generated for all reasonable alternatives. Until now, DOE has provided only a rough sketch of the outputs of its proposed plutonium operations. In addition, DOE has raised concerns for Russian MOX operations that it has not reported or not analyzed here.

For example, the Joint United States/Russia Plutonium Disposition Study released in September, 1996, included the following Russian Environmental, Safety, and Health issues:

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'The following issues should be included in the program of follow-up studies of MOX fuel production and use:

1. Analysis of data on possible concentrations of plutonium and americium in aerosol discharges in the production of MOX fuels, including aerosol dispersion under regular operating conditions and in potential accidents.'

Where is this analysis for U.S. MOX production? DOE is obligated to assess impacts in this country which it has helped to identify in Russia."

DOE should address the americium and plutonium aerosol issues in the final SPDEIS. DOE should also identify the expected level of contamination resulting from the proposed action.

VII. During the scoping period, STAND wrote, in regard to air emissions, wastewater discharges, and waste streams:

A. "To assess environmental impacts, DOE should provide a clear and comprehensive accounting of the various waste streams and contamination generated by all proposed disposition activities by addressing the following issues and questions:

13

1. Standards and guidelines for pollution levels must be quantified clearly and up-front. DOE should explain what existing regulations exist and how they might vary from state to state. Furthermore, the S&D PEIS analyses of contaminant levels are filled with vague

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FD336–12 **Human Health Risk**

Chapter 4 of Volume I presents the results of the radiological health impacts associated with operational emissions of radionuclides, including plutonium and americium, for each alternative. Radiological release quantities expected from each of the proposed surplus plutonium disposition facilities, including the MOX facility, are presented in Appendix J for normal releases and Appendix K for postulated accidents. All applicable contaminant streams are addressed in the radiological impact analyses.

The accident analysis in this SPD EIS is considered to be bounding and includes the effects of aerosol dispersion under a representative spectrum of possible operational accidents. Inhalation is the most significant dose pathway. Other pathways (ingestion) are controllable through interdiction. No major chemical accidents were identified. As discussed in Appendix K.1.1, additional documentation on hazards and accidents would be developed for each facility during the design and construction process.

The amounts and composition of waste generated for each alternative are quantified in the Waste Management sections in Chapter 4 of Volume I and Appendix H. Generation rates of TRU, low-level, mixed low-level, hazardous, and nonhazardous waste are also provided.

FD336–13 **General SPD EIS and NEPA Process**

DOE assessed the environmental impacts of air emissions, wastewater discharges, and waste streams for this SPD EIS is accordance with well-recognized and accepted procedures. The waste streams generated by the implementation of each alternative are described in the Waste Management sections in Chapter 4 of Volume I and Appendix H. Detailed information is provided in the form of tables and charts, and to the extent possible—the proposed action being of a highly technical nature—the text is presented in "common English." Chapter 5 includes a description of existing regulations and a list of State regulations for the candidate sites. Furthermore, the document is organized in accordance with 40 CFR 1502.10, and reader aids such as a glossary, a list of acronyms, and conversion charts are provided. Also available to the public are those data reports used as source material for the calculation of potential environmental impacts.

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descriptions like "minimum," "not expected," "unlikely," and "background levels," and are presented in a format which is reader unfriendly."

The Draft SPDEIS is a cumbersome document that violates every numerous NEPA requirements to present information in a clear and concise manner. 13

B. "The public has a right to know what is expected at these facilities. To provide an adequate analysis that addresses public concerns, DOE must:

- *Be sure that subjective terminology is supported with quantifiable information, and the limitations of DOE's data should be identified."* 14

DOE did not describe the limitations of its data in the Draft SPDEIS and should do so in the Final SPDEIS.

- *"Fully identify all expected contaminant and waste streams in the main document, and not just solely in source materials or referenced documents. The primary document should provide the fundamental information necessary for people to make decisions.*

- *Identify the expected levels of contaminant deposition and emissions."*

In the Draft SPDEIS, DOE failed to identify all expected contaminant streams in any document because it excluded beryllium emissions as an impact. In addition, DOE used its source documents to send people on a paper chase for pertinent information. For example, on page J-4 DOE wrote that, "source term data for radiological releases, stack heights, and release locations are provided in the data reports for the pit conversion, immobilization, and MOX facilities." In other words, the Draft SPDEIS does not provide any data on something as basic as expected quantities of radioactive air pollutants. In the final SPDEIS, DOE must provide important information in the main document, and it must do so in a reader-friendly format as required by NEPA. 15

- *"Identify known health effects of exposures to contaminants and the levels at which these health effects are known to occur."*

DOE did not address this issue in the Draft SPDEIS. Instead, DOE compared emissions data to regulatory requirements. In the final SPDEIS, DOE must discuss the potential health effects of the pollutants that will result from its proposed action. 16

C. "The waste streams quantified within the S&D PEIS did not sufficiently define the waste composition or disposal options. The SPDEIS provides an opportunity to answer questions such as: 17

What is the alternative to waste disposal at permanent repositories? If WIPP opens, is there

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In order to produce a document that is understandable and of a manageable size, DOE chose to place some technical information in supporting reports. DOE believes that this SPD EIS reflects an appropriate balance between detailed technical information desired by some reviewers and information that is understandable by the general public. Supporting reports are available in the public reading rooms near the sites, as described in the NOA for the SPD Draft EIS. A copy of the NOA is provided in Appendix A.

FD336–14 General SPD EIS and NEPA Process

All the alternatives have been evaluated using uniform methods and data allowing for a fair comparison. Limitations of the data on air emissions, wastewater discharges, and waste streams are discussed in Appendix F, and the results of the impacts analyses for these areas are discussed in Appendixes G and H, respectively. The accident analyses are based on calculations relevant to hypothetical sequences of events and models of their effects. The models provide estimates of the frequencies, source terms, pathways for dispersion, exposures, and effects on human health and the environment that are as realistic as possible within the scope of the analysis. In many cases, a paucity of experience with the accidents postulated led to uncertainty in the calculation of their consequences and frequencies. This prompted the use of models for input values that yield conservative estimates of consequence and frequency, so that the projected risks are more likely to be overestimated than underestimated.

FD336–15 Human Health Risk

Section 2.4.1.1 was revised to discuss solid beryllium and its presence in the pit conversion facility, and Appendix H was revised to include a discussion of solid beryllium in the pit disassembly and conversion waste streams. Appendix J was revised to include source term data on airborne and liquid releases of radioactive isotopes. Appendix G was revised to include stack data. No airborne emissions of beryllium are expected from anticipated facility operations.

FD336–16 **Human Health Risk**

The discussion of hazardous chemical impacts in Appendix F.10.2.1 was revised to include more information on the types of health effects that could result from exposures to hazardous chemicals and to provide more details on the methodology used to calculate these effects, both carcinogenic and noncarcinogenic. Appendix F.1.2.1 was also revised to include a discussion on how the most stringent standard or guideline relates to human health. The expanded discussions clarify the meaning and significance of the potential impacts associated with exposure to airborne releases, including hazardous air pollutants and criteria air pollutants, that are presented in the Human Health Risk and Air Quality and Noise sections in Chapter 4 of Volume I.

FD336–17 **Waste Management**

As discussed in response FD336–9, WIPP is open and can accommodate the amount of TRU waste expected from the proposed surplus plutonium disposition facilities. Further, the response discusses Yucca Mountain and its ability to accept MOX spent fuel. Response FD336–2 discusses the RAND report.

As described in Appendix H, operation of the pit conversion, immobilization, and MOX facilities would be expected to generate LLW that includes used equipment, wipes, protective clothing, and solidified inorganic solutions. LLW would be contaminated with TRU isotopes (primarily plutonium) at concentrations lower than 100 nCi and would generally not contain appreciable contamination by other isotopes. An exception is that operation of the pit conversion facility would generate LLW that includes tritium. As described in Appendix F.8, by definition TRU waste contains more than 100 nCi of alpha-emitting transuranic isotopes, with half-lives greater than 20 years, per gram of waste. Transuranic isotopes include isotopes of plutonium. Mixed TRU waste is TRU waste that contains hazardous components regulated under RCRA. LLW can contain transuranic isotopes in concentrations of no more than 100 nCi of waste. Mixed LLW is LLW that contains hazardous components regulated under RCRA. As described in the introduction to Appendix H, only a very small portion of the TRU waste would leave the

proposed surplus plutonium disposition facilities as a liquid. Most of the TRU waste generated by the proposed facilities would be solid wastes (wipes, used containers and packaging materials, and lead- lined rubber gloves), with surfaces contaminated by plutonium dioxide. All TRU waste would be appropriately placed in containers before leaving the proposed facilities. Therefore, it is unlikely that TRU waste would be released to the environment.

Plutonium is extremely immobile in the environment. Plutonium in soils is associated with organics, sesquioxides (soil coatings), clay particles, carbonates, and silicates. Studies have shown that most plutonium deposited on the ground remains in the upper soil horizons. Therefore, contamination of underground sources of water by deposition of plutonium on the soil is unlikely. The potential for plutonium contamination of the Ogallala aquifer was examined in the *Environmental Assessment for Interim Storage of Plutonium at Pantex* (DOE/EA-0812, January 1994). That document shows that no accident or routine operating condition that could result in a plutonium release could be identified with a probability greater than 1.0×10^{-6}/yr of having an impact on the aquifer. Actual mobility depends on the form of the plutonium released (including chemical compound and valence state) and the conditions of the environment into which the plutonium is released (e.g., eH and pH, and the presence of materials to which the plutonium may attach).

DOE is establishing an internet database pursuant to the terms of a lawsuit settlement (*Natural Resources Defense Council et al. v. Bill Richardson, Secretary of Energy, et al.*, Civ. No. 97-936(ss)). The database will include information on waste at each site by program office; specific information on volume and mass of radioactive materials, chemical constituents, radioactivity of materials, and disposition plans will be provided. DOE expects that this database will be operational in January 2000 and will be maintained for 5 years.

Most facility accidents would not involve the release of significant quantities of materials from the facility, and therefore, would not produce contamination outside the building. Likewise, most transportation accidents would not result in releases of radioactive materials to the environment. Due

to the immense variability of the accident scenarios, and the difficulty in estimating the amount of material that would be contaminated with radioactive and hazardous constituents, waste streams could not be reasonably estimated for the accident scenarios. If an accidental release occurred, the source of the release would be promptly contained and any significant contamination remediated. Incident response and contaminant remediation would be performed in accordance with all applicable regulations, as well as spill prevention and emergency response plans.

DOE does not decide which wastes are nonhazardous and which are hazardous. The allowable amounts of contaminants that may be present in nonhazardous waste are determined by Federal and State regulations. For example, as described in the regulations implementing RCRA, wastes are determined to be hazardous if they exhibit the characteristics of ignitability, corrosivity, reactivity or toxicity as defined in the regulations, or are otherwise determined to pose a hazard.

Although it is inevitable that regulations may change over time, issues such as how the regulatory environment will evolve are speculative and therefore are beyond the scope of this SPD EIS. If regulatory requirements relevant to the surplus plutonium disposition program change, however, DOE, will comply with those new requirements.

Earlier consideration regarding a possible HLW repository in Deaf Smith County, Texas, is unrelated to the proposed action. In December 1987, the NWPA was amended by the U.S. Congress to direct DOE to suspend characterization work at all sites except the Yucca Mountain Site in Nevada.

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sufficient space there for the new quantities of TRU waste? If not, what will be the interim and permanent fate of new TRU wastes?

Likewise, will Yucca Mountain, if it opens, have sufficient space for MOX spent fuel assemblies? Is Yucca Mountain a suitable site considering the findings in the RAND report?

What will the composition of low level waste be for each facility, based on existing experience?

What will be the concentration of transuranic elements in low level, TRU waste, and mixed low level and TRU wastes?

Of the chemicals in the mixed TRU wastes, what will be the effect of these chemicals in terms of the mobility of transuranics in the soil? What will be the chemical composition of mixed TRU waste and how will this effect Pu transport if it contaminates soil and water? 17

What will the projected waste stream be for various accident scenarios?

For nonhazardous wastes, what are the allowable tolerance for contaminants?

Will regulations change over time, much as they are being proposed for Yucca Mtn., and just as DOE changed the definition of TRU waste in 1984?

What is the possibility, especially if plutonium processing facilities are located at Pantex, of DOE revisiting the proposal for a high level (or other nuclear waste) waste repository in Deaf Smith County, Texas?"

DOE should address these unanswered questions in the final SPDEIS.

VIII. During the scoping period, STAND wrote, in regard to accident scenarios:

A. "In the S&D PEIS, DOE analyzed a limited set of accident scenarios, reported them in a reader unfriendly format, and only reported cancer risks. Although the environmental and human health risks were different at each site, DOE failed to summarize the comparative risks across sites. For the SPDEIS to be credible, DOE must make great improvements to its assessments of accident scenarios. Even European MOX fuel fabricators assess a greater spectrum of accident scenarios and health risks than DOE has to date. These include breach and/or crash of a glove box, onsite floods, and estimated dose to public for various accident scenarios. 18

DOE should have sufficient data based on past accidents at Rocky Flats, Hanford, Savannah River Site, Pantex, and INEEL to estimate the expected range of contamination possible under various accident scenarios. DOE should then estimate the comparative doses and the possible health and environmental consequences for each site, and compare the sites in a

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FD336–18 **Facility Accidents**

This SPD EIS presents accident results in terms of point estimates for consequence and qualitative frequency ranges for frequency consistent with the guidance in *Recommendations for the Preparations of Environmental Assessments and Environmental Impact Statement* (DOE Office of NEPA Oversight, May 1993). In general, the postulated beyond-design-basis accidents are significantly more severe than any accident that has occurred within the experience base of DOE.

This EIS provides several levels of detail in order to be useful to a variety of interested parties. Section 2.18 summarizes the limiting design basis accident for each candidate site by alternative. In addition, each alternative analyzed in Chapter 4 of Volume I provides a discussion of the limiting beyond-design basis accident. More detailed accident result information is provided in Chapter 4. Although the format of the accident tables is the same among alternatives, there is no explicit redundancy in the information contained in the tables. Appendix K presents a greater depth of detail, including additional accident result tables for average meteorology (as opposed to conservative meteorology, which was used for the formal results in Chapter 4).

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clear and concise format. DOE cannot simply present a series of cumbersome tables filled with exponential notation and leave the comparative risk analyses to the public."

In the Draft SPDEIS, DOE provided dozens of redundant tables filled with exponential notation and left the comparative risk analyses to the public. The final SPDEIS could be greatly reduced in size by removing redundant analyses and providing comparative analyses in an up-front and reader friendly format. 18

B. *"DOE should also expand or adjust its analyses to include:*

Incorporating an analysis of human error using past DOE records relevant to the proposed operations. DOE should provide a list of past accidents, their effects and consequences, and the stated probability at the time of the accident. For example, the recent plutonium inhalation at Los Alamos by a LANL researcher occurred due to procedural violations. What was the risk of this researcher inhaling plutonium under the existing risk analysis? What was the probability of procedures being violated, based upon past experience?" 19

DOE not address the anticipated accidents at each facility and the resulting cumulative impacts of long-lived radioactive contamination. DOE only identified "bounding" impacts and therefore understated the daily operational impacts. DOE should address these issues in the final SPDEIS.

C. *"Identifying the economic enterprises at risk from an accident, including agriculture, fisheries, and food processing facilities."* 20

DOE must identify what economic enterprises are at risk in the final SPDEIS.

D. *"Not assuming a logical chain of events during accident modeling. DOE should model accident scenarios without unrealistic assumptions such as fire water and truck hose down water being collected, monitored, sampled, and treated as process wastewater; or hundreds of square miles of land being decontaminated to background levels. What are the chances, based on DOE's real life emergency response data of accident response and mitigation measures failing?"* 21

In the Draft SPDEIS, DOE continued to assume accident responses would be orderly and logical. DOE should compare the accident response procedure at the Hanford Plutonium Finishing Plant to the accident response reality during the 1997 explosion. In the final SPDEIS, DOE should address the impacts of inadequate accident responses to anticipated and probable accidents.

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FD336–19 **Facility Accidents**

Potential accidents with a range of frequencies and consequences were addressed in this SPD EIS in accordance with DOE's NEPA guidance. Many of the accidents in Appendix K reflect potential human error and procedural violations. The accident history sections in Chapter 3 of Volume I summarize the existing data on incidents at the candidate sites.

In response to the commentor's concern, a search of the DOE occurrence reporting database for 1997 and 1998 was performed, which yielded 13 occurrences at LANL categorized under the heading "radiological issues." Of these 13 occurrences, three resulted in dose estimates ranging from 0.007 to 1.2 rem CEDE, the remainder were below measurable levels based on nasal smears. This two-year history is more recent than the five-year history summarized in Table 3–62, which documents radiation doses to onsite workers at LANL for the calendar years 1991–1995. The two-year data summarized above falls within the dose range of Table 3–62, substantiating its validity in characterizing anticipated exposures in general.

The impacts from daily surplus plutonium disposition operations are considered in the Human Health Risk sections in Chapter 4 of Volume I. Because nonradiological consequences dominate accident risks for high frequency accidents, worker accident risk from nonradiological sources was estimated using existing DOE injury and fatality rates and summarized for each alternative in the Facility Accidents sections of Chapter 4. It is not reasonable to postulate the chronic occurrence of accidents exceeding permissible release limits that might result in significant cumulative impacts from long-lived radioactive contamination. This is because regulatory action by DOE, EPA, and/or NRC would be taken in response to any such accident.

FD336–20 **Socioeconomics**

This comment is addressed in response FD336–11.

FD336–21 **Facility Accidents**

As discussed in Appendix K.1.4.1, consequences were developed using conservative assumptions and methods without regard for or without taking credit for adequate emergency response.

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IX. During the scoping period, STAND wrote, in regard to the value of clean water:

"DOE's analyses in the S&D PEIS tended to distort the cumulative effects of its proposals by using inadequate comparative baselines. For example, comparing groundwater use to existing unsustainable levels of use is misleading. If water usage is already at unsustainable levels, or if water contamination is already exists, these facts must be stated up-front. The questions is not how much usage or contamination will increase during DOE activities, but whether additional use, or contamination, is desirable.

Every site under consideration for new plutonium operations is located on or near critical water sources which support fisheries and/or agriculture, and provide critical drinking water sources. All of these water sources have been degraded or placed at serious risk by past and present DOE activities as well as commercial industrial activities. DOE should identify the existing state of the water resources it is proposing to impact."

In the Draft SPDEIS, DOE glossed over existing conditions of water resources.

B. "The issues and questions that must be addressed by DOE in the SPDEIS include:

What is the distance to groundwater, surface water, aquifers, and drinking water sources for the proposed facilities? 22

What is the cost of contaminating a safe drinking water supply, irrigation supplies, or a fishery?

One consistent theme in the S&D PEIS is that plant blowdown, firefighting water, steam condensate and other sources of wastewater will "be monitored for radioactivity, and if uncontaminated, discharged" to local sources. DOE must address the extent to which contaminated water can escape detection, the possibility of monitoring systems breaking down during emergency situations, and the consequences of such an event.

In the S&D PEIS, "drawdown representing 2.9% of the available groundwater is reported for a MOX fuel plant's impacts on the Ogallala aquifer. Who is this groundwater available to? Does this assertion incorporate the possibility of Amarillo well fields drawing down faster? Is this acceptable in light of the fact that Amarillo well field is already so depleted?

In the S&D PEIS, a proposal to use Amarillo wastewater was reported What is the state of this proposal? Where is the documentation for this proposal?

DOE should address these questions in the Final SPDEIS.

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FD336–22 **Water Resources**

DOE acknowledges the commentor's concerns regarding the potential for impacts to water resources at Pantex Section 3.4.7.2 describes potential and past DOE water use, use by the city of Amarillo, and irrigation use in Carson County. Operation of the pit conversion and MOX facilities is estimated to increase water use by 116 million l/yr (30.6 million gal/yr). This water use would still be a small portion of the water used by the city of Amarillo (0.5 percent) and that used by irrigation in Carson County, and would be less than the water used by Pantex in 1991. Although additional water use at Pantex may produce some localized drawdown of the aquifer near Pantex supply wells, this water use would not impact the overall conditions in the Ogallala aquifer. DOE is not proposing to use water from the Hollywood Road Wastewater Treatment Plant at this time; however, this measure is a viable option and could be used to mitigate impacts of additional water usage in the future.

Analyses presented in Section 4.26.3.2 indicate that there would be no discernible impacts to surface water or groundwater quality at Pantex from normal operation of the proposed surplus plutonium disposition facilities. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. It is not possible to estimate the cost of cleanup associated with contamination of drinking water supplies, irrigation supplies, or fisheries.

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X. During the scoping period, STAND wrote, concerning the value of clean air:

"The same issues that apply to water also apply to air quality. DOE should not assume that impacts to air quality are occurring to undisturbed airsheds. DOE should identify the existing state of the water resources it is proposing to impact.

Additional issues and questions that must be addressed by DOE in this EIS include:

Wording found in the PEIS such as activities will "not typically" exceed regulations or guidelines is unacceptable. DOE should qualify vague language with clear quantitative estimates. For example, on Page 4-680 of the PEIS, DOE wrote, "VOC emissions of 1,000 kg/yr ...would give trace contamination at the site boundaries." Statements like these are unacceptable and should be qualified with questions such as: What is a trace of contamination? 23

What are the volatile organic compounds and other toxins that are expected to be produced at various facilities? What are the existing regulatory levels for each contaminant that would be produced, and what are the known health effects of overexposure?"

DOE should address these questions in the final SPDEIS.

XI. During the scoping period STAND wrote, in regard to a MOX fuel fabrication facility:

"STAND is requesting that DOE completely re-analyze the impacts of building and operating a MOX Fuel Fabrication facility in the SPDEIS.

The reason for this is simple. In December, 1996, the Department of Energy published the Feasibility Assessment of Candidate DOE Sites and Buildings for a Mixed Oxide (MOX) Fuel Fabrication Facility for Disposal of Excess Weapons-Usable Plutonium. There are serious discrepancies between the findings and recommendations in this document and what was reported in the S&D PEIS.

For example, DOE has admitted that the purpose of the assessment was to "review the suitability of sites and existing buildings being considered to host the fabrication facility." Oak Ridge and the Nevada Test Site were not reviewed in the assessment because "the DOE has chosen not to introduce the MOX fabrication facility to a site without recent capability to handle or process Category I quantities of plutonium." In the S&D PEIS, NTS and ORR were eliminated because "DOE would not add Pu to sites that do not currently have Pu in storage." So on the one hand, handling and processing were the criteria, and on the other storage was the criteria. Yet, Rocky Flats, where Pu is stored, was not considered for disposition because it is undergoing closure. Why did the DOE report different screening criteria in these two documents? How did this effect the decision to settle on the four final candidate sites? 24

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FD336–23 **Air Quality and Noise**

The text referred to by the commentor was from the *Storage and Disposition PEIS.* This SPD EIS has attempted to clarify the air quality concerns associated with operating the proposed surplus plutonium disposition facilities. The air quality impacts associated with construction and operation emissions of air pollutants have been quantified for each alternative in Chapter 4 of Volume I (e.g., see Table 4–52). As shown in these tables, the amount of air pollution associated with the operations of the proposed facilities is generally small when compared to the existing site concentrations, and applicable standards or guidelines. A detailed discussion of how these impacts were calculated is included in Appendix G for each of the proposed surplus plutonium facilities at the candidate sites. Air pollutant emission rates are given for each proposed facility in kilograms per year, and rates are compared with the appropriate air quality standards and guidelines.

FD336–24 **MOX Approach**

DOE understands there could be confusion regarding various documents that address related topics. In the *Storage and Disposition PEIS*, the proposed action for plutonium disposition was to select a disposition strategy. Therefore, the decisions made were of a programmatic nature, taking into consideration the major programmatic activities at various candidate sites. Once the decision was made in the *Storage and Disposition PEIS* ROD to proceed with the hybrid and immobilization-only approaches to surplus plutonium disposition and focus on the selected candidate sites, the next step was to determine the specific DOE site(s) for constructing and operating the proposed facilities and the disposition approach and technologies. Because the decisions for this SPD EIS are site and facility specific, the decision criteria are based on the candidate site's ability to handle up to 50 t (55 tons) of surplus plutonium using the selected disposition approaches, as well as its ability to house the needed facilities.

As discussed in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), several national laboratories, including ANL-W, LLNL, LANL, and ORNL, have ongoing R&D projects related to the surplus plutonium disposition program that involve the use of small

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In the Draft SPDEIS, DOE did not address the changes that had occurred since issuance of the S&D PEIS. Since the ROD for the PEIS was issued, DOE has proceeded with MOX research and development that is centered at Oak Ridge and Los Alamos. Oak Ridge is handling and processing small amounts of plutonium in the R&D program. This contradicts the criteria for removing Oak Ridge as a plutonium processing candidate.

At Los Alamos, DOE is proceeding to upgrade plutonium storage facilities, yet these upgrades are never addressed in the Draft SPDEIS. Los Alamos personnel also stated, at the MOX Industry Conference in Atlanta, that the LANL MOX program has been approved by lab officials for an indefinite period. What capabilities are being developed at LANL that DOE did not report in the Draft SPDEIS? 24

Serious discrepancies between programmatic realities and the Draft SPDEIS and related documents continue to undermine the integrity of DOE's NEPA process. These discrepancies should be addressed in the Final SPDEIS.

B. *"In part two of the assessment, three unique attributes to Weapons grade plutonium were identified that were not reported or analyzed in the S&D PEIS:*

1. The different isotopic ratio—lower ratio of Pu-240—in weapons grade plutonium compared to weapons usable, reactor grade plutonium creates more stringent criticality limits with subsequent negative impacts on the economics and risks of the MOX option. In DOE's reevaluation of the MOX option, it must answer the following questions, as they pertain to the Plutonium isotopic ratio issue: 25

a. What additional costs are incurred during MOX fuel fabrication that have not been reported?

b. What additional criticality risks are incurred during MOX fuel fabrication that have not been reported?

c. What additional consequences are possible in the event of a plutonium release?

2. Gallium concentrations will have to be below 100 parts per million for the plutonium oxide feed. DOE has not explained in a decision document why gallium reduction must occur and the processes required to reduce it. The questions DOE must answer as they pertain to gallium (and other impurities) are: 26

a. What additional costs are incurred to prepare plutonium oxide for the MOX fuel feed that is not found in the immobilization option and which has not been reported?

b. What additional risks to workers and the environment are created with gallium reduction processes?

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quantities of plutonium. ANL–W, LANL, LLNL, as well as Hanford and SRS, are candidates for lead assembly activities in the SPD EIS because they have existing capabilities and facilities that could support these activities. ANL–W and ORNL are candidates for postirradiation examination in the SPD EIS because they have existing capabilities and facilities that could support these activities.

The LANL storage facilities mentioned by the commentor are covered under the *Site-Wide Environmental Impact Statement on the Continued Operation of the Los Alamos National Laboratory* (DOE/EIS-0238, January 1999) and are not part of the surplus plutonium disposition program. All of the MOX fuel activities being pursued at LANL were discussed in the *Pit Disassembly and Conversion Demonstration EA*. The interrelationships of the referenced documents are described in Section 1.8 of this SPD EIS.

FD336–25 **MOX Approach**

Reactor-grade and weapons-grade plutonium are chemically indistinguishable. The difference is isotopic: there is less plutonium 239 (and therefore more plutonium 240) in reactor-grade plutonium than in plutonium that was produced for use in weapons. However, since plutonium 240 is not fissile, it is the amount of plutonium 239 that dominates criticality concerns. This SPD EIS analyzes the potential impacts of the proposed actions. Therefore, analyses of criticality risks during MOX fuel fabrication, as well as all other SPD EIS analyses, reflect the isotopic content, plutonium concentrations, physical attributes, and other parameters specific to the materials, facilities, and sites under consideration. The reactor-specific analyses in the revised Section 4.28 for both routine operation and postulated accidents use source terms that reflect the proposed MOX fuel component of the reactor cores.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. Response FD336–10 discusses the separate cost reports associated with this EIS.

FD336–26 Plutonium Polishing and Aqueous Processing

The degree of removal of impurities would depend on the MOX fuel specification. Gallium and tramp impurities would not have to be removed if the plutonium dioxide from the pit conversion facility were going to be used in the immobilization facility. DOE has included plutonium polishing as a component of the MOX facility to ensure adequate gallium and impurity removal from the plutonium dioxide. Section 2.4.3 and the hybrid alternatives analyses in Chapter 4 of Volume I were revised to include a discussion of plutonium polishing.

Response FD336–10 discusses the separate cost reports associated with this EIS. The additional risks associated with plutonium polishing in the MOX facility were added to the Human Health Risk and Facility Accidents sections of Chapter 4 (e.g., see Sections 4.3.2.4 and 4.3.2.5). Gallium presence in appreciable concentrations is a concern both in the fabrication of MOX fuel through possible interference of the sintering process of uranium and plutonium oxides, and in fuel performance by increasing the potential for corrosion and embrittlement of the fuel cladding.

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c. What are the consequences of higher levels of gallium in the MOX fuel during reactor operation?

3. The facility is "not planned for high degrees of automation." This raises the critical issues of heightened worker exposure to americium and fine-grained plutonium oxide dust. DOE must answer the following questions within the scope of the SPDEIS:

a. What is the difference in costs between a state of the art highly automated MOX facility that protects worker health and safety and a labor intensive MOX facility that places workers at higher risks? 27

b. Why is the DOE proposing, in the feasibility assessment, a facility without high degrees of automation? What is DOE proposing in the SPDEIS?

c. What are the differences in risks to workers in the MOX facility at varying levels of automation? DOE must clearly explain the differences in radiation exposures at each work station, the number of work stations required, and the number of work stations that handle the plutonium oxide and depleted uranium oxide powders."

In the Final SPDEIS, DOE should address these questions.

C. *"The role of the NRC has been difficult to ascertain. Part two of the feasibility assessment states that the MOX facility will be licensed by the U.S. Nuclear Regulatory Commission. Why did DOE fail to involve the NRC in this assessment and involve the agency in the decision process at the earliest possible opportunity? Why were representatives from European private and state owned corporations involved with this process while the legally responsible U.S. Agency was excluded?*

Under NEPA, DOE is required to consult with and obtain the comments of "any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved." No comments by the NRC are published in Volume 4 of the S & D PEIS. This is an obvious NEPA violation because the NRC has special expertise. DOE admitted during the PEIS process that NRC will be a licensing agency, and nuclear reactors regulated by NRC will burn the MOX fuel. In the NOI, the role of the NRC remains unidentified. Since the NRC will be responsible for regulating both a MOX fuel fabrication facility and MOX fuel irradiation, why is the critical role of NRC left undefined?" 28

DOE addressed the role of the NRC in the Draft SPDEIS. The NRC has provided substantial comments during meetings with DOE OFMD officials in the past year. These comments should be referenced in the Final SPDEIS.

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FD336–27 **Human Health Risk**

DOE acknowledges the commentor's concerns about occupational exposures related to the degree of automation of the MOX facility. Appropriate automation would be used at the MOX facility and worker exposures would be kept as low as is reasonably achievable. DCS's experience in Europe shows that worker exposure is much lower than that reported in the SPD Draft EIS. As shown in the Human Health Risk sections in Chapter 4 of Volume I related to the MOX facility and in Appendix J (e.g., Table J–11), the average worker dose was revised to 65 mrem/yr from 500 mrem/yr. The cost difference between a highly automated MOX facility and the facility design presented in this SPD EIS has not been quantified.

The analyses presented in Chapter 4 indicate that the MOX facility would be operated in a manner that would minimize worker exposure. It is not possible at this point to describe every glovebox station in the MOX facility because its design is still evolving; however, it is known that certain processes (e.g., plutonium dioxide/depleted uranium dioxide blending) could result in higher occupational exposures than others. As explained in Chapter 4 and Appendix J, doses for all operations would be kept well below the Federal limit of 5,000 mrem/yr, and an ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

FD336–28 **NRC Licensing**

NRC's role is defined. The MOX facility would be licensed by NRC under 10 CFR 70, *Domestic Licensing of Special Nuclear Material*. NRC will continue to be responsible for licensing the reactors that would use MOX fuel, and as such would have to approve the use of MOX fuel through the license amendment process (10 CFR 50.90). Early in the preparation of the *Storage and Disposition PEIS* and this SPD EIS, DOE invited NRC to be a cooperating agency for the surplus weapons-usable fissile materials program. NRC declined the offer in favor of being a commenting agency. DOE is conducting regular meetings with NRC on the MOX approach, including fuel design and qualification.

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D. *"In the feasibility assessment, DOE proved it is perfectly capable of presenting complex materials in an orderly, uniform, and coherent format. It would be very easy for DOE to assess occupational safety within the context of this existing framework.*

In Volume 2, part 3, "The Generic MOX fuel fabrication process," thirty four work stations are identified for the entire fabrication process. For each work station, DOE should answer the following questions in plain and simple language. A complex table filled with data in scientific notation is unacceptable, as is average worker doses. Workers should be made fully aware of the known and potential risks of working in a MOX facility.

1. What is the expected range of radiological exposure under normal and abnormal operating conditions? According to European MOX Fuel Fabricators, maximum and average radiation doses are significantly higher than the average reported by DOE in the S&D PEIS:

A "staged dose assessment" at BNFL's Sellafield MOX Plant reported plant averages of 1.5 rem/year with "high manual involvement."

Belgonucleaire reported that maximum exposures ranging from 4.7 rems/year to 1.4 rems/year between 1987 and 1996 at the P0 MOX plant. This figure is nearly six times higher than the projected average reported by DOE in the PEIS. Belgonucleaire exceeded, until 1996, BNFL and Siemens Radiological Standards and Criteria, and DOE administrative limits.

Siemens reported a proposed effective equivalent dose of 1 rem per year (10 msv/year).

How do DOE's estimates, which are admittedly for a more labor intensive facility, compare to estimates and working knowledge from Europe? 29

2. Which stations will involve working with oxide powders and what increased risks of inhalation and ingestion will these workers have relative to other work stations? How much "very light and fluffy" powder would have to be inhaled to cause acute health effects, chronic adverse health effects, or a high risk of cancer?

3. Which stations will involve working with MOX scrap materials and dry contaminated waste, and what are the increased and associated risks of working with these specific materials? 30

4. What options are available to lower all these risks if increased automation was available?"

In the Draft SPDEIS, DOE presented cumbersome tables burdened with irrelevant and redundant scientific notation, and neglected to address the range of radiation exposures in a MOX plant. In the Final SPDEIS, DOE should address these issues.

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FD336–29 **Human Health Risk**

The worker dose given in this SPD EIS was revised based on France's MELOX plant operating experience.

The higher worker doses quoted by the commentor are associated with European MOX facilities that handle reprocessed irradiated plutonium, which has a much higher dose conversion factor due to trace amounts of fission products in addition to a different plutonium isotopic spectra than that associated with weapons-grade material. For comparison, the same amount of unirradiated plutonium, such as that being proposed for the U.S. MOX facility, would have a dose conversion factor of about 75 percent less. It would therefore be expected that these worker doses would be higher than those resulting from the handling of unirradiated weapons-grade plutonium at the proposed MOX facility.

The remainder of this comment is addressed in response FD336–27.

FD336–30 **Human Health Risk**

The total predicted numbers of adverse health effects from working with plutonium, including plutonium in powder form, scrap materials, and dry contaminated waste , are included in the Human Health Risk sections of Chapter 4 of Volume I related to the MOX facility and in Appendix J (e.g., Table J–11). Less than 0.1 additional fatal cancers would be expected among workers from MOX facility operations over a 10-year period. Workers are protected against the inhalation of plutonium because glovebox operations are involved and the workers wear masks. During this same 10-year period, no additional fatal cancers would be expected from MOX facility normal operations in the general population. The amount of plutonium that would have to be inhaled to cause an LCF is about 0.00005 g (5 one-hundred thousands of a gram), depending on the isotope mixture. However, since the amount of plutonium inhaled by workers or the general population from the operation of the proposed surplus plutonium disposition facilities is significantly less than this, no LCFs from plutonium inhalation are expected.

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E. *"The feasibility assessment features a large number of technical points that raise additional questions that should be answered in the SPDEIS, such as:*

1. How many plutonium processing steps are required within a MOX fuel fabrication facility that are not required in a vitrification facility?

2. MOX fuel materials will undergo frequent sampling and laboratory testing. For all necessary laboratory measurements, what mechanisms will be in place to insure quality control of critical measurements such as gallium content, isotopic ratios, fuel rod damages? What measures are necessary to assure proper accounting of plutonium?

3. The first blend of MOX fuel will require approximately 30% plutonium to "assure Pu isotopic homogeneity." Has this process been used before? What is the possibility of the identified alternative of extensive Pu blending being necessary? What additional risks to workers and operational costs would be incurred under the Pu blending alternative?

4. A ten percent "rework" factor is assumed throughout the process. At what point would a higher rework factor require that the MOX powder be "scrapped" and require immobilization? What is the effect of this rework on occupational safety?

5. What particle sizes are necessary to obtain uniform and homogenous MOX fuel blend required for commercial use? During process of the master blend, the powders are referred to as "very light and fluffy." What size particles will be involved at this "very light and fluffy" stage? What size particles are anticipated once the pore former, binder, and lubricant are added? How does this particle size, at each processing step, compare to the requirements for immobilization? 31

6. During sintering operations, a temperature of 1800 degrees centigrade in an argon/hydrogen environment is reported as required to volatilize undesirable materials. How is this temperature regulated? What would be the consequences of heating the MOX fuel pellets at higher temperatures? What are the risks associated with argon and hydrogen at these temperatures?

7. What is "grinder swarf?" What is the compostion of this material and are there any additional hazards handling it?

8. What is the composition of "dirty scrap" which would accumulate during the fabrication process?

9. According to the assessment, dirty scrap would require either immobilization, storage, or chemical reprocessing (to retrieve the plutonium). What is DOE's preferred alternative for disposition of this dirty scrap? If immobilization is preferred, what steps would be necessary, if any, to prepare the scrap?

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Concerning the commentor's question about increased automation, the MOX facility design is subject to modifications during the design and construction process. Modifications, including automation, may be made, as appropriate, to reduce radiation exposures and to optimize equipment placement and process flow. All proposed surplus plutonium disposition facilities, including the MOX facility, would incorporate design features and be operated in a manner that reduces doses to workers and the public to ALARA levels.

Although the format of the radiological impact data is the same among alternatives, there is no explicit redundancy in the information.

FD336–31 **MOX Approach**

The processing steps involved in the immobilization of surplus plutonium are given in Section 2.4.2, and those involved in the fabrication of MOX fuel are given in Section 2.4.3. A comparison of the number of processing steps would not be appropriate because a number does not provide an indication of the complexity of the process and the potential environmental impacts.

DOE would implement quality assurance and safeguards (material control and accountability) procedures at each of the proposed surplus plutonium disposition facilities. DOE has implemented a quality assurance program for the entire fissile materials disposition program in accordance with DOE Order 414.1. This quality assurance program will be expanded by DCS into detailed plans for each step of the disposition process. Additional safeguards may be added or modified as required, especially those needed to support international inspections.

As explained in Section 2.4.3.2, MOX fuel fabrication would begin with blending and milling the plutonium dioxide powder to ensure general consistency in enrichment and isotopic concentration. The uranium and plutonium powders would be blended and milled together to ensure uniform distribution of the plutonium in the MOX, and to adjust the particle size of the MOX powder. The MOX powder would then be made into pellets by pressing the powder into shape, sintering (baking at high temperature) the formed pellets, and grinding the sintered pellets to the proper dimensions.

Materials and pellets would be inspected at each stage, and any rejected materials would be returned to the process for reuse. All operations would be performed in sealed gloveboxes with inert atmospheres. Sintering furnaces would also be sealed, and offgases would be filtered and monitored prior to release to the atmosphere. Because blending is planned for all the plutonium dioxide, the risks are reflected in the Human Health Risk sections in Chapter 4 of Volume I related to the MOX facility and in Appendix J. Costs associated with the MOX facility are contained in a separate report as discussed in response FD336–10.

The 10 percent rework factor is a conservative estimate established to determine potential environmental impacts. It is not expected that the fabrication of MOX fuel would result in that amount of rework because the technologies used in this process are well known in industrial-scale operation. The human health risk of reworking 10 percent of the feed material are included in the overall risks reported in the Human Health Risk sections of Chapter 4 related to the MOX facility and in Appendix J.

The Request for Proposals specified that plutonium dioxide particle sizes would range from 1 to 100 microns. However, the decision to include the plutonium-polishing process in the MOX facility has essentially eliminated particle size requirements for the plutonium dioxide feed. The immobilization feed particle sizes are expected to range from 1 to 100 microns, although during processing, the particle size would be reduced to less than 20 microns (nominally 1 to 3 micron mean diameter).

A very narrow temperature range during sintering is required to produce uniform MOX fuel pellets that meet specifications. The temperature range would be controlled through standard mechanisms, including continual temperature measurement, automatic regulation of the heat source, and cooling mechanisms. These are standard industrial temperature control mechanisms used by industries that require high temperatures in their operations. The specific mechanisms, controls, equipment, and instrumentation would be selected during facility design. There are no safety concerns specific to the use of argon and hydrogen at the temperatures necessary for MOX fuel pellet production, only those related to any

high-temperature operation. Heating MOX fuel pellets at a temperature higher than 1,800 C (3,272 F) would not necessarily have any associated consequences. However, there is always the potential for pellets to be out of specification, even when all process parameters are met. Out-of-specification pellets can be recycled by returning them to the appropriate stage of the MOX fuel fabrication process.

The term "grinder swarf" as used in the *Feasibility Assessment* refers to MOX fuel material that results from grinding the sintered fuel pellets in a grinder to a uniform size. This material would be collected and recycled in the fuel fabrication process.

The term "dirty scrap" as used in the *Feasibility Assessment* is MOX fuel material that has become mixed with non-fuel material during processing or fabrication, and therefore, cannot be recycled as clean scrap. However, adding the plutonium-polishing process to the MOX facility makes this material amenable to recycling. DOE's preference is to recycle the nominal amount of "dirty scrap" expected to be generated during MOX fuel fabrication this way. If larger than expected quantities of "dirty scrap" are generated during MOX fuel fabrication, this material would be immobilized, rather than recycled, to avoid creating the larger amounts of wastes that would be associated with processing the material through the plutonium-polishing step.

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10. DOE has consistently stated that a dry fuel fabrication process is desirable. It has not specifically explained the risks associated with existing wet processing technologies, or explained the differences between existing technologies. What is the possibility of an aqueous process becoming necessary? What increased risk to workers is there for using dry processes? 32

11. There are several references to liquid waste in the feasibility assessment. In Volume 2, part 6, equipment is identified as necessary for "liquid waste at containment and liquid waste treatment." In Appendix D, there is reference to an email message to "assume contaminated liquid waste generation is 5 liters/month." What is the composition of this liquid waste and was it reported in another format in the S&D PEIS? Exactly how much liquid waste will there be that was not reported." 33

In the Draft SPDEIS, DOE did not address these issues and failed to adequately compare MOX to immobilization. In the Final SPDEIS, DOE must address these issues in order to provide the required comparison between MOX and immobilization.

XII. During the scoping period STAND wrote, in regard to plutonium pit disassembly and conversion:

A. "While disposition discussion has focused on MOX fuel and immobilization technologies, the action common to both alternatives--plutonium pit conversion/disassembly (pit conversion)--is characterized by an assortment of unanswered questions and technical difficulties.

Ironically, while DOE touts it dual track strategy for plutonium disposition, it is firmly committed to a single track strategy for pit conversion. DOE's sole alternative for pit conversion is the Advanced Recovery and Integrated Extraction System (ARIES). To date, DOE has not analyzed the full range of reasonable alternatives, has failed to identify the full range of alternatives, and has even failed to analyze the range of subalternatives within the ARIES alternative. In spite of abundant evidence to the contrary, DOE has mistakenly presented ARIES as common to all alternatives. In reality, ARIES or other pit conversion technologies have requirements that are specific to the MOX option, and this reality dictates that pit conversion not be analyzed as a common activity. 34

There are two primary issues associated with the existing inadequate analysis which dictate a reevaluation of pit conversion:

1. The presence of gallium and other impurities in weapons grade plutonium, which was reported during the S&D PEIS process but not incorporated into the S&D PEIS analysis. The SPDEIS will require a reanalysis of pit conversion to incorporate the following issues as they pertain to gallium and other impurities within all pit conversion alternatives.

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FD336–32 Plutonium Polishing and Aqueous Processing

As discussed in response FD336–6, DOE has added a plutonium-polishing process in the MOX facility. The risks associated with this process are included in the Human Health Risk and Facility Accidents sections in Chapter 4 of Volume I related to the MOX facility and in Appendixes J and K.

The desirability of a dry process stems primarily from its modern nature. Wet processing, while historically the predominant method used by DOE, is an older, less efficient and messier technology. The dry HYDOX system, a simpler and more easily controlled process, is the current standard for new operations in the weapons complex. Metal dissolution via wet processing generates hydrogen at a rate controlled by acid concentration and temperature, as opposed to the dry process where hydrogen introduction is precisely controlled by the quantity of feed. Since metal dissolution in acid is an exothermic process (i.e., generates heat), wet dissolution has a multi-variable runaway reaction potential the dry process does not. Finally, the use of heated, pressurized acids in a recirculation system has historically led to significant leakage within gloveboxes over time. Coupled with the increased maintenance and repair loads of a wet process, this increases worker risk even beyond the difficulties it poses to efficient process control. The risks of aqueous processing are detailed in the EIS.

After the plutonium metal has been rendered into a powder in the pit conversion facility, this material is dissolved in the plutonium polishing process to remove gallium in the MOX facility. This step involves the classical processes used in wet processing recovery (e.g., ion exchange, precipitation, and calcination) with two important exceptions: plutonium oxide does not generate hydrogen in dissolution and does not require pressurized recirculation of the dissolution acid. The potential accident associated with the plutonium-polishing step are included in Appendix K.

FD336–33 Waste Management

The technical reports on which this SPD EIS is based provide liquid waste generation rates. The introduction to Appendix H was revised to include these liquid waste generation rates. For all but nonhazardous wastes, DOE

chose to combine the liquid and solid waste generation values into one waste generation rate for ease of comparison with site waste generation numbers. Generation rates for contaminated liquid waste would generally be small.

FD336–34 Plutonium Polishing and Aqueous Processing

As discussed in response FD336–10, the full range of reasonable alternatives for the disassembly of pits and conversion of the plutonium was analyzed in this SPD EIS. As discussed in response FD336–2, Sections 2.18 and 4.30 provide summary and incremental impacts, respectively.

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a. Since the plutonium oxide derived from pit conversion must be very pure for MOX fuel fabrication, gallium must be reduced to very low levels (less than 100 parts per million) or altogether removed in order to fabricate MOX fuel. No similar requirements have been reported for conversion to plutonium oxide suitable for immobilization activities. DOE is obligated to address two pit conversion subalternatives, one for the MOX fuel track and one for the immobilization track. The differences in time, costs, waste streams, risks, and occupational hazards between conversion for MOX fuel use and conversion for immobilization action must be identified and analyzed clearly and completely. Failure to identify and analyze the range of effects associated with pit conversion will leave both the S&D PEIS and the SPDEIS legally and scientifically insufficient.

b. Gallium reduction for MOX fuel use is unproven. DOE has placed all its bets on thermal treatment, a dry process, even though this technology has not even been tested at a pilot stage. Nobody should be asked to accept an unproven technology. The alternative to thermal processing which was reported and discussed, but not incorporated into the analysis, is an aqueous process. Aqueous processing may be an undesirable technology, but it remains a reasonable alternative until a proven dry process is developed, tested, and proven suitable. Without identifying a reasonable, though undesirable, alternative DOE failed to fully analyze the cumulative effects of its decision to adopt the dual track strategy. The difference between the no-action alternative and the preferred alternative were inaccurately reported in the S&D PEIS. For the SPDEIS to be credible subalternatives must be developed for pit conversion for MOX fuel: 34

a. Aqueous processing for gallium reduction.
b. Thermal processing for gallium reduction.

2. The ARIES process has yet to be tested at a pilot scale and is currently being analyzed at the demonstration level. DOE has not identified and analyzed the full range of reasonable alternatives if ARIES technology cannot be implemented. The same issues and solutions discussed above are applicable here as well. For the S&D PEIS to be credible, DOE is obligated to identify and analyze the full range of reasonable alternatives for pit conversion.

As pointed out numerous times, DOE has still not evaluated the full range of alternatives for plutonium pit disassembly and conversion, and has still not conducted a comparative analysis between the requirements and impacts for MOX versus immobilization. This should be addressed in the Final SPDEIS.

B. Even within the ARIES process there are many emerging issues and questions that DOE is obligated to address. These include:
Why is worker radiation exposure now estimated to be at 500 millirems per year, as reported by the Amarillo National Resource Center for Plutonium in its second quarter, 1997 newsletter? This is a 150% increase above the 200 millirems per year exposure documented in the S&D PEIS. 35

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FD336–35 **Pit Disassembly and Conversion**

The worker dose estimate in the *Storage and Disposition PEIS* was preliminary. This estimate was revised in this SPD EIS to reflect a greater understanding of the pits that would be dismantled and the associated doses connected with the dismantlement effort. This dose includes all of the steps needed to dismantle the pits and to convert the plutonium to an oxide during the operation at the proposed pit conversion facility (e.g., the Special Recovery Line). Section 2.4.1.2 was revised to more fully discuss the pit disassembly and conversion process.

The analyses presented in Chapter 4 of Volume I indicate that the pit conversion facility would be operated in a manner that would be in compliance with all applicable regulations. The pit disassembly and conversion process requires the handling of plutonium dioxide powder to transfer it from the oxidation furnace crucible to a handling can in the canning operation (which may include a blending step to declassify the powder). Automation of these steps is being evaluated as part of the technology development program and will be instituted if it is determined that the dose to the handler is too high.

As explained in Chapter 4 and Appendix J, doses for all operations would be kept well below the Federal limit of 5,000 mrem/yr and DOE's administrative limit of 2,000 mrem/yr. (The Pantex administrative limit, which is less than the 2,000–mrem/yr DOE limit, might be exceeded unless modified if the pit conversion facility were sited there.) An ALARA program would ensure that doses are reduced to levels that are as low as is reasonably achievable.

The LANL document, *Estimates of Staffing for the Pit Disassembly and Conversion Facility* (LA-UR-97-1844, 1997), was one of the referenced documents used to develop the *Pit Disassembly and Conversion Facility Environmental Impact Statement Data Reports* (LA-UR-97-2907 through 2910, June 1998).

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At each step of the ARIES process, what is the variability in worker exposure?

What steps in the ARIES process require workers to handle the plutonium oxide powder?

What wastes are created at each step of the ARIES process?

Since the NOI for the SPDEIS was issued, "ARIES" has been exposed as unnecessary for all plutonium pits and as only a portion--not the whole--of a plutonium pit disassembly and conversion operation. In the Final SPDEIS, these questions should be addressed in the context of all PDCF activities, not just "ARIES" operations. 35

DOE should incorporate the LANL document *Estimate of Staffing for the Pit Disassembly and Conversion Facility* into the Final SPDEIS.

XIII. During the scoping period STAND wrote, in regard to the role of the ANRCP:

"The Amarillo National Resource Center for Plutonium has functioned as a taxpayer funded MOX lobbying consortium. As stated in our previous comments and in a letter to Secretary Pena on May 23, 1997, the ANRCP has used, and continues to use, DOE funds to influence the site selection process outside of the NEPA process.

The Office of Fissile Materials has written, in a June 13 letter to STAND of Amarillo, PANAL, and Peace Farm, that the "Amarillo National Resource Center for Plutonium is not advising the Department on site selection, has no role in the SPDEIS and does not represent the Department in this regard." However, the ANRCP did have a role in the S&D PEIS. DOE must define how that role influenced the ROD for the S&D FEIS, and how that role affects the SPDEIS.

This is a critical issue because the ANRCP has used DOE funds to act in a clear advocacy role for siting all disposition facilities at Pantex, and this role was again illustrated at the DOE workshop in Amarillo on June 12, 1997. At the workshop. 36

ANRCP funded economist Ray Perryman presented comments in favor of locating all proposed facilities at Pantex. These comments were also distributed from the ANRCP workshop booth. The comments were based on an ANRCP report, and thus a DOE funded report, which concluded that Pantex is the best economic choice for all plutonium disposition and storage activities. What parallel studies with DOE funds have occurred for other sites?

An ANRCP poster presentation did not even reference immobilization as an option. It seems that the ANRCP has forgotten that the "N" in ANRCP stands for "National", and has failed to present the national implications of the disposition program.

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FD336–36 **DOE Policy**

ANRCP is a private entity funded and directed by the State of Texas using grant funds provided by DOE. The specific work they perform is the subject of agreement between ANRCP and the State of Texas. DOE (through the Amarillo Area Office) provides oversight only on the terms and conditions of the grant to the State of Texas. That oversight shows that the work being performed is within those terms. ANRCP has not and will not play a role in the preparation of this SPD EIS nor does it represent DOE in any manner. Further, the reports, studies, statements, and presentations made by ANRCP do not represent the position of DOE. For the above reasons, DOE has considered the commentor's suggestion of parallel studies and has decided they are not appropriate. Comments from ANRCP were treated the same as any other comment on the SPD Draft EIS.

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Since the hearings, ANRCP has continued to misinform the public. In the Volume III, Issue III ANRCP newsletter, "aqueous processing" is falsely defined as processing with water. ANRCP continually fails to inform area residents as to what aqueous processing and chemical dissolution really means, resulting in a controversial issue being dangerously understated.

In the same issue, ANRCP implies that glove box operations are a new technology, and states that the ARIES process will produce a "minimal amount of waste" and have safety precautions that would keep worker radiation exposure to a "minimal level." At no time has the ANRCP informed the public what a "minimal" waste stream is.

DOE must recognize and take into account the fact that ANRCP's activities strongly contribute to a public bias towards Pantex as a disposition site, and MOX as a disposition option. To correct for the blatant violations of the NEPA process incurred by the ANRCP, DOE should consider funding parallel studies at all candidate sites to compare the results of taxpayer funded research sponsored by ANRCP. Another valid option is for DOE to completely disregard all input from the ANRCP in the SPDEIS." 36

These comments continue to adequately reflect the problematic nature of a publicly funded advocacy group disrupting the NEPA process. Since these comments were submitted the ANRCP completed a "Preliminary Comparative Risk Assessment" that failed to incorporate public input and presented a misleading and inaccurate portrayal of proposed plutonium processing operations at Pantex.

At the August 1998 public hearings in Amarillo, DOE-funded ANRCP employees and contractors provided substantial comments on the issues. These comments should be counted as DOE comments, not public comments, as they were funded by the Department of Energy.

STAND believes that the $50 million of DOE funds spent on the ANRCP should be incorporated into DOE's Cost Analysis report. $25 million should be added to the "operating costs" estimate for siting a plutonium pit disassembly and conversion facility at Pantex, and another $25 million should be added to the "operating costs" for a MOX fuel fabrication facility.

XIV. During the scoping period STAND wrote, in regard to the role of the European plutonium industry:

"Representatives of the European MOX and plutonium fuel industry have exerted considerable energies to lobby the American public and DOE to move forward on the MOX option. DOE has not insured that voices are heard that counter this wave of publicity. 37

DOE has defined the European MOX industry strictly in terms of its experience level to the absolute exclusion of its operational record. European MOX industry representatives have even acted as paid consultants to DOE.

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FD336–37 **MOX Approach**

DOE did consider past performance along with past experience in awarding the MOX fuel fabrication and irradiation services contract. DOE's NEPA implementing regulations in 10 CFR 1021 contain a specific provision, Section 216, which allows contracts to be let contingent on completion of the NEPA process, in this case the SPD EIS ROD. This section requires DOE to phase contract work in a way that will allow the NEPA review process to be completed in advance of a go/no-go decision. In the case of this SPD EIS, the go/no-go decision will be determined by which alternative is selected by the decisionmaker. In accordance with 10 CFR 1021.216, DOE prepared and provided an Environmental Critique, including information on DCS's European MOX experience, to the source selection board. The critique documents the consideration given to environmental factors and records the relevant environmental consequences of reasonable alternatives have been evaluated in the selection process. Until the decision is announced in the ROD, no substantive design work or construction can be started on the MOX facility. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

All comments received on the SPD Draft EIS were given equal consideration. DOE has prepared this SPD EIS by carefully obtaining comparable data on all of the alternatives, analyzing the data in a consistent manner using well-recognized and accepted procedures, and presenting the results in a full and open manner.

DOE has been actively pursuing immobilization options. Meetings have been held with European vitrification experts to gain their insights.

This activity indicates a clear bias towards the MOX option that suggests that DOE is not sincerely considering a full immobilization alternative. After all, COGEMA and BNFL have substantial experience in vitrification, yet DOE is not consulting these companies on vitrification issues. For DOE to compensate for this bias towards MOX, it must objectively address the following issues and questions regarding European MOX experience in this EIS:

How much opposition to MOX fuel fabrication and utilization in Europe is there? What are the primary arguments citizens have set forth in opposition to MOX in Europe?

Why have two large MOX fabrication facilities--the Belgonucleaire P1 plant and the Siemens "new" Hanau plant--failed to obtain licenses during this decade?

Why did the old Hanau plant operated by Siemens close in the early 1990's? How many accidents occurred at that plant during its operational history, and how many workers were contaminated with radiological materials? 37

What real impacts to air, water, and soil have European MOX facilities had in the past 30 years? DOE should obtain and make public annual data on emissions and discharges of radioactive and nonradioactive hazardous substances from these plants.

What differences in the regulatory framework--licensing, pollution limits, worker and public exposure to plant pollutants--exist between the United States and nations which fabricate and/or use MOX fuel?"

In the Draft SPDEIS, DOE only cited published documents from academic and trade journals to document the European MOX industry experience. This is an insufficient approach, and DOE should address these questions in the Final SPDEIS by obtaining and making public pertinent information on the European MOX industry as a condition for those companies doing business as DOE contractors.

Sincerely,

Don Moniak
Program Director
STAND of Amarillo

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September 28, 1998

STAND COMMENT #12
Surplus Plutonium Disposition Draft Environmental Impact Statement (Draft SPDEIS)
Re: NEPA AND PLUTONIUM PIT STORAGE
AT THE PANTEX NUCLEAR WEAPONS PLANT

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

The Department of Energy continues to store plutonium pits at the Pantex plant in containers unsuitable for long-term storage and in facilities that mostly lack required environmental controls and that are considered "unacceptable" by Pantex officials. Since DOE's National Labs consider "extended storage" to be greater than five years (see Background, Section III), most plutonium storage at Pantex should be defined as "long-term" rather than "interim." DOE's major efforts to improve the safety of long-term storage of plutonium pits at Pantex have not materialized, and DOE is formulating plans and proposals in response to its failure to implement its storage decisions, but without required public input.

1. "Interim" vs. "Long-term" Storage of Plutonium at Pantex.

A. Interim Storage of pits at Pantex is presently covered by the Record of Decision (ROD) for the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (Pantex EIS) and referenced in the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Impact Statement* (SD-PEIS) and the *Stockpile Stewardship and Management Programmatic Environmental Impact Statement* (SSM-PEIS). Tiering of the Draft SPDEIS to these documents cannot occur without a supplemental EIS for long-term plutonium pit storage. 1

1. The Pantex EIS only addressed storage of pits from dismantlement activities, and not from other sites.

2. According to the Pantex EIS, "Interim storage does not refer to a time frame, but rather to the interval of time that will occur until a Record of Decision (ROD) is made on long term storage and the site and facilities in that ROD are ready to receive the pits. The decision on the site and facilities for long-term storage will be based on the SD-PEIS." (Page 1-10)

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FD337–1 **Storage and Disposition PEIS and ROD**

DOE acknowledges the commentor's concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Containers* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed; addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

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3 The coverage for the Pantex EIS was only for "interim storage requirements for pits from weapons dismantlement." (Page 1-14). DOE also specified in the Pantex EIS, that, "the proposed action in this EIS was designed to specifically to encompass the interim storage of pits from weapons dismantlement until such time as longer term decisions regarding storage and disposition could be made and implemented." (Page 1-14, 1-16).

4 Coverage for interim storage of Rocky Flats plutonium was covered in the context of "cumulative impacts" for the preferred alternative in the SD-PEIS.

5. In the January 1997 ROD for the Pantex EIS, DOE selected Pantex for the interim storage of up to 20,000 plutonium pits in Zone 4 bunkers, and rejected interim storage of plutonium pits at other sites based on transportation risks and costs.

6. In the Pantex EIS, DOE failed to conduct a "full and fair analysis of the significant environmental impacts" (CFR1502.1) did not analyze reasonably foreseeable significant adverse impacts such as the failure to implement the storage decision (CFR 1502.22.(b).(1), and omitted known scientific information. (See also Background: Section IV.)

B. Long-term storage of plutonium is covered in the ROD's for the SD-PEIS and SSM-PEIS, and referenced in the Pantex EIS. The failure to implement the SD-PEIS ROD could be interpreted as meaning that plutonium storage at Pantex would remain defined as "interim."

1. DOE confirmed that long-term storage of plutonium was only to be addressed in the SD-PEIS (and also SSM PEIS): "Decisions on the long-term storage of pits would be made in the RODs of the PEIS's. A decision relating to the interim storage of pits at Pantex would be made in the ROD of the Pantex EIS pending implementation of the selected long-term storage alternative(s)." (SD-PEIS, Page 1-6, Page 1-7)

2. In Footnote 6 of the SD-PEIS (Page 1-7), DOE wrote that: "If there is a delay in implementing the ROD's for either of the PEIS's (for example, delay due to the availability and construction of upgrades for long-term storage facilities), then there would be a need to make a decision on the location of interim storage of pits. The Pantex EIS has been completed with the analysis of interim storage alternatives...to support a decision relating to the storage of pits until a long-term storage decision is made and implemented." (Page 1-9)

3. Storage of RFETS at Pantex was considered only in the context of long-term storage analyses and the cumulative impact of long-term RFETS plutonium storage on the interim storage of plutonium from dismantlement at Pantex.
4. In the SD-PEIS ROD, DOE selected Pantex as the long-term storage site for Pantex plutonium pits from dismantlement activities, RFETS plutonium pits, and SRS strategic plutonium pits. In the SD-PEIS, DOE selected existing facilities in Zone 12 at Pantex for long-term storage following upgrades to those facilities, and identified the AT-400A as the container in which all plutonium pits would be repackaged over a five year period.

1

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II. JUSTIFICATION FOR A SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR LONG -TERM STORAGE OF PLUTONIUM PITS

STAND believes the U.S. Department of Energy (DOE) is in violation of the National Environmental Policy Act (NEPA) for not conducting a supplemental EIS for long-term and interim plutonium pit storage. In addition, DOE should not "charge" the costs of plutonium pit repackaging to the operations costs for a Plutonium pit disassembly and conversion facility at DOE candidate sites other than Pantex. DOE is in violation of NEPA for three specific reasons:

A. The ongoing transportation of plutonium pits from DOE's Rocky Flats Environmental Technology Site (RFETS) near Denver, Colorado to the Pantex Nuclear Weapons Plant near Amarillo, Texas. This action was proposed in the January 1997 Record of Decision (ROD) for the Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Impact Statement (SD-PEIS). Shipments of plutonium from RFETS to Pantex is in violation of NEPA for insufficient analysis and because it is only part of the long-term storage decision that has not been implemented. (see Background: RFETS Pu Shipments, Page 4)

B. Long- term storage activities at the Pantex plant that were not analyzed under NEPA. Since existing Rocky Flats plutonium pits were moved in violation of NEPA, they are being stored in violation of NEPA. According to the SD-PEIS ROD, long term storage of RFETS plutonium at Pantex was contingent upon the implementation of facility and container upgrades. These upgrades have since been abandoned. Long- term storage and interim storage activities of Rocky Flats plutonium at Pantex activities are occurring at the Pantex plant that were not analyzed under NEPA. (See Background: RF's Pu Interim Storage, Page 5) 1

Actions A and B are in violation of NEPA because:

- "NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken." (CFR1500.1.(b))

- The actions are not covered by the existing program statement (CFR1506.1.(c)).

- DOE has not prepared a supplemental Environmental Impact Statement in response to "substantial changes to the proposal or significant new circumstances or information." (CFR1021.314.(a)).

C. DOE is proposing and analyzing plans for long-term storage of plutonium at the Pantex plant outside of the NEPA process, which is in violation of NEPA requirements to

- "integrate the NEPA process with other planning at the earliest possible time to in planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts." (CFR1501.2).

· "begin its NEPA review as soon as possible after the time that DOE proposes an action or is presented with proposal."

· "Agencies shall not commit resources prejudicing selection of alternatives before making a final decision." (CFR1502.2.(f)).

(see Background: Long-Term Plutonium Pit Storage Plans, Page 8)

A. Background: RFETS Pu Shipments

Past and on-going transport of plutonium pits from DOE's Rocky Flats Environmental Technology Site (RFETS) near Denver, Colorado to the Pantex Nuclear Weapons Plant near Amarillo, Texas is a violation of NEPA. This action was proposed in the January 1997 Record of Decision for the Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Impact Statement.

1. The analysis of the effects of transport from Rocky Flats to Pantex was incomplete in the SD-PEIS, and some effects were not analyzed.

a. The future of the plutonium pits at Rocky Flats was analyzed within the context of the SD-PEIS. In the Pantex EIS, which only covered plutonium from dismantlement activities, DOE wrote that, "the environmental impact associated with transferring surplus pits from RF's to Pantex, including the impacts of their storage at Pantex Plant, will be included in the Final SD PEIS." (Page 1-15) Furthermore, DOE wrote that the proposed action in the Pantex EIS "would not require additional intersite transportation." (Page 3-24). 1

b. In the SD-PEIS, DOE wrote that, "The intersite transportation analysis for shipment of the RFETS Pu to Pantex is given in Section 4.4 of this PEIS for both workers and the public" (Page 4-53).

c. The only indication of an intersite transportation analysis in the SD-PEIS is a single "summary table" (Table 4.4.3.2-1) presented in Section 4.4 and titled: "Total potential fatalities from intersite transportation activities for the preferred alternative for storage." (Page 4-821). This same table is referenced and repeated in Section 4.6, pages 4-892-893.

d. In the SD-PEIS, DOE wrote that, in regard to intersite transfers, "supporting analyses and information are contained in Appendix G." (Page 4-821. Q-1)

e. DOE stated Appendix G in the SD-PEIS "provides estimated health risks from the transport of materials, historical shipment data for the affected sites, and other supporting documentation." (Page G-1).

f. In Appendix G, there is no supporting documentation for transportation of plutonium from RFETS to Pantex or other sites. Appendix G only contains historical intersite shipment data.

g. Appendix G does not provide estimates of actual radiological exposures to maximum exposed individuals or the average exposures to people along the transportation routes.

h. While Appendix G provides a substantial assessment of the risks of transportation for MOX fuel fabrication in Europe, it does not provide equivalent analyses for intersite transportation of plutonium pits or non-pit plutonium. There are no accident analyses of on-the-road transportation risks.

i. Appendix M does not contain any analyses of on-the-road transportation risks only a bounding analysis for intrasite movement of plutonium.

j. In the Pantex EIS, DOE evaluated the radiological exposure and health risk from shipping 8,000 plutonium pits and shipping 20,000 plutonium pits from Pantex to potential interim storage sites. (Section 4.16.4.1, Pages 4-232 to 4-234). No equivalent analyses for radiological exposure was conducted for transportation of RF's plutonium to Pantex. DOE also provided supporting documentation and analyses in Appendix F of the Pantex EIS for all intersite shipments of nuclear materials. 1

B. Background: RFETS Pu Interim Storage

Interim storage of Rocky Flats plutonium is occurring at Pantex although the storage activities do not involve those activities necessary to implement the SD-PEIS ROD. Long-term storage and interim storage activities of Rocky Flats plutonium at Pantex activities are occurring at the Pantex plant that were not analyzed under NEPA. (The failure to implement long-term storage ROD has also resulted in the disposition transportation analyses being invalid at this time.)

1. Rocky Flats plutonium pits were moved in violation of NEPA, and are being stored in violation of NEPA.

2. Analysis in the SD-PEIS was for long-term storage of plutonium pits presently at Rocky Flats, not for interim storage of Rocky Flats plutonium.

3. The Pantex EIS only addressed interim storage of plutonium pits resulting from the dismantlement of nuclear weapons, and not plutonium from other sites.

In the Pantex EIS, DOE wrote that, "the environmental impact associated with transferring surplus pits from RF's to Pantex, including the impacts of their storage at Pantex Plant, will be included in the Final SD PEIS." (Page 1-15)

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DON MONIAK
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4. The Pantex EIS only addressed the cumulative impacts of the SD-PEIS alternative for long-term storage of Rocky Flats Pu pits.

The final SD-PEIS will contain analyses of RFETS alternative, including "intersite transportation, packaging operations at both RFETS and Pantex plant, storage of the pits, first in Zone 4 and then in Zone 12, and intrasite transportation from Zone 4 to Zone 12. The environmental impacts of its action have been added to this cumulative impact discussion in Chapter 4 of this Final EIS." (Page 1-15)

5. There is no NEPA analysis for interim storage of RFETS plutonium pits. According to the SD-PEIS, Interim Storage of Rocky Flats plutonium was to addressed in the RFETS "Interim Storage of Plutonium at the Rocky Flats Environmental Technology Site EIS " (Page 1-9). There is no document prepared or being prepared.

6. According to the SD-PEIS, the supporting documentation for storage of RFETS Pu at Pantex is covered in Appendix Q of the SD-PEIS, "storage and intrasite transportation (at Pantex) of RFETS pits at Zone 4 West is described in Appendix Q." (Page 2-53, 4-812) and "intrasite transportation of pits between Zone 4 and Zone12 at Pantex to support storage of RFETS pits for the Preferred Alternative is described in Appendix Q." (Page G-1).

7. The preferred alternative for long-term storage, and the analysis in Appendix Q to support storage of RFETS pits, is based on the assumption that existing Pantex facilities will be upgraded. According to the SD-PEIS, "Upgrade storage facilities in Zone 12 south (to be competed by 2004) at Pantex to store those pits currently at Pantex, and pits from RFETS, pending disposition. Storage facilities at Zone 4 would continue to be used for these pits prior to the completion of upgrades." 1

a. DOE did not analyze the effects of long-term storage of Rocky Flats plutonium in Zone 4 at Pantex. DOE presently intends to keep Rocky Flats and Pantex plutonium in Zone 4 pending disposition, which violates the spirit and letter of the SD-PEIS ROD (see IV).

b. In the SD-PEIS No Action alternative, DOE wrote that, "all site Pu holdings specific to the Storage and Disposition program would continue to be stored at Zone 4 facilities."

c. Use of Zone 4 for long-term storage of plutonium pits awaiting disposition constitutes an unreasonable alternative in the SD-PEIS. DOE did not cite Zone 4 long-term storage on Page 2-2, where it states that "Options that were not disqualified or eliminated through the use of the screening criteria emerged from the screening process...two options were identified as reasonable: Upgrade of storage facilities to make them suitable for long term storage and consolidation....at DOE sites." Long-term storage in Zone 4 did not pass this screening criteria.

d. In the SD-PEIS, the screening criteria for long-term storage included the technical viability of "providing "storage of nuclear components and materials for up to 50 years" (Page 2-2). In the

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Pantex EIS, the average remaining life span for 22 pit storage facilities at Pantex is only 34 years, and this average includes buildings in Zone 12 that are newer than those in Zone 4 (Page 4-10).

e. Pantex managers defined the proposed upgrade of facilities in Zone 12 as only providing "interim storage of strategic pits, excess plutonium and secondaries in existing facilities for up to 30 years without having to construct entirely new facilities."

f. All identified upgrades for pit storage are for Zone 12 at Pantex, not Zone 4:

- "Buildings 12-66 and 12-82 in Zone 12 south would be modified to accommodate the long term store of Pantex Pu material and RFETS pit Pu material for the storage preferred alternative." (Page 4-863, 4-873, 4-876,4-879)

- "Since the result of any of these alternatives would be the removal of Pu pits not in weapons from Zone 4, aircraft crash and release probabilities would be reduced." (R-1).

- "The upgrade alternative would modify existing facilities in Zone 12 South." "The modifications for storage would be integrated into the Pantex infrastructure, waste, security and assembly/disassembly operations systems."

- Buildings 12-66 and 12-82 would be upgraded. (2-53) 1

g. In the SD-PEIS, DOE only analyzed the accident analysis of existing facilities in Zone 12. (Section M.5.2.5). "The accident analysis of the upgrade...of existing facilities at Pantex consist of two buildings, a Surplus Materials Storage Building (SM building) and a Strategic Reserves Storage Building (M-285)

8. The preferred alternative for long-term storage, and the analysis in Appendix Q to support storage of RFETS pits, is based on the assumption that repackaging of pits in AT-400A containers will occur the repackaging of plutonium pits in AT-400A containers.

a. DOE has failed to implement the AT-400A container repackaging program.

b. Even under the No-Action alternative, DOE was committed to repackage pits in the "more robust AT-400A containment vessel, and storage. (p. 2-22, SD-PEIS) DOE also committed to repackaging in AT-400A's in the Pantex EIS. The transportation of existing Pantex pits from Zone 4 to Zone12 and the repackaging of the pits from AL-R8 to AT-400A containers is analyzed in the Pantex EIS (SD-PEIS Page 2-53). The analysis in the Pantex EIS, DOE stated that "because this pit repackaging process has not been done with this type of container, there is no historical dosimetry information available. Therefore, conservative dose estimates have been made for this operation." (Page 4-274, Pantex EIS).

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DON MONIAK
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c. In Appendix Q of the SD-PEIS, DOE stated that pits to be transferred from Rocky Flats to Pantex "would be packaged in FL containers at RFETS before shipment, and upon receipt at Pantex, would be repackaged into AL-R8 containers in zone 12 South and placed into storage in Zone 4 west pending availability of AT-400A containers and relocation to upgraded facilities in Zone 12 South" (Q-1, 2-53)

d. "After the AT-400A containers are available, the pits would be repackaged into AT-400A containers for either long term storage or transportation to a disposition site." (Q-2, Q.4.)

e. In the Pantex EIS, DOE stated that "it is planned that up to 20,000 pits will eventually be repackaged in AT-400A containers," (Page 4-273), and in the SD-PEIS, DOE stated that 2,000 pits per year would be repackaged in AT-400A's starting in 1997 (SD-PEIS, Q.4).

f. In the SD-PEIS, DOE stated that, "For the disposition alternative, the transportation analysis was based upon the assumption that the storage preferred alternative had been implemented prior to the start of disposition transportation." (Page 4-893)

g. There is no analysis in Appendix Q or elsewhere in the SD-PEIS for repackaging of pits for transportation to a plutonium pit disassembly and conversion facility. DOE did not analyze the foreseeable option of the AT-400A program failing. (See Section III).

h. In 1996, Pantex managers stated "The AT-400A process will allow us to protect excess and strategic pits in storage until final disposition of the material is made." 1

C. Background: Proposed Long-Term Storage Plans

DOE is proposing and analyzing plans for long-term storage of plutonium at the Pantex plant outside of the NEPA process.

1. DOE continues to store plutonium pits in AL-R8 containers at Pantex; even though DOE did not, and has not, reported or analyzed in any NEPA documents the real impacts of storing plutonium pits in AL-R8 containers for an "extended storage period."

a. DOE did not report known information abut the AL-R8 during the SD-PEIS or the Pantex EIS. DOE only informed the public in NEPA documents that AL-R8's are not suitable for shipping. DOE did not inform the public that AL-R8's were considered unsuitable for extended storage by the Design labs.

In 1995, a joint Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL) memorandum was issued to the Department of Energy's Albuquerque Operations Office as well as Pantex and DOE's Amarillo Area Office. In the letter, the labs recommended for strategic reserve pits:

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· defined "extended storage" as more than five years.

· strongly recommended "that these pits be removed from the AL-R8's as soon as possible because of a potential corrosion problem caused by moisture and chloride in the Celotex."

· "If AL-R8's are used for more than 5 years or greater, humidity control is recommended at 15-20% RH plus an aggressive monitoring program to be established."

· Recommended temperature controls of 70 degrees (+/- 5 degrees) Fahrenheit in "both AL-R8 and AT-400A storage containers, and to all facility configurations."

Storage recommendations for surplus pits were less rigid but did include "we recommend that no pits be stored in AL-R8's."

b. DOE has no defined, approved schedule for repackaging of pits from AL-R8's into suitable storage containers and has not analyzed the impacts of long term storage of pits in AL-R8's. .

c. Estimates for repackaging pits from AL-R8's into a suitable environment range from 15-30 years in the *Conceptual Design Report (CDR) for Building 12-66* (Pages 9, 11) to five years--pending selection during the Pantex presentation to the PPCAB on 3/30/98.

2. DOE has not analyzed under NEPA the effects and cumulative impacts of repackaging of plutonium pits in containers that do not meet the same specifications for long term storage and transportation as the AT-400A, yet DOE is proposing to use the AL-R8 sealed insert for long term storage of plutonium pits and not use the AT-400A container. 1

a. "A mechanical line for repackaging pits into AT-400A containers is expected to be operational in FY 1998 which will provide a combined total repackaging maximum capacity of 960 pits per year...At the present time the plans are to close the manual line when the mechanical line becomes operational which will reduce the repackaging output to less than 60 per month." (Conceptual Design Report, Page 9)

b. "A sealed insert has been developed, and is under review for use in storage of pits in AL-R8 containers." (CDR , Page 9)

c. Discussion of alternative storage containers began as early as July 1997 under the context of the AL-2100 working group. The AL-R8 was developed in 1997 and presented as an option to the public in September 1997.

d. DOE and Pantex presented analysis of storage container options to the Pantex Plant Citizens Advisory Board on March 31, 1998. The AL-R8 sealed insert was identified as a preferable container.

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DON MONIAK
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c. In May, 1998, the DNFSB reported that sealed inserts had been selected for certain pit types, and that the AT-400A Manual Line was discontinuing and was being shutdown.

4. DOE is proposing to not upgrade Building 12-66 in Zone 12 for long term storage of surplus plutonium pits and intends to keep plutonium pits in Zone 12 despite considering this an "unacceptable alternative."

a. In December, 1997, the DNFSB reported that DOE was not moving forward with the upgrade of building 12-66.

b. DOE has not informed the public of this decision

c. Pantex is now evaluating Building 12-66 for a new mission of assembling Radioisotope Thermal Generator Mission.

d. In the Conceptual Design Report (CRD) for Building 12-66, DOE and its contractor determined that there were no other acceptable alternatives for either interim or long-term storage of plutonium pits at Pantex. (Pages 10-12). Zone 4 was considered unacceptable for continued storage because "these magazines are not properly equipped with the cooling systems necessary to ensure the pits are maintained at the required temperatures to preserve surplus pits during long term storage." (Page 10). No buildings other than 12-66 "are available or meet the criteria for providing a long term storage function for surplus pits." (Page 10). 1

e. In the Conceptual Design Report, the SD-PEIS is cited as a justification for not reviewing other DOE sites for long-term storage of surplus plutonium (Page 11).

f. The NEPA documentation for Building 12-66 identified the project as being part of the implementation of the SD-PEIS ROD.

g. DOE reported "reviewing" Zone 4 magazines for excess plutonium to the Pantex Plant Citizens Advisory Board on 3/31/98. There are no known NEPA documents identifying continued storage as implementation of any NEPA ROD's.

5. DOE is conducting an Integrated Pit Storage Program Plan (IPSPP) without public input and without NEPA coverage.

a. The IPSPP was presented to the PPCAB on 3/31/98 in the context of evaluating container options, facility options and modification, the surveillance program, and an implementation plan. The Final Draft was scheduled for release by 5/31/98, but remains unfinished. (DNFSB weekly reports).

b. The IPSPP was identified as a work in process as early as January 1997. DOE told the GAO the Final Draft would be completed by 4/30/98.

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c. The IPSPP was first reported as being scheduled for January 30, 1998 (DNFSB weekly report: 1/16/98). A working draft was released that was described by the GAO as "only a preliminary draft" and "mostly in outline format." (GAO, Page 34).

d. DOE internally presented an Integrated Pit Storage Plan briefing in early March (DNFSB Weekly Report for Pantex 3/6/98) 1

e. An IPSPP "Tiger Team" began work in early April 1998 to provide "Pantex input on the DOE-AL IPSPP. Working groups were established to address: [1] packaging; [2] movement, staging, shipping, and receiving; [3] storage; [4] monitoring and surveillance; [5] safeguards/transparency." (DNFSB Weekly Reports for Pantex, 4/3/98, 4/10/98).

Sincerely:

Don Moniak
Program Director
STAND of Amarillo, Inc.

STANFORD, CLAUDIA
PAGE 1 OF 1

Hello, my name is Claudia Stanford. I live in Amarillo, Texas and I heard on the news that we could comment at this number about our feelings on the possible ability of a plutonium pit disassembly plant being located here at Pantex. And I just wanted to express my feelings that I'm opposed to this and hope that this is placed somewhere else and feel as though it poses too much a threat to the Ogalala Aquifer. And just appreciate the opportunity to be able to express my feelings to you. 1

PD018

PD018–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the pit conversion facility at Pantex. Section 4.26.3.2 analyzes impacts to the environment (including contamination to the Ogallala aquifer) due to construction and normal operation of a pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based upon environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Jim Steiert
Box 95
Hereford, TX 79045

August 19, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC, 20026-3786

To the DOE:

I **OPPOSE** plutonium pit disassembly and conversion at the Pantex Plant at Amarillo. Undemonstrated and unproven technologies are proposed for use. Plutonium at Pantex imperils the precious Ogallala aquifer. Further processing of plutonium at Pantex presents an even greater hazard to groundwater and residents. 1

Pantex has already polluted its site with high explosives in a perched aquifer lying above the Ogallala, not only soiling its property, but adjacent private land as well. 2

Routine emissions of tritium, plutonium, americium, and other deadly compounds can be expected from the smokestacks of any plutonium processing facility at Pantex. Pit disassembly and conversion at Pantex would create unacceptable new hazards.

Pantex has never processed plutonium, and it doesn't have any business starting now. Your own agency's cost estimates place the taxpayer expense of locating plutonium processing at Pantex at $60 million or more.

Despite promises, safety conditions at the Pantex plant haven't improved. Up to 20,000 plutonium pits are heating-up the old bunkers at Pantex. Both the U.S. Government Accounting Office and the Defense Nuclear Facilities Safety Board have been critical of plutonium storage safety at Pantex. Your agency promised that aging munitions bunkers at Pantex were for "temporary" storage of plutonium pits, yet the pits still remain crammed in these aging bunkers in unsuitable storage containers, potentially in an unstable environment. Many of these bunkers began heating-up immediately after pits went into them. Only about three bunkers even have air conditioning. How long is this "temporary" storage going to continue before some disaster occurs? 1

Pantex has neither the size, the equipment, nor the expertise to handle processing of plutonium. We don't need the radioactive contamination in the Texas Panhandle that your agency's presence and activities have already "gifted" Rocky Flats, Colorado, and Hanford, Washington with. **Keep plutonium pit processing OUT of Pantex!**

Thank you for the opportunity to comment.

Sincerely,

Jim Steiert

Jim Steiert
Box 95
Hereford, Texas 79045

MD083

MD083–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the pit conversion facility at Pantex. It is true that this would be the first consolidated facility for accomplishing surplus plutonium disposition on a large scale. However, the processes are not entirely new; many are in use at LANL and LLNL. DOE has recently started a pit disassembly and conversion demonstration project at LANL, where the processes will be further tested and additional data pertinent to future operations developed. As shown in Section 2.18, Table 2–4 includes a summary of the environmental impacts by alternative. Alternative 5 shows that the impacts associated with operating the pit conversion facility at Pantex would likely be minor. The estimated dose to the public from radiological emissions (e.g., americium, tritium, and plutonium) would be 0.58 person-rem/yr, which would result in an increase of 2.9×10^{-3} LCFs over the 10-year operating life of the facility.

DOE acknowledges the commentor's concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and*

Associated Storage of Nuclear Weapon Components (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed; addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

MD083–2 **Water Resources**

Analyses presented in Sections 2.18 and 4.26.3.2.2, respectively, indicate that there would be no discernible impacts on water quality or to the human health of nearby residents from normal operation of the proposed surplus plutonium disposition facilities at Pantex.

TEXAS, LIEUTENANT GOVERNOR
HONORABLE BOB BULLOCK
PAGE 1 OF 1

Bob Bullock
Lieutenant Governor of Texas
President, Texas Senate

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1-800-735-2989 TDD

July 29, 1998

Mr. Bert Stevenson, NEPA Compliance Officer
DOE Office of Fissile Material Disposition
c/o SPE EIS
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

Dear Mr. Stevenson:

I have written in the past to express my support for the Pantex Nuclear Weapons Plant in Amarillo as an excellent choice for handling the U.S. Department of Energy's (DOE) surplus plutonium. I would like to take this opportunity to restate my position.

I am referring specifically to the selection of Pantex as the preferred site for locating the plutonium pit disassembly and conversion facility. I am aware that the DOE has selected the Savannah River Site as the preferred site for the MOX fuel fabrication facility and is considering SRS, along with Pantex, as the location for the disassembly and conversion mission. I believe it is in the best interest of Texas and the country that Pantex assume this new function.

Pantex has a long history of handling plutonium pits. Unnecessarily transporting classified plutonium pits across the country from Pantex would result in increased exposure to risks and higher costs to taxpayers. Pantex already has the infrastructure and operational protocol in place to ensure that disposition goals are met. Furthermore, the plant enjoys overwhelming public and political support in the community. 1

Disposition of the nation's surplus plutonium must be accomplished in a manner that protects the health and safety of our citizens and our environment. The Pantex plant has the expertise and is the logical choice for this new mission. Based upon these reasons, I urge DOE to designate Pantex as the site for the pit disassembly and conversion facility.

Sincerely,

BOB BULLOCK
Lieutenant Governor

BB:mhe

cc: The Honorable George W. Bush
The Honorable Teel Bivins
The Honorable Tom Haywood

MD008

MD008–1 **Alternatives**

DOE acknowledges the Lieutenant Governor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TEXAS A&M UNIVERSITY
JOHN M. SWEETEN
PAGE 1 OF 5

JMS/August 11, 1998

REVIEW COMMENTS
SURPLUS PLUTONIUM DISPOSITION
DRAFT ENVIRONMENTAL IMPACT STATEMENT, July, 1998

At the request of the Amarillo National Resource Center for Plutonium, a consortium of the Texas A & M University System, the University of Texas System, and Texas Tech University, I have reviewed the 4-part document "Surplus Plutonium Disposition Draft Environmental Impact Statement: Summary, Volume I-Part A, Volume I-Part B, and Volume II", U. S. Department of Energy, Washington, D. C., July, 1998.1,500 p. While my review of the Surplus Plutonium Disposition (SPD) Environmental Impact Statement (EIS) was focused on those parts relating specifically to the Pantex Plant and to the environmental quality assessment and impact considerations, a general review was given also to other locations under consideration.

The analysis of the 23 alternatives articulated and presented for review was thorough and balanced with respect to the various sites under consideration. I understand that some of these alternatives are no longer under consideration subsequent to a DOE recent decision to locate the fuel rod assembly fabrication process using plutonium oxide at Savannah River Site (SRS) which is the point of proposed final utilization in an existing nuclear power plant. This decision constrains the selection of alternatives involving Pantex to only those involving (a) current mission of long-term plutonium pit storage with upgrades, (b) pit disassembly, and (c) pit conversion of Pu into plutonium dioxide, a component along with uranium dioxide of eventual Mixed Oxide (MOx) fuel rods fabricated at SRS. In essence the remaining alternatives involving Pantex are as follows (n=8): Alternatives 1, 4A, 4B, 5A, 5B, 11B, 12C, and 12D . 1

I do not view Alternative 1 (No Action) as a viable option, in that the estimated half-life of plutonium in its present form is some 24,000 years. This is a long time for governments, militaries and taxpayers to guard and protect from terrorism, accident, environmental and natural resource damage, and human tragedy some 50 metric tons of active fissile material that has commercial value as well as obvious destructive potential. This potential "legacy" should not be left for future generations of Texans and other Americans. The 1:1 leveraging opportunities with the former Soviets with respect to their disassembled and stored fissile materials would be lost as well. The other 22 alternatives would put all this behind us by the year 2015, or with typical public works delays by the year 2020-2025 at least. The Panhandle, Texas, America and the world then will be a safer place. 2

So the question really becomes two-fold:
(a) is the presently-proposed suite of technologies adequate to perform the plutonium handling and conversion safely and effectively; and
(b) is it environmentally secure. 3
I will defer the former question to the involved experts in nuclear engineering, nuclear physics, chemical engineering, occupational health and safety, and other relevant fields.
Regarding the second question, my involvement over the last 18 months with ANRCP technical

TXD49

TXD49–1 **Alternatives**

DOE presented its preferred alternative for siting the immobilization and MOX facilities in the SPD Draft EIS. However, these are only preferences, not decisions. The only alternatives that have been eliminated at this time are those in which the immobilization facility was proposed for Building 221–F at SRS. It was determined that the amount of space required for the immobilization facility would be significantly larger than originally planned. These new space requirements mean that the annex in Building 221–F would be similar in size and environmental impacts to a new immobilization facility at SRS. Therefore, this SPD EIS only presents the alternatives involving a completely new immobilization facility at SRS. DOE will announce its decision regarding facility siting in the SPD EIS ROD.

TXD49–2 **Alternatives**

DOE acknowledges the commentor's opposition to the No Action Alternative, analysis of which is required under NEPA. Section 2.5 indicates that the No Action Alternative would not satisfy the purpose and need for the proposed action because DOE's disposition decisions in the *Storage and Disposition PEIS* ROD would not be implemented. As indicated in Section 1.6, DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

TXD49–3 **Human Health Risk**

DOE acknowledges the commentor's conclusion that the surplus plutonium disposition activities could be conducted in an environmentally secure manner.

staff and a team of experts evaluating and providing risk assessment for the Pu/MOx fuel conversion process, together with my reading of the SPD EIS document itself suggests that, with the data presented so far, the remaining alternatives involving Pantex can be carried out in an environmental secure manner. The probabilities, exposure, and health effect numbers are very, very small. The land area that would be affected by worst-case scenarios involving release of Pu to the environment are very small, contained within site boundaries, and off-site impacts would be practically negligible. 3

Nevertheless, there is necessary and continuing involvement by agricultural scientists and engineers with the agencies affiliated with the Cooperative Research, Education, and Extension Triangle for the Panhandle (Texas Agricultural Experiment Station, Texas Agricultural Extension Service, West Texas A & M University, USDA-Agricultural Research Service, and Texas Veterinary Medical Diagnostic Laboratory), joined by our colleagues at TAMU-College Station and at the TAES Blacklands Research Center at Temple, in providing new data, information, questions, answers and dialogue from the perspective of agricultural production and processing, including soil/water/plant/animal/wildlife relationships. We are interested as well in impacts on water, soil and air resources from the perspective of rural residents and communities. Our concerns with maintaining the viability of crop, feedlot, range and pasture production systems as part of the human food chain, and of those who operate them, is paramount. The recent, current and future scientific projects with ANRCP sponsorship and involvement reflect those concerns and provide answers that should be taken into account with regard to the present SPD EIS and future plant design and operations. We are available for continuing dialogue and partnerships involving scientific discovery, interpretation, exchange, and education in these areas. 4

In terms of the EIS document itself, my remarks will be restricted to only a few areas at this time.

* **Summary, Section S.5**--Topics analyzed in the SPD EIS are appropriate: air quality, noise, waste management, socioeconomics, human health risk, facility accidents, transportation, environmental justice, geology and soils, water resources, ecological resources, cultural and paleontological resources, land use and visual resources, and infrastructure. However, agricultural production systems are not addressed for any of the potential sites, all of which sit in or adjacent to extensive crop and livestock production appropriate to the regions. 5

* **Chapter 2. Alternatives for Disposition of Surplus Weapons-Usable Plutonium--**
  - Page 2-3-- As noted above, several of these alternatives can be eliminated with recent decisions regarding the SRS mission, namely Alternatives 2, 4A, 4B, 6A, 6B, 6C, 6D, 7A, 7B, 8, 9A, 9B, and 10. 6
  - Pages 2-4 to 2-7--From the maps, every site except Pantex has at least one river running through or adjacent to it. 7

* **Chapter 3. Affected Environment--**
  - Section 3.1, Approach to Defining the Affected Environment--the Region of Interest (ROI) did not directly include agricultural resources or producitn practices for any of the candidate sites. If environmental damage were to occur despite safeguards, the public would be 8

TXD49

TXD49–4 **General SPD EIS and NEPA Process**

DOE acknowledges and appreciates the commentor's offer.

TXD49–5 **Socioeconomics**

Appendix J discusses food production analyses for potential radiological doses in counties near each of the candidate sites. Doses received via the ingestion pathways were then used in the dose assessment to the population at each specific site. The potential impacts on prime farmlands are evaluated in the Geology and Soils discussions in Chapter 4 of Volume I. According to the environmental analysis presented in this SPD EIS, neither construction nor normal operation of the proposed facilities should have an impact on the agricultural economy surrounding the candidate sites.

TXD49–6 **Alternatives**

The alternatives cited by the commentor cannot be removed as reasonable alternatives from this SPD EIS because DOE has not yet decided on an alternative for the disposition of surplus plutonium.

The remainder of this comment is addressed in response TXD49–1.

TXD49–7 **Water Resources**

As described in Section 3.4.7.1.1, no streams or rivers flow through Pantex although a number of playas at Pantex hold water after precipitation events. The closest river is the Canadian River 27 km (17 mi) north of Pantex. Although other sites have rivers running through or near them, the analyses presented in Section 4.26 indicate that there would be no discernible impact on surface waters.

TXD49–8 **Socioeconomics**

Appendixes J.1.1.3, J.2.1.3, J.3.1.3, and J.4.1.3 discuss incident-free (normal) releases of radioactivity from the proposed surplus plutonium disposition facilities to the food production chain for each of the candidate sites. The food grid was used in the assessment of doses to the population of each candidate site via the ingestion pathway. However, surplus plutonium disposition activities would be limited to each candidate site boundary and

TEXAS A&M UNIVERSITY
JOHN M. SWEETEN
PAGE 3 OF 5

very interested in food supply and food chain safety issues, and farmers/livestock producers would be directly affected in terms of restrictions on future production practices or marketing opportunities. These are an important considerations. 8

- **Section 3.4, Pantex Plant, Pages 3-88 to 3-124**--the extensive agricultural production practices and programs within a 9-county area around Pantex nor adjacent to the site were not discussed or data listed. This information was provided to the ANRCP in January 1998 in a contract project final report and needs to be presented or summarized herein. The agricultural data should include: crops (types and acreage), soil management practices, livestock grazing (rangelands and wheat pasture), cattle feedlots including sources of feedstuff supplies , beef slaughtering and processing facilities, and grain storage. Dairies, horses swine, poultry, and other species of relevance are not identified as well. Potential secondary pathways of possible contamination--e.g. nonpoint source runoff, wind erosion, water erosion, etc.-- are not addressed. Similar information should be provided for all the other candidate sites in the respective sections within the Regions of Interest. For example, fruit, vegetable, cattle and dairy production are prominent in Idaho and Washington state in general vicinity of INEEL and Hansford plants, respectively, and South Carolina is a poultry production state. Also, no mention is made of local management districts for groundwater and surface water resources; these include the Panhandle Ground Water Conservation District No. 3, White Deer, which encompasses an 8-county area including Pantex. 9 10

* **Chapter 4, Environmental Consequences**--The forgoing comments for Chapter 3 generally apply to this chapter as well. 11

- **Section 4.6, Alternative 4A**--Indicates that the air quality impacts will be minimal along with waste management, human health , or water resource risks. Increments added by operation of the pit conversion at Pantex will be non-existent or minimal (Table 4-5 vs. Table 4-58), and resultant site concentrations will be far below EPA or TNRCC ambient air quality standards for most contaminants and below EPA NAAS for PM10 on both an annual and 24-hour averaging time basis. 12

* **Appendix F, Impact Assessment Methods, and Appendix G, Air Quality**--
- Does not include information for any site concerning 13
  - agricultural production practices
  - accidental releases--explosion, fires, spills, etc.
  - dispersion modeling
  - areas affected 14
  - redistribution of particulates from Pantex by water or wind erosion.

* **Appendix I, Socioeconomics**

- Does not include discussion concerning agricultural production, land use, or rural residents including whether or not they could be affected. 15

TXD49

should not impact the soil used for agriculture and farming in adjacent regions. Any impacts to the surrounding areas would be within Federal, State, and local regulatory limits. Based on the analysis in this SPD EIS, there should be no impact on the agricultural lands surrounding the sites from the construction or normal operation of the proposed facilities.

TXD49–9 **Socioeconomics**

This comment is addressed in response TXD49–5.

TXD49–10 **Water Resources**

Section 3.4.7.2.1 reflects that Pantex is in Panhandle Groundwater District 3.

TXD49–11 **Socioeconomics**

This comment is addressed in responses TXD49–5, TXD49–8, and TXD49–10.

TXD49–12 **Air Quality and Noise**

DOE acknowledges the commentor's conclusion that air quality, waste management, human health, and water resource impacts at Pantex for Alternative 4A would likely be minor.

TXD49–13 **Socioeconomics**

Although Appendix F and Appendix G do not specifically address agricultural production practices, the potential impact to human health from the consumption of agricultural products is addressed in Appendixes J.1.1.3, J.2.1.3, J.3.1.3, and J.4.1.3. This analysis includes consideration of potential contamination of agricultural products and livestock, and consumption of these products by persons living within an 80 km (50 mi) radius of each of the candidate sites.

TXD49–14 **Facility Accidents**

Appendix F is actually an overview of accident analysis methods. Detailed development of the consequences of hypothesized accidents can be found in Appendix K and a discussion of dispersion modeling and particulate redistribution is included in Appendix J.

TXD49–15 **Socioeconomics**

Land use at Pantex is discussed in Section 4.26.3.5. It was concluded that because the environmental impacts associated with operating or constructing the proposed surplus plutonium disposition facilities at Pantex would likely be minor, there would be little if any impact on the surrounding land.

The remainder of this comment is addressed in response TXD49–13.

TEXAS A&M UNIVERSITY
JOHN M. SWEETEN
PAGE 5 OF 5

* **Appendix J, Human Health Risks**--
- The agricultural data mentioned (from the 1987 Census of Agriculture) but not shown should be presented for all four sites. This information should be presented in a separate Appendix.
  - Other agricultural data sources or more recent vintage than the Census of Agriculture are readily available as well, from entities such as the State Crop and Livestock Statistical Services, the Cooperative Extension Services (eg. Texas Agricultural Extension Service), the USDA-Farm Services Agency, etc.. 16

  - Analysis does not appear to take into account Pu doses, transience, or effects on field grain crops, forages, or animals, nor contamination pathways other than direct ingestion. 17

The opportunity to reiew and comment on the SPD EIS document is appreciated. I hopw these remarks are useful in strengthening the document and provide the basis for continuing development of greater scientific information regading the environmental quality for Pantex and other sites in other locations also.

Prepared by: John M. Sweeten, Ph.D., P. E., Professor and Resident Director, Texas Agricultural Experiment Station, Texas A & M University Agricultural Research and Extension Center, Amarillo, TX.

TXD49

TXD49–16 **Socioeconomics**

This SPD EIS is tiered from the *Storage and Disposition PEIS*. The agricultural data used to model radiation doses to the public were based on the 1987 U.S. Census of Agriculture for the four candidate sites. These data are not reprinted in this SPD EIS but were made available to the public as a reference to the *Storage and Disposition PEIS*. The reference cited in the *Storage and Disposition PEIS* is *Health Risk Data for Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement* (HNUS, October 1996).

TXD49–17 **Human Health Risk**

DOE acknowledges the commentor's concern that the radiological impact assessments may not take into account doses from plutonium releases; transience considerations; effects on field grain crops, forage, and animals; and contamination pathways other than direct ingestion.

The assessments were performed using the GENII–II computer program, as discussed in Appendix F.10 and expanded on in Appendix J. The source terms in the assessments include the various plutonium isotopes released to the environment. All possible dosage pathways were evaluated: external exposure from finite atmospheric plumes, inhalation, internal exposure from consumption of food and inadvertent intake of soils, and external exposure from contaminated soils. Transience considerations would only marginally affect the results.

It is generally acknowledged that if humans were protected from radiation impacts, other biota would also be protected. Evidence from *Effects of Ionizing Radiation on Plants and Animals at Levels Implied by Current Radiation Protection Standards* (IAEA Technical Report Series 332, 1992) indicates that chronic doses below 0.1 rad/day (36.5 rad/yr) do not harm animals or plant populations. Since doses to humans from all pathways combined would be maintained below 0.1 rem/yr (DOE Order 5400.5), which is less than 0.1 rad/yr, it is highly probable that doses delivered to plants and animals would be less than 0.1 rad/day. Therefore, no radiological damage to plant and animal populations would be expected as the result of surplus plutonium disposition activities.

1998-008937 Aug 3 p 3:44

TEXAS AFL-CIO

1106 LAVACA 512/477-6194 FAX 477-2962 P.O. BOX 12727 AUSTIN, TEXAS 78711

JOE D. GUNN
President

EMMETT SHEPPARD
Secretary-Treasurer

July 30, 1998

Elizabeth Anne Moler
Acting Secretary of Energy
Department of Energy
Forrestal Building
1000 Independence Ave. S.W.
Washington, D.C. ,20585

Dear Ms. Moler:

Thank you for the opportunity to comment on the Department of Energy's (DOE) Draft Surplus Plutonium Disposition Environmental Impact Statement (SPDEIS).

I am aware that DOE has selected the Savannah River Site (SRS) as the preferred alternative for the Mixed Oxide Fuel mission and is considering SRS, along with Pantex, as the location for the Pit Disassembly and Conversion mission. I am extremely disappointed in DOE's tentative decision to site the MOX mission at SRS, since Pantex remains the best and most economically feasible site for that mission.

I, now, wish to focus my comments on the selection of Pantex as the preferred site for locating the Pit Disassembly and Conversion mission. Pantex operates within an extremely strict safety envelope, adhering judiciously to "Conduct of Operations" and "Formality of Operations". Pantex currently stores more than 8,000 pits and have handled these items, safely, for over 45 years. This strict operations protocol and it's safety related infrastructure has been carefully maintained and has not been jeopardized as those at other sites where environmental restoration has been and continues to be the primary mission. Furthermore, given the current weapons assembly-disassembly and storage functions at Pantex, disassembly and conversion of the plutonium pits already stored and located there is consistent with the historic 1

FD107

FD107–1 **Alternatives**

DOE acknowledges the commentors' support for siting the pit conversion facility at Pantex. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TEXAS AFL-CIO
JOE D. GUNN ET AL.
PAGE 2 OF 3

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Elizabeth Anne Moler
Acting Sec. of Energy

mission of the plant. Opponents who are opposed to siting disposition missions at Pantex, (SRS in particular), argue that DOE should not introduce plutonium missions at a site where the work could be considered "new" at the location. This argument is false and disingenuous because Plutonium work at Pantx has, is currently and will, in the future, be performed in the areas of Radiation Safety Contingencies, Waste Operations, and Pit Reuse. SRS, itself, is already sited for a "new" type of work - tritium production via an accelerator. If their argument is valid, then DOE has no alternative but to place the tritium mission elsewhere.

Pantex has a well-trained and qualified Union Workforce which is second to none in the nation. This Union Workforce is staffed by three full-time Metal Trades Council Union Safety Officers. No other plant in the nation has anything comparable to this program and it provides the crucial and necessary check and balance if DOE intends to follow former Secretary Pena's Memo on Environment, Safety and Health of April 14, 1998. This Union Safety Officer Program at Pantex has also been called a model for the entire DOE Complex by former Secretary of Energy Federico Pena. The Workforce actively participates in such endeavors as the Voluntary Protection Program, Integrated Safety Management, Seamless Safety-21 Program, and Enhanced Work Planning. Pantex's World Class Security Force, consistently ranked number one in the DOE complex, has, again, won the Secretary's Trophy as the Top Security Force in DOE. These accomplishments by the Pantex workforce do not sound as if they are a bunch of "amateurs" to me as they have been described by members of the South Carolina delegation. When considering the proliferation risks involved in unnecessarily transporting a large number of classified plutonium pits across the country from Pantex, it makes budgetary and policy sense to site disposition missions where storage already exists and is taking place. Pantex is clearly the most cost-effective site over the life of the program than any other site under consideration. Pantex has the necessary safety culture, security and surveillance capabilities to accommodate this expanded role. 1

FD107

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Elizabeth Anne Moler
Acting Sec. of Energy

Based upon these reasons, I respectfully urge DOE to designate Pantex as the site for the Pit Disassembly and Conversion Facility. Thank you, in advance, for your consideration. 1

Yours truly,

Joe D. Gunn
President

Emmett Sheppard
Secretary-Treasurer

JDG/ES/vc
opeiu298/afl-cio

cc: The Hon. John Sharp, Texas State Comptroller
The Hon. Al Gore, Vice-President
Frank George, Metal Trades Council of Amarillo

FD107

TEXAS BUILDING AND CONSTRUCTION TRADES COUNCIL
GALE VAN HOY
PAGE 1 OF 2

Thank you for the opportunity to comment on the Department of Energy's actions regarding the location for the disassembly/conversion mission.

The Texas Building and Construction Trades Council is aware that D.O.E. has selected the Savannah River Site as the preferred alternative for the MOX fuel fabrication facility and is considering SRS, along with Pantex, as the location for the disassembly/ conversion mission. We are very disappointed that the DOE decided to locate the MOX facility at SRS, since Pantex remains the best, cleanest, and cheapest site for that mission, and not coincidentally that it is a unionized plant.

Precisely because the Pantex plant has unionized, and therefore highly trained workforce, we are concerned that locating the plutonium pit disassembly and conversion mission at a site other than Pantex would not only increase the hazards of dealing with but would also ignore the facts that make Pantex the site most capable of ensuring that disposition goals are met with the utmost attention to economic and safety considerations. 1

Pantex is already uniquely suited to assume this new function, in spite of comments from some South Carolina politicians. Pantex currently safehouses

TXD41

TXD41–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

more than 8,000 surplus pits and has a long history of handling pits and related infrastructure in a highly professional fashion that has as its highest goal an excellent safety culture. Furthermore, given the current weapons disassembly and storage functions at Pantex, disassembly and conversion of the pits already located here is consistent with the historic mission of Pantex.

Pantex is ready to go Day One, with a well-trained, unionized workforce—hardly the group of "amateurs" as they have been described.

We believe the Pantex site is best for the above reasons and when one considers the risk factors of moving live weapons clear across the country, we believe that the logical conclusion is that it's cheaper, safer and easier to track converted plutonium pits for IAEA and international inspections at the site of original pit storage. 1

Based upon these reasons, I, as Secretary-Treasurer of the Texas Building and Construction Trades Council, respectfully urge D.O.E. to designate Pantex as the site for the pit disassembly and conversion facility. Thank you for the opportunity to comment of this decision-making process.

TXD41

TEXAS HOUSE OF REPRESENTATIVES
HONORABLE JOHN SMITHEE
PAGE 1 OF 2

The State of Texas
House of Representatives
Austin, Texas

John Smithee
State Representative
District 86

Armstrong
Dea' Smith
Oldham
Randall

Committees:
Insurance
Chairman
Energy Resources

July 31, 1998

DOE Office of Fissile Material Disposition
c/o SPD EIS
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786
Attn: Mr. Bert Stevenson
NEPA Compliance Officer
Re: Comment on DOE's Draft Surplus Plutonium
Disposition Environmental Impact Statement

Dear Mr. Stevenson:

Thank you for the opportunity to comment on the Department of Energy's (DOE) Draft Surplus Plutonium Disposition Environmental Impact Statement (SPD EIS).

Pantex has been a very important part of the Panhandle since the 1940's. Safety and health is a constant concern for any community where radioactive materials are present. I feel that our first priority is to ensure that any expansion at Pantex be conducted in a safe and environmentally sound manner. 1

We are aware that DOE has selected the Savannah River Site as the preferred alternative for the MOX fuel fabrication facility and is considering Savannah River, along with Pantex, as the location for the disassembly/conversion mission. The Amarillo community was very disappointed in DOE's decision to site the MOX facility at Savannah River, since Pantex remains the best and cheapest site for the MOX facility. 2

I do want to focus my comments on the proposed plutonium disposition actions and alternatives discussed by the department on the selection of Pantex as the preferred site for locating the plutonium pit disassembly and conversion facility. There is growing concern that locating the conversion mission at a site other than Pantex would not only increase the hazards of dealing with plutonium, but would also ignore the facts that make Pantex the site most capable of ensuring that disposition goals and economic and safety concerns are meet. 3

Capitol: P.O. Box 2910 • Austin, Texas 78768-2910 • 512-463-0702 • FAX: 512-476-7016
District: P.O. Box 12036 • Amarillo, Texas 79101 • 806-372-3327 • FAX: 806-379-8568

MD010

MD010–1 **DOE Policy**

DOE has and will continue to make health, safety, and environmental issues a matter of utmost importance in the planning and conduct of all nuclear operations, including the disposition of surplus plutonium. This SPD EIS shows that the impact of properly implementing the proposed action at Pantex would have no major effect on the health, safety, and environment in the Amarillo area.

MD010–2 **Alternatives**

DOE acknowledges the Representative's support for siting the MOX facility at Pantex. As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. Because cost issues are beyond the scope of this EIS, this comment has been forwarded to the cost analysis team for response. The cost report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

MD010–3 **Alternatives**

DOE acknowledges the Representative's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

page 2
State Representative John Smithee
Mr. Bert Stevenson
Department of Energy

Pantex has played a major role in our national defense needs. It is uniquely suited for this new function. The taxpayers have already paid for more than 8,000 surplus pits and trained qualified employees to handle pits and the related infrastructure with and operational protocol that is the mainstay of an excellent safety culture.

There are numerous other matters such as proliferation risk, and the transportation of plutonium that I am not qualified to discuss, but, are very important issue that must be dealt with. I feel that if these matters are addressed with regard to safety, cost, and what is best for the nation, Pantex, is the best site for the disassembly and conversion mission. 3

Again, I want to thank the department for allowing me to voice my concerns and views on this matter, and would respectfully urge DOE to designate Pantex as the site for the pit disassembly and conversion facility.

Yours very truly,

John Smithee

MD010

TEXAS HOUSE OF REPRESENTATIVES
HONORABLE DAVID SWINFORD
PAGE 1 OF 1

ORAL STATEMENT BY STATE REPRESENTATIVE DAVID SWINFORD AT AUGUST 11, 1998 DOE HEARING ON DRAFT SURPLUS PLUTONIUM DISPOSITION ENVIRONMENTAL IMPACT STATEMENT

Thank you for the opportunity to comment on the Department of Energy's (DOE) Draft Surplus Plutonium Disposition Environmental Impact Statement (SPD EIS).

I wish to focus my comments on the selection of Pantex as the preferred site for locating the plutonium pit disassembly and conversion facility. I am concerned that locating the conversion mission at a site other than Pantex would not only increase the hazards of dealing with plutonium but would also ignore the facts that make Pantex the site most capable of ensuring that disposition goals are met with the utmost attention to economic and safety considerations.

Pantex is already uniquely suited to assume this new function. Pantex currently safehouses more than 8,000 surplus pits and has a long history of handling pits and the related infrastructure and operational protocol that is the mainstay of an excellent safety culture. Furthermore, given the current weapons disassembly and storage functions at Pantex, disassembly and conversion of the pits already located there is consistent with the historic mission of the plant. Pantex has a production culture with a well-trained workforce - hardly a group of "amateurs" as they have been described by members of the South Carolina congressional delegation. 1

The Pantex plant enjoys tremendous public and bipartisan political support for new missions. To accomplish its disposition goals, DOE must have strong, broad-based political support. Bringing in the support of Texas Senators and Congressmen will help ensure that DOE disposition initiatives succeed.

Based upon these reasons, I respectfully urge DOE to designate Pantex as the site for the pit disassembly and conversion facility. Thank you for the opportunity to comment on this decision-making process.

TXD40

TXD40–1 **Alternatives**

DOE acknowledges the Representative's support for siting the proposed pit conversion facility at Pantex, as well as the observations regarding broad political and community support. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

This SPD EIS analyzes the potential environmental impacts associated with implementing the proposed activities at the candidate sites. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, demonstrate that the activities would likely have minor impacts at any of those sites, including Pantex. Incident-free (normal) releases of radioactivity from the proposed surplus plutonium disposition facilities to the food production chain are explained for each site in Appendix J. Current and future operations at the candidate sites should not impact the soil used for agriculture and farming in any of the regions adjacent to these sites.

TEXAS RADIATION ADVISORY BOARD
MICHAEL S. FORD
PAGE 1 OF 3

Statement to DOE on PD&C Mission at Pantex/ M. S. Ford
Page 1 of 3
11 August 1998

Good afternoon. My name is Michael Ford and I stand before you wearing two hats today. I making a living as a certified health physicist and radiological engineer at Pantex. However, my primary role here today is to represent the Texas Radiation Advisory Board (TRAB). We advise three agencies within the State of Texas on radiation safety matters: the Bureau of Radiation Control, the Texas Natural Resource Conservation Commission, and the Railroad Commission of Texas. While the TRAB has not taken specific action to endorse the Pit Disassembly and Conversion mission, the TRAB continues to take an interest in Pantex operations. It is anticipated that a vote for endorsement of the PD&C mission at Pantex will be held at the October 3rd, 1998 meeting. Based on my understanding of the position of several members of the Board, I feel that the TRAB would join Governor Bush in supporting the PD&C mission at Pantex. 1

Certain troubling statements by two South Carolina politicians, however, require a clarification of any terms of the support for this facility. Representative Lindsey Graham (R-S. C.) has stated on August 3rd 1998 that "It would be foolhardy to introduce plutonium contamination to a site that isn't already contaminated." And on August 4th, Senator Strom Thurmond of South Carolina indicated that he was willing to use the existing separations canyons — 1950's and 60's technology — to perform the PD&CF mission as a cost savings.

The combined affect of these statements by these politicians indicate that South Carolina is less concerned about embracing the proposed technology — which would confine the plutonium to enclosed processes -- than they are about bringing the work to their state. Unfortunately, it appears that they are prepared to increase the plutonium contamination at Savannah River Site at the expense of the surrounding environmental in order to secure the facility. I firmly believe that I would speak for the Governor and all members of the TRAB when I say that a PD&CF that uses the inefficient and wasteful technologies of the 50's and 60's would be an unacceptable replacement for what is proposed in the SPD EIS. As a TRAB member and a U.S. taxpayer, I find South Carolina's position to be very troubling. 2

TXD45

TXD45–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TXD45–2 **DOE Policy**

DOE acknowledges commentor's concern that the surplus plutonium disposition program be carried out in an environmentally safe and efficient manner. The proposed surplus plutonium disposition facilities would be designed, constructed, operated, and deactivated in accordance with applicable Federal, State, and local environmental, safety, and health requirements. Within these limits, DOE believes that the level of contamination should be kept as low as is reasonably achievable, so that the benefit of reducing the already low level of contamination would warrant the additional cost of that reduction. Further, D&D would be necessary wherever the proposed facilities were located. D&D is discussed in Section 4.31. DOE will evaluate options for D&D or reuse of the proposed facilities at the end of the surplus plutonium disposition program.. At that time, DOE will perform engineering evaluations, environmental studies, and further NEPA review to assess the consequences of different courses of action.

This SPD EIS does not consider the use of existing canyons for any pit disassembly and conversion activities. For example, the use of F-Canyon at SRS to convert plutonium for use in either the immobilization or MOX facility would require reconfiguring the canyon and keeping it in operation for another 10 years or more. DOE has already made a commitment to the public, the U.S. Congress, and DNFSB to shut the canyon down.

TEXAS RADIATION ADVISORY BOARD
MICHAEL S. FORD
PAGE 2 OF 3

Statement to DOE on PD&C Mission at Pantex/ M. S. Ford
Page 2 of 3
11 August 1998

In reviewing the Cost Analysis (in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition), I noted with interest where the document states in multiple locations that -- in both constant 1997 dollars and discounted costs -- overall, the costs for the alternatives are approximately the same. However, some clarification would be appreciated in the following areas:

1. It appears that some of the PD&CF needs for SRS are being rolled into the design changes for the APSF (page 3-3) and are not being reflected in the cost estimates.
2. The need for a Source Calibration Facility is not discussed in the SPD EIS and its function is not stated in the Cost Analysis. Instrument calibrations are currently handled by both Pantex personnel and offsite calibration services. 3
3. The initial D&D efforts needed to support construction in currently contaminated facilities is not addressed in any detail. (pg. 1-9).
4. The indirect cost factors were not explained in any detail. It was not clear whether these factors varied by location, and if so, what the basis for the variation was (pg. 1-10).
5. It is unclear as to what additional SNM-processing facilities are required beyond those that the PD&CF provides (pg. 2-3).
6. Zone 4 stores weapons <u>and</u> pits (§ 2.3.3, ¶2).

The costs for repackaging the pits was addressed in the Cost Analysis as $69M for repackaging and $10M to $15M for transportation, but little attention was paid to what impact the repackaging effort might have on Pantex's weapons mission. Over the last five years, Pantex's total collective doses have ranged from 14.6 to 44.9 person-rem with an average of 31 person-rem. In the EIS addressing plutonium storage, it was estimated that approximately 30 person-rem per year would be incurred due to the repackaging of pits in DOT Type B containers. Such an activity would roughly double Pantex's average exposures, and it would triple 1997's collective doses. With the reduction in the dose limits, this could have a noticeable impact on Pantex's weapons mission. 4

TXD45

TXD45–3 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

TXD45–4 **Human Health Risk**

Appendix L.5.1 was revised to show that workers at Pantex would receive an additional dose of 10.4 person-rem/year. On the basis of a health risk estimator of 400 fatal cancers per 1 million person-rem (see Appendix F.10.2.1), a dose of 10.4 person-rem translates to an increase of 0.0042 LCF per year. Thus, for a 10-year operational period, the risk of a single additional fatal cancer among the workforce would be less than 1 in 20. While DOE continually evaluates dose limits, there are no current plans to change the existing limits.

Statement to DOE on PD&C Mission at Pantex/ M. S. Ford
Page 3 of 3
11 August 1998

Finally, Pantex personnel have been called "amateurs" with regard to the PD&C mission. Using the word "amateur" does not appear to be consistent with Pantex's role in assembling, disassembling and maintaining some of the most complex weapon systems in the world. While Pantex has not undertaken plutonium processing operations in the past, its record of safely handling both plutonium and high explosives more than demonstrates the competence and capabilities of Pantex personnel to successfully undertake the PD&C mission. 5

Thank you for allowing me to speak on behalf of the TRAB.

Very Respectfully,

Michael S. Ford, CHP
Member
Texas Radiation Advisory Board
1100 West 49th Street
Austin, Texas 78756

TXD45

TXD45–5 **Other**

DOE would not have considered Pantex for the surplus plutonium disposition program if it did not believe that Pantex employees were qualified to perform the work safely and effectively.

TEXAS SENATE
HONORABLE TOM HAYWOOD
PAGE 1 OF 2

TOM HAYWOOD
DISTRICT 30

COMMITTEES:
ECONOMIC DEVELOPMENT
EDUCATION
NATURAL RESOURCES
• SUBCOMMITTEE ON AGRICULTURE, CHAIRMAN
NOMINATIONS

The Senate of
The State of Texas

CAPITOL OFFICE:
P.O. Box 12068
Austin, Texas 78711
512/463-0130
TDD 1-800-735-2989

July 28, 1998

Bert Stevenson, NEPA Compliance Office
DOE Office of Fissile Material Disposition
c/ SPD EIS
US Department of Energy
PO Box 23786
Washington, DC 20026.3786

Dear Mr. Stevenson,

Thank you for the opportunity comment on the Department of Energy's Draft Surplus Plutonium Disposition Environmental Impact Statement (SPD EIS).

Please know that I am adamant that any current and future functions at Pantex be conducted in a safe and environmentally sound manner. My first priority is to ensure that expansion there does not impair the health or safety of area residents, or have an adverse effect on the environment. These goals serve as a prerequisite to any current or future activities at Pantex, which is located within my Texas Senate District. 1

I am aware that DOE has selected the Savannah River Site (SRS) as the preferred alterative for the MOX fuel fabrication facility and is considering SRS, along with Pantex, as the location for the disassembly/conversion mission. I am extremely disappointed in DOE's decision to site the MOX facility at SRS, since Pantex remains the best and cheapest site for that mission. 2

However, of the proposed plutonium disposition actions and alternatives discussed by the department in the SPEIS, I wish to focus my comments on the selection of Pantex as the preferred site for locating the plutonium pit disassembly and conversion facility. I am concerned that locating the conversion mission at a site other than Pantex would not only increase the hazards of dealing with plutonium, but would also ignore the facts that make Pantex the site most capable of ensuring that disposition goals are met with the utmost attention to economic and safety considerations. Pantex is already uniquely suited to assume this new function. Pantex currently storehouses more than 8,000 surplus pits, with a long history of handling pits and the related infrastructure and 3

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940/767-3075

3201 Texoma Pkwy., Suite 285
Sherman, Texas 75090
903/868-2547

1025 East North Tenth Street
Abilene, Texas 79601
915/672-2436

MD006

MD006–1 **DOE Policy**

DOE has and will continue to make health, safety, and environmental issues a matter of utmost importance in the planning and conduct of all nuclear operations, including the disposition of surplus plutonium. This SPD EIS shows that the impact of properly implementing the proposed action at Pantex would have no major effect on the health, safety, and environment in the Amarillo area.

MD006–2 **Alternatives**

DOE acknowledges the Senator's support for siting the MOX facility at Pantex. As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

MD006–3 **Alternatives**

DOE acknowledges the Senator's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

operations protocol that is the mainstay of an excellent safety culture. Furthermore, given the current weapons disassembly and storage functions at Pantex, disassembly and conversion of the pits already located there is consistent with the historic mission of the plan. Opponents of siting disposition functions at Pantex (SRS in particular) argue that DOE should not introduce plutonium missions at a site where the work could be considered "new" at the location. This argument is false and disingenuous. With the new MOX facility, SRS will undertake an NRC licensed function which is completely new to it -- current and future personnel will be required to receive training in an entirely new function. Pantex, on the other hand, has a production culture with a well trained, unionized workforce -- hardly a group of "amateurs" as they have been described by members of the South Carolina delegation. 3

When considering the proliferation risks involved in unnecessarily transporting a large number of classified plutonium pits across the country from Pantex, it makes budgetary and policy sense to site disposition functions where storage already exists. ***First***, due to its cheaper labor costs and utility rates, and water and land availability, Pantex clearly is the most cost-effective site over the life of the program than any other site under consideration. ***Second***, transportation of plutonium in non-classified form (after disassembly and conversion at Pantex) to the SRS is far preferable to the perils that would be incurred by shipping plutonium in a weapons-ready form. Pantex has the necessary safety, security, and surveillance capabilities to accommodate an expanded role. ***Third***, it is in the best interests of the United States to engage Russia in bilateral demilitarization and inspections independent of the politically contentious MOX fuel fabrication process. It will also be far easier to track converted plutonium pits for IAEA and international inspections if these activities are undertaken at the site of original pit storage. 4

The Pantex plant enjoys tremendous public and bipartisan political support for new missions, and could provide them at the lowest additional costs to taxpayers. To accomplish its disposition goals, DOE must have strong, broad-based political support. Bringing in the support of Texas Senators and Congressmen could ensure the success of DOE disposition initiatives. 3

While I do not profess to be a rocket scientist, my doctorate in physics and my 1996 tour of the Pantex facility do provide greater insight.

Based upon these reasons, I respectfully urge DOE to designate Pantex as the site for the pit disassembly and conversion facility. 3

Sincerely,

Tom

TOM HAYWOOD
Texas State Senator

MD006

MD006–4 **Transportation**

DOE has considered the inherent risks, including proliferation concerns, associated with transporting pits versus plutonium dioxide. While DOE prefers to minimize the transportation of plutonium that is still desirable for weapons use, plutonium is routinely and safely transported in the United States. As described in Appendix L.3.3, transportation of nuclear materials would be performed in accordance with all applicable DOT and NRC transportation requirements. Interstate highways would be used, and population centers avoided, to the extent possible.

All shipments of surplus plutonium that have not been converted to a proliferation-resistant form would be made by DOE's SST/SGT system, as described in Appendix L.3.2. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. By working in parallel with Russia to reduce stockpiles of excess plutonium, the United States can reduce the chance that weapons-usable nuclear material could fall into the hands of terrorists or rogue states and help ensure that nuclear arms reductions will never be reversed.

TEXAS SENATE
HONORABLE JOHN HIRSCHI
PAGE 1 OF 1

John Hirschi
State Representative
District 69

August 17, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

I do not support plutonium processing at the Pantex Plant. In the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, the Department of Energy prudently decided against locating one plutonium processing facility (MOX fuel fabrication) at the Pantex Plant. For the following additional reasons, a Plutonium Pit Disassembly and Conversion facility also should not be located at Pantex:

. Pantex has never processed plutonium. The Pantex Superfund site has so far apparently escaped the type of radioactive contamination found at plutonium processing sites like Rocky Flats in Colorado and Hanford in Washington. 1

. The Pantex Plant occupies an area that is a fraction of the size of other plutonium sites.

. The technologies proposed in the Plutonium Pit Disassembly and Conversion Facility are undemonstrated and unproven. It is unacceptable to have plutonium operations above the Ogallala Aquifer and only one mile from where people live and work in a vibrant agricultural producing area. The Pantex legacy already includes heavy contamination in a perched layer of groundwater less than one hundred feet above the Ogallala Aquifer. This pollution extends from under the Pantex Plant to adjacent private property and the real impacts remain unknown. The risk of any additional groundwater pollution is unacceptable in an agricultural region. 2

Thank you for this opportunity to comment.

Sincerely,

John Hirschi
State Representative

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MD058

MD058–1 **Alternatives**

DOE acknowledges the Senator's opposition to siting any plutonium processing facilities at Pantex. This SPD EIS analyzes the potential environmental impacts associated with implementing the proposed activities at the candidate sites. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, would likely have minor impacts on any of those sites, including Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD058–2 **Alternatives**

Pit disassembly and conversion technologies are currently being demonstrated at LANL. This activity is described in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), which is available on the MD Web site at http://www.doe-md.com.

The analyses presented in Section 4.26.3.2.2 indicate that there would be no discernible impacts on water quality from normal operation of the pit conversion and MOX facilities at Pantex. Other sections show, moreover, that the normal operation of these facilities would likely have minor impacts on human health, agriculture, and livestock: Section 4.17.1.4 and 4.17.2.4 addresses the potential radiological and hazardous chemical effects of the maximum-impact alternative on workers and the public; Appendix J.3, the potential contamination of agricultural products and livestock, and the consumption of these products by persons living within an 80-km (50-mi) radius of Pantex.

1998
Texas State Republican Party
Platform
(page 23-24)

The Party recognizes the value of alternative energy sources and supports continued private research and development of such sources; but we oppose the federal government using hazardous waste as an alternative energy source,

such as the processing or reprocessing of plutonium and uranium for making mixed oxide fuels in agricultural areas and above major water sources. 1

by: Richard L. Geddes
8/13/98

SCD19

SCD19–1 **Alternatives**

DOE acknowledges the commentor's support for private research and development of alternative energy sources. The MOX approach does not involve the use of hazardous waste as an alternative energy source. Further, the use of U.S. surplus plutonium does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

This SPD EIS analyzes the potential environmental impacts associated with implementing the proposed activities at the candidate sites. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, demonstrate that the activities would likely have minor impacts at any of those sites, including Pantex. Incident-free (normal) releases of radioactivity from the proposed surplus plutonium disposition facilities to the food production chain are explained for each site in Appendix J. Current and future operations at the candidate sites should not impact the soil used for agriculture and farming in any of the regions adjacent to these sites.

furthermore, public money or public powers should not be used to fund or implement any private projects such as high-speed rail or sports stadiums.

Balanced Budget - The Party supports full disclosure of all "on" and "off" budget spending. We demand that our federal legislators vote only for balanced budgets. Social Security should be taken off budget. In case of a budget surplus it should never be used to increase spending.

Waste and Fraud in Government Contracts - The Party is opposed to waste and fraud in government contracts and recommends that the Attorney General of the United States investigate fraud and misuse of government funds in government contracts prosecuting those found to be responsible. The Party also believes that all government contracts should be awarded only on the merits of the bidders' ability to produce the quality of the product or service performed at a reasonable cost. We also support the repeal of the Davis Bacon Act. We encourage the government to follow fair business practices.

Business Subsidies - The Party urges the cessation of subsidies. We support movement toward a free market economy both domestically and internationally.

Downsizing the Federal Government - We support the downsizing of the federal government in order to reestablish states' rights guaranteed by the Tenth Amendment of the United States Constitution. We further support the abolition of federal agencies involved in activities not delegated to the federal government under the original intent of the Constitution including, but not limited to, the Environmental Protection Agency, the Department of Energy, the Department of Housing and Urban Development, 'the Department of Health and Human Services, the Bureau of Alcohol, Tobacco and Firearms, the Department of Education, and the position of Surgeon General. These authorities should be eliminated or, where needed, transferred to the state or local governments. We also call for the defunding and abolition of the National Endowment for the Arts.

Sunset Laws - The Party supports a mandatory Sunset Law for the state of Texas which would automatically terminate all agencies or programs if they are not reenacted by the legislature every twelve years.

Unfunded Mandates - The Party favors limited government and no new taxes. The effect of mandating services without funding is a tax increase for local government. We oppose all unfunded mandates by the federal and state governments.

Domestic Energy Industry

Support of the Domestic Energy Industry - The foundation of our National Energy Strategy must be a competitive domestic oil and gas industry. Federal tax and regulatory policies are destroying the independent sector of this industry. Regulation and rule making must be done on a cooperative, rather than an adversarial basis, preserving jobs and the economy while promoting environmental preservation. The Party encourages the U.S. Congress to (1) aggressively support a greatly expanded use of domestic natural gas as a method to reduce U.S. dependence on foreign crude oil; (2) repeal all provisions of the alternative minimum tax that treat intangible drilling costs as tax preference items; and (3) stop the promulgation of unnecessary environmental legislation or regulation that causes domestic production to be economically not feasible.

Alternative Energy Sources - The Party recognizes the value of alternative energy sources and supports continued private research and development of such sources; but we oppose the federal

government using hazardous waste as an alternative energy source, such as the processing and or reprocessing of plutonium and uranium for making mixed oxide fuels in agricultural areas and above major water sources.

Restructuring Electrical Utilities - The electric services industry in Texas should be restructured. The Party believes the state of Texas instead of the federal government should restructure the electric service industry in Texas. We support deregulation with real competition.

Restoring American Sovereignty and Leadership

Immigration - The Party acknowledges that America is a beacon of hope and a place of new beginnings and we continue to welcome legal immigrants. Because we believe that one responsibility of government is to secure our nation's borders, we support: 1) returning immigration quotas to traditional levels in practice prior to 1965 of 300,000 per year or less, 2) expeditious hearing on deporting non-violent illegal aliens held in prisons or jails, 3) reclaiming control of international borders, 4) screening immigrants for communicable diseases, including HIV, 5)the amendment of the Immigration and Naturalization Act of 1952 to grant birthright citizenship only to the newborn of citizens of the United States of America or permanent legal residents, and 6) Congressional oversight of federal agencies to follow-up over-stayed visas.

The Party opposes: 1) automatic citizenship by birth to children born to illegal aliens, 2) federally-imposed requirements on the state regarding the care of illegal aliens including the extension to illegal aliens the benefits of public education, non-emergency medical care, and welfare including Social Security and SSI payments, 3) a national tracking system for control of immigration (or any other purpose), and 4) participation in any election by illegal aliens.

International Communism - The Party supports the worldwide movement away from Communism and toward representative government based on the premise that men' s and women's rights come from God and governments are established to protect these rights.

MIA's and POW's - The Party urges the President and Congress to continue all measures necessary to seek and act upon all information concerning our Missing in Action and Prisoners of War. We oppose the extension of MFN status or normalizing relations with any nation before they support a full and complete accounting for all missing American service personnel.

Middle East - The Party believes that the U.S. and Israel share a special long-standing relationship based on shared values, a mutual commitment to our republican form of government, and a strategic alliance that benefits both nations. Our foreign policy in the Middle East should reflect the special nature of this relationship through continued military and economic assistance to Israel and recognition that Jerusalem is the capital of Israel and should remain an undivided city accessible to people of all faiths. We commend the Republican Congress' resolution to move the U.S. embassy from Tel Aviv to Israel's capital, Jerusalem. We commend Israel's privatization of state-owned companies and budget cuts in order to achieve its goal of economic independence. We encourage the Republican Congress' continuing support for Prime Minister Netanyahu's government in the peace talks between Israel and the Palestinians. We oppose pressuring Israel to make concessions it believes would jeopardize its security. We support continued sanctions against Iran in response to its celebration of "Death to America Day."

THE CENTER FOR LEGAL AND SOCIAL JUSTICE
TADEO SPIKE ZYWISKI
PAGE 1 OF 3

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC, 20026-3786

Dear Department of Energy, Office of Fissile Materials Disposition:

I do not support plutonium processing at the Pantex Plant. In the *Surplus Plutonium Disposition Draft Environmental Impact Statement*, the Department of Energy prudently decided against locating one plutonium processing facility (MOX fuel fabrication) at the Pantex Plant. For the following additional reasons, a Plutonium Pit Disassembly and Conversion facility also should not be located at Pantex: 1

Pantex Should Not Become the Next Rocky Flats

Pantex has never processed plutonium. The Pantex Superfund site has so far apparently escaped the type of radioactive contamination found at plutonium processing sites like Rocky Flats in Colorado and Hanford in Washington.

Risks That Are Unknown Are Too High

The Pantex Plant occupies an area that is a fraction of the size of other plutonium sites.

SIZE MATTERS: A Comparison of the Area of the Four Candidate Sites (Square Miles)			
Pantex	Savannah River Site	Idaho National Engineering Lab.	Hanford
23	309	890	560

2

The technologies proposed in the Plutonium Pit Disassembly and Conversion Facility are undemonstrated and unproven. It is unacceptable to have plutonium operations above the Ogallala Aquifer and only one mile from where people live and work in a vibrant agricultural producing area. The Pantex legacy already includes heavy contamination in a perched layer of groundwater less than one hundred feet above the Ogallala Aquifer. This pollution extends from under the Pantex Plant to adjacent private property and the real impacts remain unknown. The risk of any additional groundwater pollution is unacceptable in an agricultural region.

Common sense dictates that negative consequences to people and farmland from nuclear accidents are far more likely in a small, open, windy location like Pantex. The Department of Energy has acknowledged that the most visually unappealing feature of the plutonium facilities will be their smokestacks. Visual blight will be a minor inconvenience compared to the air pollutants--many of them radioactive--expected to escape into the atmosphere daily through smokestack filters. Routine air emissions of tritium, plutonium, americium, and beryllium constitute unacceptable new hazards to the Texas Panhandle. 3

MD107

MD107–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. As described in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of any of the proposed activities during routine operations at any of the candidate sites would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed facilities in compliance with today's strict environmental, safety, and health requirements. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

MD107–2 **Human Health Risk**

Although Pantex is smaller in overall size in comparison with the other candidate sites, analyses in Chapter 4 of Volume I indicate that impacts of operating the pit conversion facility on health, safety, and the environment at Pantex would likely be minor (e.g., see Section 4.6).

While it is true that the pit conversion facility is the first consolidated facility for accomplishing this mission on a large scale, the processes that would be used in this facility are not entirely new. Many of these processes are in use at LANL and LLNL. In addition, DOE has recently started a pit disassembly and conversion demonstration project at LANL, where processes will be further developed and tested.

Section 4.26.3.2 analyzes impacts to the environment (including contamination to the Ogallala aquifer) due to construction and normal operation of a pit conversion facility at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. Appendix J.3 includes an analysis of potential contamination of agricultural products and livestock and consumption of these products by persons living within an

80-km (50-mi) radius of Pantex. If the proposed surplus plutonium disposition facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation. This analysis indicates that impacts of operating the pit conversion facility on agricultural products, livestock, and human health at Pantex would likely be minor.

MD107–3 **Human Health Risk**

It is DOE policy to operate in compliance with all applicable air quality requirements and to protect human health and the environment. DOE takes into consideration pollution reduction techniques to minimize air releases when designing, constructing, and operating its facilities. It also considers aesthetic and scenic resources in the design, location, construction, and operation of facilities. Potential concentrations of air pollutants at Pantex for the various alternatives have been estimated, considering appropriate local meteorology and other data associated with the area. Because the releases from the pit conversion and MOX facilities would be very small (see Appendix J.3.1.4), estimates of resultant radiological health risks are small. As indicated in Section 4.17.2.4, the maximum possible dose delivered to a member of the public during normal operations of the MOX and pit conversion facilities at Pantex would be 0.077 mrem/yr, 0.02 percent of the dose that individual would receive annually from natural background radiation. The estimated dose to the public from radiological emissions (e.g., americium, tritium, and plutonium) would be 0.58 person-rem/yr which would result in an increase of 2.9×10^{-3} LCFs over the 10-year operating life of the pit conversion facility. Any new facilities that might be built would be within existing site boundaries, and would be matched aesthetically with the current plant to limit potential visual impacts.

THE CENTER FOR LEGAL AND SOCIAL JUSTICE
TADEO SPIKE ZYWISKI
PAGE 3 OF 3

There is Valid, Strong Criticism of Safety in the Storage of Plutonium at Pantex

Since Pantex became the nation's long-term storage location for up to 20,000 plutonium pits, promises to improve safety conditions have not happened. The U.S. Government Accounting Office and the Defense Nuclear Facilities Safety Board have issued reports critical of plutonium storage safety at Pantex. Fifty million taxpayer dollars were spent on a failed plutonium pit container program (the AT-400A) and the plan to move over 10,000 pits into a safer remodeled building (Building 12-66) has also failed.

When it comes to plutonium pit storage problems, Panhandle residents are back to square one. The plutonium remains in old, unsuitable, corroding storage containers and in 35-55 year old "bunkers" that the Department of Energy promised were for "temporary" use. Plutonium that is supposed to be stored in a stable environment now sits in the bunkers--all but three without air conditioning--even as the Texas Panhandle experiences a spell of more than 40 consecutive days of 90+ degree temperatures, and more than 20 days this summer with thermometers registering 100+ degrees. If the Department of Energy cannot accomplish the job of safely storing Pantex plutonium in the most stable environment, there is no reason to accept its unsubstantiated assurances to safely process deadly plutonium powders at Pantex. 4

Thank you for this opportunity to comment.

Sincerely:

August 14/1998

To Whom it may concern!
Advances in technology Versus
repression of Wisdom provides the signal to
Emphasize Wisdom hold fast on what we
have of technology. 5
When balanced restart technology
Sincerely
Tadeo Spike Zywiski
213 Avant Cove
San Antonio TX 78210

MD107

MD107–4 **DOE Policy**

DOE acknowledges the commentor's concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed; addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

MD107–5 **Other**

DOE acknowledges the commentor's concern that technology advances must be met with caution.

THE METAL TRADES COUNCIL OF AMARILLO, TEXAS AND VICINITY
RONALD W. ZERM
PAGE 1 OF 3

THE METAL TRADES COUNCIL
of
Amarillo, Texas and Vicinity
A.F. of L. - C.I.O.
AMARILLO, TEXAS

DOE Office of Fissile Materials Disposition
c/o SPD EIS
P.O. Box 23786
Wasington, D.C. 20026-3786

SUBJECT: SURPLUS PLUTONIUM DISPOSITON DRAFT EIS

MD186

THE METAL TRADES COUNCIL OF AMARILLO, TEXAS AND VICINITY
RONALD W. ZERM
PAGE 2 OF 3

As a Metal Trades Union Safety Officer, I would like to comment on this proposed EIS. Having both mechanical and safety backgrounds, I feel I can comment both on the proposed processes and the safety envelope within which these processes are to function.

In commenting on the processes, I would first comment on the Mixed Oxide Fuel Facility. The MOX process is, primarily, a mechanical process accomplished in glove boxes. Pantex already possesses parallel processes which are similarly found in a MOX plant. We blend materials, press these materials into pellets, weigh them, perform non-destructive inspection on them, heat (or scinter) them, and assemble the final product. We have been performing these processes for over 45 years. And we are actively performing these same processes today. Having had the opportunity to visit actual MOX plants in England and France, I can state with confidence that Pantex can perform this part of the EIS mission in an unparalleled manner. .

In addressing the Pit Disassembly and Conversion Facility, it is important to keep in mind that the Aries System is a mechanical disassembly system. I have toured the Aries

system at Los Alamos and have seen no potential problems with its being sited here at Pantex. Pantex has, as I have already stated above, safely handled the items, slated for disassembly and conversion, for over 45 years and we currently store over 10,000 of them. 1

A major factor in siting these missions atPantex is a well-trained and qualified Union Workforce, which is second to none in the country. This workforce actively participates in such endeavors as Voluntary Protection Program, Integrated Safety Management, Seamless Safety - 21 Program, and Enhanced Workplanning. All pro-active programs and all needed if the DOE intends to follow Former Secretary of Energy Pena's memo on Environment, Safety and Health of April 14, 1998. In addition, the one program which Pantex has which sets it apart from all other plants is the Metal Trades Union Safety Officer Program, which is staffed by three full-time Union Safety Officers. No other plant in the nation has anything comparable to this program and it provides the crucial and necessary check and balance needed by the DOE to maintain and further ES&H credibility with the nation.

Siting these two missions at Pantex is the most logical choice. Pantex is an "active" site, observing strict operational protocols. The safety infrastructure at Pantex has not been compromised "as at other sites" due to their "primary" mission being environmental remediation/restoration. It is of extreme importance to place these activities at a site where an **established** and **successful** Conduct of Operations / Formality of Operations philosophy is already in existence and utilized day to day.

MD186

MD186–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

The DOE Pantex Plant should be the choice for these future PU EIS missions.

Sincerely,

Ronald W. Zerm

Metal Trades Union Safety Officer

MD186

U.S. Army
Stacy R. Rusk
Page 1 of 1

I support Pantex. | 1

WD017

WD017–1 **Alternatives**

DOE acknowledges the commentor's support for expanded missions at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

UNDERWOOD, WILSON, BERRY, STEIN & JOHNSON, P.C.
JAMES W. WESTER
PAGE 1 OF 1

UNDERWOOD, WILSON, BERRY, STEIN & JOHNSON, P.C.
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WRITER'S DIRECT E-MAIL:
jww@uwe-soft.com

WRITER'S DIRECT DIAL:
(806) 378-0354

August 12, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
MD-4 Forrestal Building
1000 Independence Avenue, SW
Washington, D.C. 20585

VIA FAX ONLY
1-800-820-5156

Dear Ladies and Gentlemen:

As a resident of Amarillo, Texas, I encourage you to choose the Amarillo Pantex plant as the location for the disassembly and conversion of nuclear weapons plutonium components.

While I was unable to attend your hearings in Amarillo on Tuesday, August 11, 1998, I wanted to take this opportunity to encourage you to select the Amarillo Pantex plant. I presume that you have information concerning the important role that Pantex plays in the Amarillo community. I hope you are also aware of the appreciation and support of local residents. Further, Pantex's track record in the handling of plutonium pits speaks for itself and makes it the natural and best choice for the project. 1

In conclusion, I would again urge you to select the Amarillo Pantex plant for the disassembly and conversion of nuclear weapons plutonium components.

Sincerely,

James W. Wester

James W. Wester

JWW/tb

FD242

FD242–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

WHALEY, JAN
PAGE 1 OF 1

3224 Janet, #106
Amarillo, TX 79109
August 11, 1998

United States Department of Energy
Washington, D.C.

Re: PIT DISASSEMBLY AND CONVERSION FACILITY

Dear Sirs:

I would like to take this opportunity to express my support for the Pit Disassembly and Conversion Facility to be located at the Pantex Plant in Amarillo.

As a taxpayer, I believe it only makes sense to locate the facility in close proximity to the pits. To me, it would be total nonsense to transport the pits to Savannah River when there is a facility here that could competently handle the project. Not only does it make economical sense, but from a safety standpoint it only makes sense to leave the pits in one location.

I believe the entire production and maintenance workforce (labor and management), which includes a world class security/protective force, is second to none. In my opinion, Pantexans have demonstrated that we are, without a doubt, the best in the entire DOE complex. Pantex operates within a stringent safety envelope, and has a safety record which speaks for itself. We currently house and store more than 10,000 plutonium pits and we have safely handled and worked with pits and other hazardous items for more than 45 years. 1

When you weigh all of the above factors and add to it the tremendous community support offered the Pantex Plant, I see no other logical conclusion. I trust that you will come to the same conclusion.

Sincerely,

Jan Whaley

Jan Whaley

TXD19

TXD19–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Potential impacts from transportation of pits would likely be minor if Pantex were chosen as the site for pit disassembly and conversion because pits are currently stored there, while potential impacts from transportation of plutonium dioxide would likely be minor if SRS were chosen because SRS is the preferred location for the MOX facility. Transportation impacts are summarized in Chapter 4 of Volume I and Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation risks), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Yes, my name is Carolyn Wheeler. I live in Whitedeer, Texas, close to Pantex and I am very interested in seeing the work come to Pantex rather than Savannah River. I believe that Pantex could do it very safely and very efficiently. Thank you very much. 1

PD017

PD017–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

WOLFE, BILL K.
PAGE 1 OF 1

August 10, 1998

U. S. Department of Energy
Office of Fissile Materials Disposition
MD-4 Forrestal Building
1000 Independence Avenue, SW
Washington, D.C. 20585

I support the disassembly and conversion of nuclear weapons plutonium pits at the Amarillo Pantex plant.

The work force of Amarillo and the Texas Panhandle has exceptionally good work etchics. The productivity and safety records of our people is outstanding.

The fact that there is no major contamination at the Pantex plant speaks very highly of both the plant management and its work force. There is no reason to believe that conversion of the pits would cause any additional contamination here and every reason to believe it would make a bad situation worse at any of the other possible locations. 1

Most people in and around Amarillo also support Pantex and its missions completely.

Sincerely,

Bill K. Wolfe
7805 Lindsey Lane
Amarillo, Tx. 79121
Fax 806 358-9233

FD058

FD058–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. This SPD EIS analyzes impacts of the environment from construction and normal operation of the pit conversion facility. This facility would be located in a new building at either Pantex or SRS and, regardless of the site location, would generate the same level of contamination and require the same amount of D&D. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

WONDERLAND AMUSEMENTS, INC
PAUL D. BORCHARDT
PAGE 1 OF 1

Wonderland Park

11 August 1998

U.S. Department of Energy
Office of Fissile Material Disposition
MD-4 Forrestal Bldg.
1000 Independence Ave. SW
Washington, D.C. 20585

Ladies & Gentlemen:

As President and General Manager of Wonderland Amusements, Inc., I wish to express my support for the disassembly and conversion of nuclear weapon "pits" here in Amarillo at the Pantex Plant.

We employ job-entry youth on a seasonal basis and have over 47 years experience with their work ethics and performance. As future employees to our service and manufacturing industries, we feel that this area has an excellent workforce that is responsible, sensible, ethically sound, and desirous to perform work that is necessary and beneficial. I think this workforce has been beneficial to Pantex as the past performance and safety record of the plant are very good. 1

I feel that we have the best location to do the necessary job. Why not disassemble, store, and re-manufacture in one location, rather than transport and potentially expose a greater area of our country? Our area has been a source of energy for many years. As new forms become available, we would like to continue to be a source for the future.

Just as I am continually involved in safety, I am aware and feel that the employees of Pantex want the same safe place to work and live as do our area residents.

Respectfully,
Paul D. Borchardt

P.O. BOX 2325 • AMARILLO, TEXAS 79105-2325
IN THOMPSON PARK • HWY. 287 N. • (806) 383-0832 • FAX 383-8737
http://www.wonderlandpark.com/

TXD46

TXD46–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses (including analyses of transportation), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Office of
Fissile Materials Disposition

United States Department of Energy

Surplus Plutonium Disposition Final Environmental Impact Statement

Comment Response Document

Volume III - Part B

November 1999

For Further Information Contact:
U.S. Department of Energy
Office of Fissile Materials Disposition, P.O. Box 23786, Washington, DC 20026-3786

Cover Sheet

Responsible Agency: United States Department of Energy (DOE)

Title: *Surplus Plutonium Disposition Final Environmental Impact Statement* (SPD EIS) (DOE/EIS-0283)

Locations of Candidate Sites: California, Idaho, New Mexico, North Carolina, South Carolina, Tennessee, Texas, Virginia, and Washington

Contacts:

For further information on the SPD Final EIS contact:

Mr. G. Bert Stevenson, NEPA Compliance Officer
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786
Voice: (202) 586–5368

For information on the DOE National Environmental Policy Act (NEPA) process contact:

Ms. Carol Borgstrom, Director
Office of NEPA Policy and Assistance
Office of Environment, Safety and Health
U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585
Voice: (202) 586–4600 or (800) 472–2756

Abstract: On May 22, 1997, DOE published a Notice of Intent in the Federal Register (62 Federal Register 28009) announcing its decision to prepare an environmental impact statement (EIS) that would tier from the analysis and decisions reached in connection with the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic EIS*. At that time, the U.S. Environmental Protection Agency decided to be a cooperating agency. The *Surplus Plutonium Disposition Draft Environmental Impact Statement* (SPD Draft EIS) (DOE/EIS-0283-D) was prepared in accordance with NEPA and issued in July 1998. It identified the potential environmental impacts of reasonable alternatives for the proposed siting, construction, and operation of three facilities for the disposition of up to 50 metric tons (55 tons) of surplus plutonium, as well as a No Action Alternative. These three facilities would accomplish pit disassembly and conversion, plutonium conversion and immobilization, and mixed oxide (MOX) fuel fabrication.

For the alternatives that included MOX fuel fabrication, the SPD Draft EIS described the potential environmental impacts of using from three to eight commercial nuclear reactors to irradiate MOX fuel. The potential impacts were based on a generic reactor analysis that used actual reactor data and a range of potential site conditions. In May 1998, DOE initiated a procurement process to obtain MOX fuel fabrication and reactor irradiation services. In March 1999, DOE awarded a contract to Duke Engineering & Services, COGEMA Inc., and Stone & Webster (known as DCS) to provide the requested services. A *Supplement to the SPD Draft EIS* was issued in April 1999, which analyzed the potential environmental impacts of using MOX fuel in six specific reactors named in the DCS proposal. Those reactors are Catawba Nuclear Station Units 1 and 2 in South Carolina, McGuire Nuclear Station Units 1 and 2 in North Carolina, and North Anna Power Station Units 1 and 2 in Virginia.

DOE has identified the hybrid approach as its Preferred Alternative for the disposition of surplus plutonium. This approach allows for the immobilization of 17 metric tons (19 tons) of surplus plutonium and the use of 33 metric tons (36 tons) as MOX fuel. DOE has identified the Savannah River Site near Aiken, South Carolina, as the preferred site for all three disposition facilities (Alternative 3). DOE has also identified Los Alamos National

Laboratory in New Mexico as the preferred site for lead assembly fabrication, and Oak Ridge National Laboratory in Tennessee as the preferred site for postirradiation examination of lead assemblies.

Public Involvement: In preparing the SPD Final EIS, DOE considered comments on the SPD Draft EIS and the *Supplement to the SPD Draft EIS* received via mail, fax, and email, and comments recorded by phone and transcribed from videotapes. In addition, comments were captured by notetakers during interactive public meetings held on the SPD Draft EIS in August 1998 in Amarillo, Texas; Idaho Falls, Idaho; North Augusta, South Carolina; Portland, Oregon; and Richland, Washington, as well as during a public meeting on the *Supplement to the SPD Draft EIS* held in June 1999 in Washington, D.C. Comments received and DOE's responses to these comments are found in Volume III, the Comment Response Document, of the SPD Final EIS. Information on the surplus plutonium disposition program can be obtained by visiting the Office of Fissile Materials Disposition Web site at http://www.doe-md.com.

DOE/EIS-0283

Surplus Plutonium Disposition Final Environmental Impact Statement

Comment Response Document

Volume III - Part B

United States Department of Energy
Office of Fissile Materials Disposition

November 1999

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List of Acronyms

AEA	Atomic Energy Act of 1954
AECL	Atomic Energy of Canada Limited
AED	aerodynamic equivalent diameter
AIRFA	American Indian Religious Freedom Act
ALARA	as low as is reasonably achievable
AMWTP	Advanced Mixed Waste Treatment Project
ANL–W	Argonne National Laboratory–West
APSF	Actinide Packaging and Storage Facility
AQCR	Air Quality Control Region
ARF	airborne release fraction
ARIES	Advanced Recovery Integrated Extraction System
AVLIS	Atomic Vapor Laser Isotope Separation
BEA	Bureau of Economic Analysis
BEIR V	Report V of the Committee on the Biological Effects of Ionizing Radiations
BIO	Basis for Interim Operation
BLM	Bureau of Land Management
BNFL	British Nuclear Fuels
BWR	boiling water reactor
CAA	Clean Air Act
CAB	Citizens Advisory Board
CANDU	Canadian Deuterium Uranium (reactors)
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CPP	Chemical Processing Plant
CWA	Clean Water Act of 1972, 1987
D&D	decontamination and decommissioning
DBA	design basis accident
DCS	Duke Engineering & Services, COGEMA Inc., and Stone & Webster
DNFSB	Defense Nuclear Facilities Safety Board
DOC	U.S. Department of Commerce
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
DR	damage ratio
DU PEIS	*Final Programmatic Environmental Impact Statement for Alternative Strategies for Long-Term Management and Use of Depleted Uranium Hexafluoride*
DWPF	Defense Waste Processing Facility
EA	environmental assessment
EBR	Experimental Breeder Reactor (I or II)
EIS	environmental impact statement
EPA	Environmental Protection

	Agency
ES&H	environment, safety, and health
ESTEEM	Education in Science, Technology, Energy, Engineering, and Math
ETB	Engineering Test Bay
ETTP	East Tennessee Technology Park
FAA	Federal Aviation Administration
FDP	fluorinel dissolution process
FEMA	Federal Emergency Management Agency
FFCA	Federal Facility Compliance Agreement
FFF	Uranium Fuel Fabrication Facility
FFTF	Fast Flux Test Facility
FI	field investigation
FM	Farm-to-Market (road)
FMF	Fuel Manufacturing Facility
FMEA	failure modes and effects analysis
FMEF	Fuels and Materials Examination Facility
FONSI	finding of no significant impact
FPF	Fuel Processing Facility
FPPA	Farmland Protection Policy Act
FR	Federal Register
GAO	General Accounting Office
GDP	gaseous diffusion plant
GE	General Electric Company
GENII	Generation II, Hanford environmental radiation dosimetry software system
GPS	global positioning satellite
HE	high explosive
HEPA	high-efficiency particulate air (filter)
HEU	highly enriched uranium
HFEF	Hot Fuel Examination Facility
HHS	Department of Health and Human Services
HIGHWAY	(computer code for distances and populations along U.S. highways)
HLW	high-level waste
HLWVF	high-level-waste vitrification facility
HMIS	Hazardous Materials Information System
HWTPF	Hazardous Waste Treatment and Processing Facility
HYDOX	hydride oxidation
IAEA	International Atomic Energy Agency
ICPP	Idaho Chemical Processing Plant
ICRP	International Commission on Radiological Protection
ID DHW	Idaho Department of Health and Welfare
INEEL	Idaho National Engineering and Environmental Laboratory
INRAD	Intrinsic Radiation
INTEC	Idaho Nuclear Technology and Engineering Center
IPE	Individual Plant Examination
ISC	Industrial Source Complex Model
ISC3	Industrial Source Complex Model, Version 3
ISCST3	Industrial Source Complex Model, Short-Term, Version 3
ISLOCA	interfacing systems loss-of-coolant accident
ITP	In-Tank Precipitation Process
LANL	Los Alamos National Laboratory

LCF	latent cancer fatality
LDR	Land Disposal Restrictions
LEU	low-enriched uranium
LLNL	Lawrence Livermore National Laboratory
LLW	low-level waste
LOCA	loss-of-coolant accident
LPF	leak path factor
LWR	light water reactor
M&H	Mason & Hanger Corporation
MACCS2	Melcor Accident Consequence Code System (computer code)
MAR	material at risk
MD	Office of Fissile Materials Disposition
MEI	maximally exposed individual
MIMAS	Micronized Master
MMI	Modified Mercalli Intensity
MOX	mixed oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Science
NCRP	National Council on Radiation Protection and Measurements
NDA	nondestructive analysis
NEPA	National Environmental Policy Act of 1969
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPH	natural phenomena hazard
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRU	National Research Universal
NTS	Nevada Test Site
NWCF	New Waste Calcining Facility
NWPA	Nuclear Waste Policy Act
NWS	National Weather Service
ORIGEN	ORNL Isotope Generation and Depletion Code
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PBF	Power Burst Facility
PEIS	programmatic environmental impact statement
PFP	Plutonium Finishing Plant
PIE	postirradiation examination
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
PNNL	Pacific Northwest National Laboratory
PRA	probabilistic risk assessment
PSD	prevention of significant deterioration
PUREX	Plutonium-Uranium Extraction (Facility)
PWR	pressurized water reactor

R&D	research and development
RADTRAN 4	(computer code: risks and consequences of radiological materials transport)
RANT	Radioactive Assay and Nondestructive Test
RAMROD	Radioactive Materials Research, Operations and Demonstration
RCRA	Resource Conservation and Recovery Act, as amended
REA	regional economic area
RF	respirable fraction
RfC	reference concentration
RfD	reference dose
RFETS	Rocky Flats Environmental Technology Site
RFP	Request for Proposal
RIA	Reactivity Insertion Accidents
RIMS II	Regional Input-Output Modeling System II (computer code)
RISKIND	(computer code: risks and consequences of radiological materials transport)
ROD	Record of Decision
ROI	region of influence
RMF	Radiation Measurements Facility
RWMC	Radioactive Waste Management Complex
S/A	Similarity of Appearance (provision of Endangered Species Act)
SAR	safety analysis report
SARA	Superfund Amendments and Reauthorization Act of 1986
SCDHEC	South Carolina Department of Health and Environmental Control
SCE&G	South Carolina Electric & Gas Company
SCSHPO	South Carolina State Historic Preservation Officer
SDWA	Safe Drinking Water Act, as amended
SEIS	supplemental environmental impact statement
SHPO	State Historic Preservation Officer
SI	sealed insert
SMC	Specific Manufacturing Complex
SNF	spent nuclear fuel
SNM	special nuclear material
SPD	surplus plutonium disposition
SPD EIS	*Surplus Plutonium Disposition Environmental Impact Statement*
SPERT	Special Power Excursion Reactor Test
SRS	Savannah River Site
SSM PEIS	*Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management*
SST/SGT	safe, secure trailer/SafeGuards Transport
SWMU	solid waste management unit
SWP 1	Service Waste Percolation Pond 1
TA	Technical Area
TCE	trichloroethylene
TNRCC	Texas Natural Resource Conservation Commission
TPBAR-LTA	tritium-producing burnable absorber rod lead test assembly
TRA	technical risk assessment

TRANSCOM	transportation tracking and communications system
TRU	transuranic
TRUPACT	TRU waste package transporter
TSCA	Toxic Substances Control Act
TSP	total suspended particulates
TVA	Tennessee Valley Authority
TWRS	tank waste remediation system
TWRS EIS	*Tank Waste Remediation System Final Environmental Impact Statement*
UC	Regents of the University of California
UFSAR	updated final safety analysis report
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEC	United States Enrichment Corporation
USFWS	U.S. Fish and Wildlife Service
UV	ultraviolet
VOC	volatile organic compounds
VORTAC	very high frequency omnidirectional range/tactical air navigation (facility)
VRM	Visual Resource Management
WAG 3	Waste Area Grouping 3
WERF	Waste Experimental Reduction Facility
WIPP	Waste Isolation Pilot Plant
WM PEIS	*Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*
WNP–1	Washington Nuclear Plant–1
WNP–2	Washington Nuclear Plant–2
WPPSS	Washington Public Power Supply System
WROC	Waste Reduction Operations Complex
WSRC	Westinghouse Savannah River Company
ZPPR	Zero Power Physics Reactor

Chemicals and Units of Measure

°C	degrees Celsius (Centigrade)
°F	degrees Fahrenheit
μCi	microcurie
μg	microgram
μm	micrometer (micron)
46°26'07"	46 degrees, 26 minutes, 7 seconds
Ci	curie
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dBA	decibel, A-weighted
DUF_6	depleted uranium hexafluoride
eH	oxidation reduction potential
ft	foot
ft^2	square foot
ft^3	cubic foot
g	gram
g	gravitational acceleration
gal	gallon
GWD/t	gigawatt days (per ton)
ha	hectare
hr	hour (in compound units)
in	inch
kg	kilogram
km	kilometer
km^2	square kilometers
kV	kilovolt
l	liter
lb	pound
m	meter
m^2	square meter
m^3	cubic meter
mg	milligram
mi	mile
min	minute
mph	miles per hour
mrem	millirem
MTHM	metric tons of heavy metal
MVA	megavolt-ampere
MW	megawatt
MWe	megawatt electric
MWh	megawatt-hour
N_2	nitrogen
nCi	nanocurie
NO_2	nitrogen dioxide
pCi	picocurie
pcm/F	percent mille/per degree Farenheit
pH	hydrogen ion concentration
$PM_{2.5}$	particulate matter less than or equal to 2.5 μm in diameter
PM_{10}	particulate matter less than or equal to 10 μm in diameter
ppm	parts per million
PuO_2	plutonium dioxide
rad	radiation absorbed dose
rem	roentgen equivalent man
s	second
SO_2	sulfur dioxide
t	metric ton
ton	short ton
UF_6	uranium hexafluoride
UO_2	uranium dioxide
yd	yard
yd^3	cubic yard
yr	year (in compound units)
wt %	weight percent

Metric Conversion Chart

To Convert Into Metric			To Convert Out of Metric		
If You Know	**Multiply By**	**To Get**	**If You Know**	**Multiply By**	**To Get**
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
sq. inches	6.4516	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.092903	sq. meters	sq. meters	10.7639	sq. feet
sq. yards	0.8361	sq. meters	sq. meters	1.196	sq. yards
acres	0.40469	hectares	hectares	2.471	acres
sq. miles	2.58999	sq. kilometers	sq. kilometers	0.3861	sq. miles
Volume					
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.45360	kilograms	kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

Metric Prefixes

Prefix	Symbol	Multiplication Factor
exa-	E	1 000 000 000 000 000 000 = 10^{18}
peta-	P	1 000 000 000 000 000 = 10^{15}
tera-	T	1 000 000 000 000 = 10^{12}
giga-	G	1 000 000 000 = 10^{9}
mega-	M	1 000 000 = 10^{6}
kilo-	k	1 000 = 10^{3}
hecto-	h	100 = 10^{2}
deka-	da	10 = 10^{1}
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	μ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001= 10^{-12}
femto-	f	0.000 000 000 000 001 = 10^{-15}
atto-	a	0.000 000 000 000 000 001= 10^{-18}

COMMONWEALTH of VIRGINIA

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
http://www.deq.state.va.us

Dennis H. Treacy
Director

(804) 698-4000
1-800-592-5482

September 15, 1998

Mr. Howard R. Canter, Acting Director
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

RE: Surplus Plutonium Disposition Draft Environmental Impact Statement (DEIS)

Dear Mr. Canter

The Commonwealth of Virginia Agencies have completed their review of the DEIS for the noted action. The Department of Environmental Quality is responsible for coordinating Virginia's review of federal environmental documents and responding to the appropriate officials on behalf of the Commonwealth. The following locality and agencies participated in this review:

Department of Environmental Quality; and
Hampton Roads Planning District Commission.

In addition, the Department of Health and the Department of Emergency Services were invited to comment through the Department of Environmental Quality.

The document identifies reasonable alternatives and potential environmental impacts for the proposed citing, construction, and operation of three facilities for plutonium disposition. The first is a facility to disassemble and convert pits, a nuclear weapons component, into plutonium oxide suitable for disposition. The preferred sites are Pantex Plant and Savannah River Site (SRS). The second is a facility to immobilize surplus plutonium for disposal in a geologic repository. SRS is the preferred site. The third is a facility to fabricate plutonium oxide into mixed oxide (MOX) fuel. SRS is the preferred site. The EIS also discusses decommissioning and decontamination of the three facilities.

An Agency of the Natural Resources Secretariat

FD308

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
MICHAEL P. MURPHY
PAGE 2 OF 4

Mr. Howard R. Cantor
September 15, 1998
Page Two

The Commonwealth offers the following comments and recommendations:

- None of the facilities are located in Virginia. The Commonwealth's only concern is with shipment of the surplus plutonium through the state. Will this issue be addressed in the final EIS or in a separate document?

- Any transportation of wastes through Virginia should be preceded with advance notification to the Department of Emergency Services, Brian Iverson, at (804) 674-2400 and the affected localities so that adequate safety precautions may be taken. The localities should be notified directly in advance of any notification to the news media. 1

- The Department of Environmental Quality will coordinate the Commonwealth's review and response on the final environmental impact statement for this proposal, if appropriate. Correspondence should be addressed to: Director, Office of Environmental Impact Review, Department of Environmental Quality, P. O. Box 10009, 629 East Main Street, Richmond, Virginia 23240-0009.

Thank you for the opportunity to comment on the DEIS for the proposed activity. The comments of the reviewing agencies are attached for your review and consideration.

Sincerely,

Michael P. Murphy, Director
Division of Environmental
Enhancement

Attachments

cc: Arthur L. Collins, Hampton Roads PDC
Brian Iverson, DES
Kerita L. Kegler, DEQ-TRO

FD308

FD308–1 **Transportation**

After DOE selects an alternative, a transportation plan (in which State, tribal, and local officials in addition to DOE, the carrier, and other Federal agencies would be involved) would be prepared to address the details of implementing the actions analyzed in this SPD EIS, including prenotification of States. The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

DOE reserves the right to consider traversing States in accordance with DOT regulations and route selection criteria. DOE Order 460.2, *Departmental Materials Transportation and Packaging Management*, and 10 CFR 71.97 contain the requirements for notifying States and tribes before shipping waste within or through their jurisdictions.

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

JOE S. FRANK, CHAIRMAN · ROBERT C. CLAUD, SR., VICE-CHAIRMAN · MYLES E. STANDISH, TREASURER
ARTHUR L. COLLINS, EXECUTIVE DIRECTOR/SECRETARY

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AUG 13 1998
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YORK COUNTY
Sheila S. Noll, Chairman
Daniel M. Stuck, County Administrator

August 11, 1998

Mr. Thomas M. Felvey
Environmental Technical Service Administrator
Department of Environmental Quality
629 East Main Street
Richmond, Virginia 23219

Re: Surplus Plutonium Disposition
DEQ #98-061F (ENV:NUKE)

Dear Mr. Felvey:

Pursuant to your request of July 31, 1998, the staff of the Hampton Roads Planning District Commission has reviewed Surplus Plutonium Disposition Draft Environmental Impact Statement.

Based on this review, it appears that the report does not indicate whether any surplus plutonium will be transported using the ports or roads of the Hampton Roads region. We need this issue clarified before we can provide any significant comments on the proposed project. 1

We appreciate the opportunity to review this project. If you have any questions, please do not hesitate to call.

Sincerely,

Arthur L. Collins
Executive Director/Secretary

HRV:fh

HEADQUARTERS • THE REGIONAL BUILDING • 723 WOODLAKE DRIVE • CHESAPEAKE, VIRGINIA 23320 • (757) 420-8300
PENINSULA OFFICE • HARBOUR CENTRE, 2 EATON STREET • SUITE 502 • HAMPTON, VIRGINIA 23669 • (757) 728-2067

FD308

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
MICHAEL P. MURPHY
PAGE 4 OF 4

To: Thomas M. Felvey@OCS@DEQ
Cc:
Bcc:
From: Kerita L. Kegler@VABC1@DEQ
Subject: Environmental Review
Date: Thursday, August 13, 1998 10:33:32 EDT
Attach:
Certify: N
Forwarded by:

Thank you for the clarification. We don't have any comments on the information presented in the study. We, will however, be on the lookout for the citizen calls once the material starts moving thru tidewater.

Thanks again

FD308

ANONYMOUS
PAGE 1 OF 1

I would like to comment that I do not wish that this plutonium dump site be at Hanford, Washington. I don't think that they have proved that they can clean up the mess that they already have out there. Let's do that first and then project to the future. But right now I do not think Hanford is ready is ready for this. 1

PD010

PD010–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

ANONYMOUS
PAGE 1 OF 1

Thank you for the opportunity to comment on the Storage and Disposition of Fissile Material. I would like to go on record stating that action should be conducted at Hanford utilizing the FMEF, Feed Material Examination Facility. I think that any other place in the United States would be a total disregard of the capabilities of the Hanford Site and would result in excessive of costs to do the project. Also all the hype about Hanford is exactly that, it is hype relative to what the anti-nuclear activist are saying. There is no shred of proof in anything that they are saying. And I think that it is incumbent upon the Department of Energy to take a strong stance and to tell them where they can put their opinions. It is about time the Department of Energy stands up, does the right thing rather than the politically correct easy way out. Thank you for your time and again FMEF is the name of the game. 1

PD009

PD009–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities using FMEF at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost and schedule estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

I believe you should select the Hanford Site as the place to bring the stuff. We have had it out here for years. We know how to handle it. We've never had an accident involving a fatality out here in regards to nuclear radiation or any of the material involved. I believe with an existing structure to house the stuff and handle it you will save yourselves a lot of money. Thank you. 1

PD007

PD007–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost and schedule estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

BENTON COUNTY
PAGE 1 OF 2

BENTON COUNTY STATEMENT
U.S. Department of Energy Draft EIS for Plutonium Disposition

We appreciate the opportunity to present the Benton County position on plutonium disposition.

Let me say at the outset that Benton County supports plans to vitrify and dispose of scrap plutonium in a national repository and to dispose of excess plutonium in a commercial reactor using mixed oxide (MOX) fuel. 1

We do however, have serious concerns with the decision-making process and the logic used to arrive at the preferred alternatives outlined in the draft EIS.

1st Point

The decision-making process up to this point has not adequately addressed cost. Using the Fuels and Materials Examination Facility (FMEF) for MOX fuel manufacturing provides substantial savings to the American taxpayer and to the DOE cleanup budget over construction of a new MOX manufacturing facility at Savannah River. Cost savings become even more attractive (over $500 million) when you consider co-locating both fuel fabrication and pit disassembly and conversion. To not fully consider these cost savings and share this information with the public is incompetent at best and intentionally misleading at worst. 2

2nd Point

The notion that the cleanup program at Hanford can't be completed effectively while supporting a fuel fabrication and pit disassembly/conversion is ridiculous! Both the environmental cleanup and plutonium disposition missions close the loop on the Cold War. When viewed from this perspective they are extremely compatible and both missions have local and state support. Washington State Governor Gary Locke has stated in a letter sent earlier this year to Secretary Pena that he would accept a MOX program at Hanford on the condition DOE TPA cleanup commitments are met. We support that position. 3

WAD07

WAD07–1 **Alternatives**

DOE acknowledges the commentor's support for the hybrid approach.

WAD07–2 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at Hanford will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

WAD07–3 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

Conclusion

My comments are short today. Please see the previous meeting record for our detailed comments. What you are hearing today, and what you heard at the last meeting on this subject, is not new. What is baffling is your dogged determination to ignore the facts and proceed on a pre-determined course. This is not responsible governance. It cheats the American taxpayers and it further damages the credibility of the federal government, and the Department of Energy. 4

The EIS should be withdrawn, revised and a new draft issued that gives balanced consideration to all pertinent issues. And in the future, please don't come here and take our comments if you aren't willing to listen to what we have to say. It is a waste of time for all involved parties.

WAD07

WAD07–4 **General SPD EIS and NEPA Process**

No decisions on the siting of the proposed surplus plutonium disposition facilities have been made. DOE analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities. All comments, regardless of how or from whom received, were given equal consideration and responded to. Decisions on the surplus plutonium disposition program will be based on public input, environmental analyses, technical and cost reports, and national policy and nonproliferation considerations.

BRIEHL, SUSAN
PAGE 1 OF 1

Susan Briehl
Holden Village
1100 Step 2
Chelan, WA 98816

Secretary of Energy
U.S. Department of Energy
1000 Independence Ave. S.W.
Washington, D.C. 20585

Dear Sir,

I am truly concerned about the plans to create mixed-oxide fuel to burn in commercial nuclear reactors, especially in the Pacific Northwest. This is dangerous, unwise, and only proliferates nuclear waste. We want to clean up Hanford and protect the Columbia River. 1

More importantly, my Christian faith calls me to tend and help heal the creation of God. Please, let's work together to eliminate all nuclear proliferation.

Sincerely,
Susan Briehl
Susan Briehl

FD338

FD338–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a potential geologic repository built in accordance with the NWPA.

US DOE needs to hear your voice NOW!

1. Should Clean Up be the sole mission at Hanford?
Yes No

2. Should the United States Government maintain its longstanding policy against the use of weapons Plutonium to fuel civilian nuclear reactors?
Yes No

3. Which alternative would you prefer to see the US Department of Energy pursue:
Immobilization (encasement of plutonium in glass-like tombs)
Or
The MOX plan (burning plutonium to fabricate fuel for use in a civilian nuclear reactor)?

4. Should Plutonium, to be used for processing and fabrication of MOX fuel, be imported to the Hanford site along the Columbia River?
Yes No

5. How concerned are you about the transportation of Plutonium through the Northwest?
Not concerned slightly concerned very concerned completely opposed
B. How concerned are you about the transport through the Northwest of fuel containing weapons Plutonium?
Not concerned Slightly concerned Very concerned Completely opposed

6. Should commercial nuclear power plants be allowed to run on MOX fuel containing weapons Plutonium?
Yes No
B. Should they be subsidized with tax dollars to do so?
Yes No

7. Should MOX fuel containing weapons Plutonium be used to restart the FFTF reactor at Hanford to produce Tritium for nuclear bombs?
Yes No

Name Joan Chantler
Address 1009 Snowden
Phone White Salmon WA 98672
509-493-1976

Please return this to:
Hanford Action
25-6 NW 23rd Place #406
Portland, OR 97214
(503) 235-2531

MD289

MD289–1 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD289–2 **Nonproliferation**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

MD289–3 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. DOE has determined that 17 t (19 tons) of the surplus plutonium would be immobilized due to the complexity, timing, and cost that would be involved in purifying those plutonium materials to make them suitable for use in MOX fuel. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not considered a reasonable alternative at this time and is not analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

MD289–4 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD289–5 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by

meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MD289–6 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

CHANTLER, JOAN
PAGE 4 OF 4

Additional Comments:

Recreation, including windsurfing, is becoming our primary economy. A "Nuclear" windsurf is desirable — a nuclear River is not. Please exercise care with our river.

7

MD289

MD289–7 **Water Resources**

As described in Section 4.26.1.2, surface water would not be used in construction and operation of the proposed surplus plutonium disposition facilities at Hanford. Due to the dilution capability of the Columbia River, as well as FMEF's location relative to the Columbia River, there would be no discernible contamination of aquatic biota (fish) or drinking water resulting from the proposed facilities at Hanford, either from minute quantities of air deposition into the river or from any other potential wastewater releases. Therefore, no discernible impacts on the Columbia River would be expected.

Hi, my name is M. B. Condon. I'm leaving a comment for the Surplus Plutonium Draft EIS. This comment is for myself and for Tim Young. Our address is 380 Ilsa Way, Goldendale, Washington, 98620. Our phone number is (509) 773-6991. And I'm going to read a statement we prepared. We tried to fax it into this number according to your message but were not able to get through and we are aware that the deadline is today, September 16. So I'm going to read a long statement in and we're also going to mail it, but I want this included in the public record. We want the following questions, concerns, and assumptions addressed in the Surplus Plutonium Draft EIS.

What classified toxic elements are contained in nuclear warhead pits and how much toxic pollution is going to be created by the separation of those elements from plutonium? Where are the toxic waste products going to be stored and how are they going to be handled? 1

Which specific reactors in the United States are going to be licensed to burn plutonium? How are reactors that were never designed for this fuel going to be tested and certified before allowing plutonium radiation to be generated by them? How are the safety records of commercial reactor operators going to be factored into the decisions to allow them to use plutonium as a reactor fuel? Why should reactors that are scheduled for decommissioning be allowed to continue operating beyond their scheduled life span and then be allowed to utilize a fuel they were never designed to burn? 2

PD062

PD062–1 **Pit Disassembly and Conversion**

A pit is made of plutonium, which consists mainly of the isotope plutonium 239. Pit plutonium can contain trace amounts of a variety of hazardous impurities such as beryllium and lead. These contaminants are expected to remain entrained in the plutonium dioxide material. The very low levels of contaminants do not adversely affect the MOX and immobilization approaches, and inclusion of the polishing step in the MOX facility would remove a good deal of the contaminants. Some pits may also be contaminated with tritium, a radioisotope of hydrogen, which can be removed by heating the pit material in a vacuum furnace to drive off the tritium gas. Another element, which may be present in pit plutonium at low levels, but above trace amounts, is gallium, which is added as an alloying agent. Because high levels of gallium may adversely affect MOX fuel performance, it would be removed during the plutonium polishing process, as discussed in Section 2.4.3.2. The pit conversion process would generate some LLW and TRU waste and a very small amount of mixed LLW and hazardous waste. These wastes include spent filters, used containers and equipment, paper and cloth wipes, protective clothing, shielding, solvents, and cleaning solutions. In general, these wastes contribute to less than 4 percent of the existing wastes at all the candidate sites and would be handled as part of the site waste management practice. A description of waste generation and management is provided in Appendix H.

PD062–2 **MOX Approach**

Although no U.S. commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily accommodate a partial MOX core. Therefore, DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. As a result of this procurement, DOE identified Catawba, McGuire, and North Anna as the reactors proposed to irradiate MOX fuel as part of the proposed action in this SPD EIS. In accordance with a stipulation of its *RFP for MOX Fuel Fabrication and Reactor Irradiation Services*, these are new reactors, that is, reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. The selected team, DCS, would have to apply for a reactor operating license amendment for each individual

reactor before it can use MOX fuel. For this amendment, the licensee would have to demonstrate that all safety, testing, and environmental impacts have been addressed as well as complete the public hearing process. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and the commercial reactors selected to use MOX fuel to ensure adequate margins of safety. Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents.

Specifically, how much radioactive waste will be created by each step of plutonium reprocessing from the removal of plutonium oxide from bomb cores, the creation of MOX fuels, the transportation of all radioactive materials, including the waste products to the generation of electricity and possibly the production of tritium? How much more radioactive waste will be generated by each reactor that will be allowed to operate beyond its decommissioning date compared to amount of radioactive waste created if the reactor were retired on schedule? 3

How are DOE and the commercial reactor operators going to protect the public and the environment from the radioactive hazards posed by the generation of more nuclear waste from the burning of MOX fuels, when both the DOE and commercials operators have no idea of how to protect the public and the environment from the radiation hazards presently posed by the burning of uranium in reactors? 4

What specific transportation means and routes will be used to transport the weapons grade plutonium, MOX fuels, and the resulting nuclear and toxic waste? How will the public be notified so there elected officials can participate in the creation of disaster plans in the case of a mishap? What specific plans are in place for nuclear mishaps along the transportation routes and are they adequate to protect the public, crops, livestock, and the environment from exposure in the case of an accident or intentional destructive act? 5

PD062

PD062–3 **Waste Management**

DOE acknowledges the commentor's concerns regarding waste generation and management. Waste streams that would be generated by the pit conversion, immobilization, and MOX facilities are detailed in the Waste Management sections in Chapter 4 of Volume I and Appendix H. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS. The shipment of waste will be done in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997).

The production of tritium in a commercial light water reactor is being evaluated in a separate DOE EIS, *Final EIS for the Production of Tritium in a Commercial Light Water Reactor* (DOE/EIS-0288, March 1999).

In choosing reactors to use the MOX fuel fabricated under the surplus plutonium disposition program, DOE looked at the criteria of reactor age. DOE chose only reactors whose planned operating life extended through the full life cycle of the surplus plutonium disposition program.

PD062–4 **Human Health Risk**

DOE and NRC are committed to protecting the health and safety of the public. This includes designing, constructing, and operating DOE- and NRC-regulated facilities (e.g., domestic, commercial reactors) in such a way as to continually provide a level of safety and reliability that meets or exceeds established standards. DOE and commercial reactors also have plans and

programs for the safe management and ultimate disposal of their nuclear waste. Section 4.28 addresses the issue of waste generation by those domestic, commercial reactors designated to irradiate MOX fuel.

The remainder of this comment is addressed in response PD062–3.

PD062–5 **Transportation**

DOE anticipates that transportation of plutonium pits, nonpit plutonium, MOX fuel, and HEU (i.e., special nuclear materials) required to disposition surplus plutonium would be done through the DOE Transportation Safeguards Division using SST/SGTs as described in Appendix L.3.2. The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. For emergency response planning, all shipments are coordinated with appropriate law enforcement and public safety agencies. If requested, DOE will assist these officials with response plans, and, if necessary, with resources in accordance with DOE Order 5530.3, *Radiological Assistance Program*. DOE has developed and implemented a Radiological Assistance Program to provide assistance in all types of radiological accidents. Through this coordination and liaison program, DOE offers in-depth briefing at the State level.

The transportation of depleted uranium oxide and waste (i.e., non-special nuclear materials) would be done using commercial carriers. Nuclear material shipments must comply with both NRC and DOT regulatory requirements. Appendix L.3.3 provides details on the transportation of this type of materials and the transportation route selection process. DOT routing regulations require that shipments of radioactive material be transported over a preferred highway network including interstate highways, with preference toward bypasses around cities, and State-designated preferred routes.

The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that will be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http:\\www.doe-md.com.

We, M.B. Condon and Tim Young, are totally opposed to the reprocessing of weapons-grade plutonium into MOX fuel to be burned in commercial nuclear reactors. Furthermore, we believe there should be no taxpayer subsidies to commercial operators to allow them to use MOX fuels in reactors that were never designed to do so and to allow the life of reactors to be extended beyond their scheduled decommissioning date. The DOE and the commercial nuclear industries should not be allowed to initiate any programs that will create more radioactive and toxic wastes when the technology doesn't exist to deactivate and neutralize the waste created over the last 50 years by industry and the Government. We support the isolation and vitrification of weapons-grade plutonium. Although this is an inadequate solution to the radioactive waste problem, it at least offers some assurance that these materials won't find their way into nuclear weapons in the future. 6

Finally, we have no confidence in the DOE's ability to safely and securely transport weapons-grade plutonium and MOX fuel to reactor sites. The public and their elected representatives are totally uninformed and unprepared for any nuclear mishaps that could result. And we don't think that the DOE or the nuclear industry has the will or the resources to adequately prepare the public for the possible dangers that these materials represent to their communities. We are also unwilling to give up any of our rights so that these materials can be moved "securely" through our communities. Thank you and we will be sending our comments through the mail. We would like to be submitted in the public record as we have recorded them on this message of September 16, 1998. Thank you. 7

PD062

PD062–6 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach and support for the immobilization approach to surplus plutonium disposition.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost

estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

PD062–7 **DOE Policy**

It is DOE's policy that plutonium shipments must comply with applicable DOT and NRC regulatory requirements. The highway routing of nuclear material is systematically determined according to DOT regulations 49 CFR 171 through 179 and 49 CFR 397 for commercial shipments. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE–owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions would be expected for any of the surplus plutonium disposition alternatives proposed at the candidate sites. A description of the transportation activities is given in Section 2.4.4. Transportation risks and steps to mitigate the risks are analyzed in Chapter 4 of Volume I and Appendix L.

DAVENPORT, LESLIE C.
PAGE 1 OF 2

Leslie C. Davenport
Senior Engineer, Nuclear Safety (Retired)
1922 Mahan Avenue
Richland, WA 99352-2121

August 20, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
c/o SPD EIS
P.O. Box 23786
Washington, D.C. 20026-3786

Gentlemen:

Please include the following in the record of public comments for the "Surplus Plutonium Disposition Environmental Impact Statement" (SPD EIS). If there are questions, please contact me at my home telephone, (509) 946-4409.

I support the **HYBRID APPROACH** of **ALTERNATIVE 4B** for surplus plutonium disposition. I support the use of 33 metric tons or more to make MOX fuel. I support IMMOBILIZATION of the completely unusable scrap and waste (in CERAMIC form) using the CAN-IN-CANISTER method. However, only the initial 8 metric tons that was declared as surplus (waste, low-purity, nonpit plutonium) not suitable for use in MOX fuel should be immobilized promptly. The remaining 9 metric tons that was later declared surplus/waste should be retained until the MOX fuel fabrication process is operating to see if some of this Pu could be used in producing MOX fuel after all. 1

I agree that HANFORD'S TOP PRIORITY MUST REMAIN ENVIRONMENTAL CLEANUP, but do not believe it has to be Hanford's sole mission!

Alternative 4B involves pit storage at Pantex (both continuing long term for weapons stockpile pits, and short term until surplus pits are converted). The Pit Disassembly and Conversion Facility (PD&CF) should be located at Pantex. This will provide high security for the pits at Pantex until they are reduced to an unclassified geometry, since Pantex already has most of the U.S. inventory of pits. The Fuels and Materials Examination Facility (FMEF) at Hanford should be used for MOX Fuel Fabrication Facility and possibly the Immobilization Facility. The alternative would be immobilization at the High Level Waste Vitrification Facility (HLWVF) to be constructed at Hanford. Hanford is the only DOE site with extensive experience in fabrication, irradiation, and testing of MOX fuel (e.g., MOX fuel for FFTF and other research reactors was fabricated at Hanford).

The FMEF is an existing facility that was designed for plutonium processing, is uncontaminated and hence easy to modify, is built to modern safety standards in DOE's General Design Criteria, is licensable by the NRC, and meets NQA-1 equivalent standards. DOE/MD-0005 (1996) states in part that the FMEF is the "... least cost building option... capital cost savings on the order of $200 million... Well suited to accomplish the MOX fabrication mission." FMEF has 250,000 ft^2 on six levels, in which there is space for glovebox operations, hot cell operations, facility services, radiation control, and offices. FMEF offers proven operable systems with the least cost and schedule risk and is the quickest option to address the Congressional recommendation to rapidly reduce proliferation risk through pit disassembly and MOX fuel fabrication. The National Academy of Sciences evaluated FMEF as the lowest cost, most expeditious, and leading candidate option for MOX fuel fabrication. Further, Hanford already has complete infrastructure and waste handling facilities in place, and will soon have a high-level waste vitrification facility and associated analytical laboratories. 2

Please reconsider the initial decision to locate both the PD&CF and Immobilization Facilities at the Savannah River Site (SRS). Please address timing considerations and honest comparisons to bring existing or new facilities on-line and determine the most expeditious and economical way to proceed in an ACCURATE, POLITICALLY UNBIASED manner. The significant advantages of diversification and utilization of existing resources at Hanford is extremely important, and does not make the mistake of granting one site in the DOE complex all of the new missions.

Sincerely,

Leslie C. Davenport,
Senior Engineer, Nuclear Safety (Retired)
Consultant, Criticality Safety

cc: Senator Slade Gorton, Congressman Doc Hastings

MD123

MD123–1 **Alternatives**

DOE acknowledges the commentor's support of Alternative 4B for surplus plutonium disposition. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. In the *Storage and Disposition PEIS* ROD, DOE committed to immobilizing at least 8 t (9 tons) of surplus, low-purity, nonpit plutonium. Since the ROD was issued, however, DOE has identified that an additional 9 t (10 tons) of low-plutonium-content materials would require additional processing, and would therefore be unsuitable for MOX fuel fabrication due to the complexity, timing, and cost that would be involved in purifying those plutonium materials.

MD123–2 **Alternatives**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium*

Disposition (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

August 14, 1998

The U.S. Department of Energy needs to hear you voice NOW!
What do you think about a new era of nuclear proliferation?

Hanford Action of Oregon will forward this questionnaire to USDOE. Please circle your responses.

1. Should clean-up be the sole mission at Hanford? (Yes) No — my folks taxes made the stuff – now use mine and my kids taxes to clean up the mess. 1
2. Should the United States government maintain its longstanding policy opposing the use of weapons plutonium to fuel civilian nuclear reactors? (Yes) No — What about the Salt talks? Who are we kidding? 2
3. Should commercial nuclear reactors be allowed to run on MOX fuel containing weapons-grade plutonium? Yes (No) — Dumb ideas die hard – Kill this idea. 3
   3a. Should they be subsidized with tax dollars to do so? Yes (No) — Clean up — We should stop subsidizing this insane industry.
4. Which alternative would you prefer to see the U.S. Department of Energy pursue: 4
   Immobilization (encasement of plutonium in glass logs or in cannisters for entombment) — may be too hot to bury
   The MOX plan (processing plutonium into fuel for use in civilian nuclear reactors).
   if we can actually do it, but we should at least try it.
5. How concerned are you about the transportation of plutonium ~~through the Northwest to Hanford~~ anywhere? 5
   Not concerned Slightly Concerned (Very Concerned and Completely opposed)
6. How concerned are you about transporting plutonium MOX fuel ~~through the Northwest to Hanford~~ anywhere? 6
   Not concerned Slightly Concerned (Very Concerned and Completely opposed)
7. Should MOX fuel be used to restart the Fast Flux Text Facility (FFTF), a risky liquid-metal reactor at Hanford, to produce tritium for nuclear bombs? Yes (No) — Never start up the FFTF again.

Name Rochelle Giddings
Address 12211 C St S Tacoma WA 98444-5118
Phone _____ e-mail _____
Please return to Hanford Action of Oregon by September 10, 1998.
Pacco High School Class of 1954 and still waiting for clean up.

Hanford Action of Oregon
25-6 NW 23rd Pl. #406 tel: (503) 235-2924 fax: (503) 736-0097 e-mail: hannie@aol.com

MD276

MD276–1 **DOE Policy**

DOE acknowledges the commentor's view on cleanup of former weapons production sites. Weapons production was necessary for national security in the past, and now cleanup is necessary to provide a better environment for future generations.

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD276–2 **Nonproliferation**

An objective of the arms reduction is to make sure that the weapons materials declared surplus would not be used for weapons again. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this objective. Turning surplus plutonium into highly radioactive spent fuel would make reuse of this plutonium technically difficult, time consuming, and very costly.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

MD276–3 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. Analyses provided in Section 2.18.3 and Chapter 4 of Volume I for the alternatives that include MOX fuel fabrication and irradiation show that potential impacts would likely be minor.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MD276–4 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. DOE has determined that 17 t (19 tons) of the surplus plutonium would be immobilized due to the complexity, timing, and cost that would be involved in purifying those plutonium materials to make them suitable for use in MOX fuel. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not considered a reasonable

alternative at this time and is not analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

Testing is under way to confirm that the immobilized plutonium would meet the performance criteria for disposal in a potential geologic repository pursuant to the NWPA.

MD276–5 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in Fissile Materials Disposition Program SST/SGT Transportation Estimation (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD276–6 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

HANFORD ATOMIC METAL TRADES COUNCIL
KEITH A. SMITH, JR.
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I am concerned that the U S Department of Energy may not give cost the importance it deserves when selecting a site at which Pu pit disassembly will occur and MOX fuel fabrication takes place. The Hanford Atomic Metal Trades Council believes the FMEF at Hanford to be the best location at which to perform pit disassembly and MOX fuel fabrication and should be placed high on the options list for these operations. Siting these operations elsewhere to Hanford would materially add to the taxpayer burden by necessitating the construction of an entire new facilicty in which to perform the the pit disassembly and MOX fuel prouduction. Costs to upgrade Hanford facilities would cost much less. Much more less than to what the DOE now gives credence. That is due to the way the DOE estimates costs, the result of creative perspectives designed to put the best light on the preconceived notions of certain out of touch officials. 1

The Hanford Atomic Metal Trades Council would like to propose an independent review and some cost-benefit analyses of the different Sites which have been or are now lacking in honesty and candor.

The Hanford Atomic Metal Trades Council requests the decision for Siting the MOX fuel program and Pit disassembly operation to be reexamined and the FMEF be given full consideration for implementation in the forseeable future. To fail that and wind up spendiing hundreds of millions of dolllars more than necessary would seem to the Council to result in more reductions in available clean up dollars and put the entire clean up program in jeopardy. 2

WD007

WD007–1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities in FMEF at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

WD007–2 **General SPD EIS and NEPA Process**

DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for the proposed surplus plutonium disposition facilities.

Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

In the interest of saving dollars the Council also offers the represented work force at Hanford as a source of experienced workers and those who are trained to handle fissile material for the MOX fuel and pit disassembly activity. The Council is fully prepared to engage any new employer in a cooperative spirit and to facilitate the movement of experienced and trained workers into new missions with new, private employers, even as we are doing now with Johnson Controls. British Nuclear Fuels, the Vitrification Plant contractor has already expressed and interest in forming a working relationship with the Council and that willingness has been reciprocated.

The lastest edition of the Scientific American contains the report of a study which asserts that an organized work force is sixteen percent above the baseline in efficiency while a non-union work force is eleven percent below the baseline in efficiency. That should clearly place the Hanford Workforce at an advantage for cost effectiveness and thereby free up dollars for clean up. 1

Budget crunch at Hanford has already begun to stretch the existing work force beyond reasonable limits. It has come to the place where in some cases if two people are lost due to vacations or illness, no work can be done. We do not need further cuts and to irresponsibly site the MOX fuel production and pit disassembly somewhere beside Hanford will surely result in fewer dollars for cleanup.

WD007

HANFORD ATOMIC METAL TRADES COUNCIL
KEITH A. SMITH, JR.
PAGE 3 OF 3

The Hanford Atomic Metal Trades Council represents over 2,600 workers on the Site. These are the people who do the work and bear the greatest risk and responsibility on a daily basis, for working with and around nuclear materials of evey type. The U S Department of Energy would not regret siting the disassembly of Pu pits and the manufacture of MOX fuel at the FMEF at Hanford. 1

WD007

Hanford Communities

Richland • Kennewick • Pasco • West Richland • Benton City • Benton County

P.O. Box 190, Richland, WA 9935
Telephone (509) 943-7348 Fax (509) 943-569

October 17, 1997

Honorable Federico Peña
Secretary of Energy
U. S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Re: Use of Hanford Facilities for Plutonium Disposition

Dear Mr. Secretary:

BACKGROUND

We sincerely appreciated the opportunity to meet with you to discuss the Hanford Communities' concerns about environmental cleanup of the Hanford Site and the potential use of Hanford facilities for plutonium disposition. As a former Mayor, you clearly understand our concerns as elected officials, to see the Hanford cleanup proceed in the most expeditious and cost effective manner possible.

In examining the budget projections for 1998 and budget targets for 1999, even in the highest case budget scenarios, funding will fall short of covering the cleanup requirements in our Tri-Party Agreement. In 1999, in addition to environmental cleanup, the Department will also need to begin to take action to meet its responsibilities for tritium production and plutonium disposition. We anticipate that funds from existing programs will be drawn down to cover costs associated with these two new initiatives. We became aware of this situation in meetings we had with staff at the Office of Management and Budget in March. They informed us that no new money would be allocated to the Department of Energy. We believe, therefore, that it is essential for the Department to put political concerns aside and look for the lowest cost alternative, which would be to use existing Hanford facilities to accomplish these new missions. 1

FAST FLUX TEST FACILITY

Hanford's Fast Flux Test Facility is the newest and most sophisticated reactor in the DOE Complex. Recently completed studies indicate that this facility merits serious consideration for the production of tritium to meet the defense needs of the United States. Its potential for producing medical isotopes is of particular importance to the advancement of medical science and the economic stability of our communities. FFTF has historically run on mixed oxide fuel and therefore should additionally be considered for the role it can play in plutonium disposition. 2

WAD04

WAD04–1 **Cost**

Funds are not being taken from DOE's budget for environmental cleanup in order to support surplus plutonium disposition. Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably.

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

WAD04–2 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

HANFORD COMMUNITIES
HONORABLE LARRY HALER
PAGE 2 OF 4

FUELS AND MATERIALS EXAMINATION FACILITY

At our lunch meeting a month ago we discussed the advantages of using the Fuels and Materials Examination Facility (FMEF) located directly adjacent to FFTF for various tasks associated with plutonium disposition. This unique facility was built for the purpose of manufacturing mixed oxide (MOX) fuel for the nation's breeder reactor program. It is the only existing building in the country that can house both plutonium pit disassembly and conversion and mixed oxide fuel manufacturing in the same facility. Colocating these functions in one building will save hundreds of millions of dollars in operting and capital costs. 3

We also indicated to you that we, and others in the DOE Complex, believe there appears to be a strong bias on the part of DOE Headquarters' staff to locate all aspects of plutonium disposition facilities at the Savannah River Site. We have drawn this conclusion for many reasons. Last year, the Department completed a Programmatic Environmental Impact Statement (PEIS) addressing storage and disposition options for weapons useable fissile materials. The local Advisory Committee we appointed to analyze that PEIS, came to the conclusion that decision making criteria were heavily biased to achieve a Savannah River outcome. For your information, we have enclosed the critiques submitted by our communities and comments provided by DOE-Richland regarding the PEIS and the supporting technical summary documents. While extensive analysis is included in the technical documents regarding Savannah River facilities, virtually no consideration is given to facilities at Hanford. We are seeing this same bias surface in the current Environmental Impact Statement process. 4

NOTICE OF INTENT

In March, several of our local elected officials attended an Energy Communities Alliance meeting in Washington, D.C. While there, we discovered that the Department was about to issue a Notice of Intent to proceed with an Environmental Impact Statement designating Savannah River as the preferred alternative site for both plutonium immobilization and mixed oxide fuel fabrication. When we inquired why such a decision had been made prior to a full environmental impact assessment, we were given the following answers:

1. "It will be easier and cheaper to license a new building with the Nuclear Regulatory Commission as opposed to an existing facility." The NRC has not provided such advice to the Department of Energy. 5

2. "There will be strong opposition on the part of environmentalists in the Northwest to plutonium disposition functions occurring at Hanford." We encourage Department staff to look at a letter they received from the Military Production Network in December opposing any consideration of mixed oxide fuel for plutonium disposition anywhere in the country. Most of the organizations are located in the Eastern United States.

WAD04

WAD04–3 **Alternatives**

DOE acknowledges the commentor's support for collocating pit disassembly and conversion and MOX fuel fabrication in FMEF at Hanford. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

WAD04–4 **General SPD EIS and NEPA Process**

For this SPD EIS, DOE carefully obtained comparable data on all of the alternatives, analyzed the data in a consistent manner using well-recognized and accepted procedures, and presented the results in a full and open manner. To properly address this comment, DOE again reviewed the subject critique together with the source material on the Hanford and SRS sites. The review indicated that all information from Hanford and SRS had been evaluated and used in a consistent, unbiased manner.

WAD04–5 **NRC Licensing**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Hanford. An NOI statement on a preferred alternative is not a decision. The DOE statement regarding the potential difficulty of NRC licensing one of a number of facilities collocated in one building was based on DOE's understanding of NRC's regulatory requirements at the time of the Richland scoping hearing. Because a number of attendees at the Richland hearing indicated that there were precedents for NRC licensing collocated facilities, DOE met with NRC to discuss the issue, and included several alternatives (4B, 6B, and 6D) in the SPD Draft EIS that

Additionally, at the EIS Scoping Meeting held in Richland on July 1, 1997, spokesmen for two of the most vocal Hanford stakeholder environmental organizations offered testimony indicating that any plutonium disposition function at Hanford must not have a negative impact on the Hanford cleanup. They did not reject a plutonium disposition role. The combined attendance at the afternoon and evening meetings was over 150 people. The Department received overwhelming testimony in support of plutonium disposition functions being located at Hanford. 5

COST COMPARISONS

During the summer we learned that the Department was not intending to include cost considerations in identifying plutonium disposition sites. We do not know if this decision has been reconsidered. However, the evaluation of capital costs and the operational cost savings of co-locating plutonium disposition tasks would be favorable only to Hanford. By rejecting this increasingly important criteria, advantages of using the Hanford Site are diminished if not eliminated. 6

NRC LICENSING

At the Richland scoping meeting on July 1, 1997, the public was also informed that there would be an NRC licensing problem with co-locating plutonium pit disassembly, plutonium conversion, and MOX fuel assembly in one building. We asked who, in the Nuclear Regulatory Commission, had provided such advice to the Department of Energy and received no response. Our own conversations with NRC indicate that not only has such a decision not been made, but that specific discussions had not begun at that time. 7

SIZE OF FMEF - CO-LOCATION COST ADVANTAGES

We were advised at the scoping meeting that FMEF is not large enough to accommodate these various functions based on an analysis that was done by the National Laboratories. We indicated that nuclear fuel manufacturers, firms who have actually made mixed oxide fuel, have carefully analyzed the layout of the facility and have drawn the conclusion that there is adequate space to accommodate the various functions. This was affirmed as recently as August 1997 when a study team sent by DOE Headquarters visited the facility. A letter submitted by Siemens Power Corporation in July also affirming that the facility has adequate space is enclosed for your information. We are enclosing other documentation about the capabilities of the facility. This material has previously been provided to the Materials Disposition (MD) Office in DOE Headquarters. We keep providing documentation and MD staff keep coming up with new and creative reasons not to accept it. Frankly, this has become extremely frustrating. 8

We recognize that the seniority and political clout of the members of Congress from the State of Washington is not equal to that of members of Congress from the vicinity of the Savannah River Site. However, Congress and the Administration appear fully committed to balancing the budget in the next several years. Based on our conversations with staff at the 9

WAD04

collocate the MOX facility with one of the other proposed facilities in FMEF at Hanford. The decision that all three facilities would not be collocated in FMEF was made not because of potential NRC licensing issues, but rather because there is not enough space in FMEF to accommodate all three facilities. While no specific issues were identified for FMEF, NRC indicated that overall regulation of a collocated facility may be complicated and burdensome, depending on the degree of integration of the MOX facility and other nuclear facilities that would not be regulated by NRC.

WAD04–6 **Cost**

This comment is addressed in response WAD04–3.

WAD04–7 **NRC Licensing**

This comment is addressed in response WAD04–5.

WAD04–8 **NRC Licensing**

Collocation alternatives continue to be considered that involve the use of FMEF at Hanford. Alternatives 2 and 11A include collocating the immobilization and pit conversion facilities; Alternative 4B, the immobilization and MOX facilities; and Alternative 6B, the MOX and pit conversion facilities. The only alternative eliminated for consideration in this SPD EIS was collocating all three proposed surplus plutonium disposition facilities in FMEF based on space requirements. The most current data available shows the size required for each of the three proposed facilities preclude the use of FMEF.

WAD04–9 **Cost**

This comment is addressed in response WAD04–3.

HANFORD COMMUNITIES
HONORABLE LARRY HALER
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Office of Management and Budget, we don't anticipate that any new money will be provided to the Department for plutonium disposition or tritium production. Therefore, the merits of using existing facilities that will save the Department hundreds of millions of dollars in capital and operating costs should not be ignored. 9

LACK OF LOBBYING EFFORTS

Most recently we have been informed that we will not be chosen for a plutonium disposition role at Hanford because we have not been lobbying the Department of Energy as aggressively as Savannah River. I do not beleive that conclusions should be drawn in an Environmental Imapct Statement based on political clout or lobbying efforts in Washington D.C. 10

CONCLUSION

We are simply asking for a fair, balanced evaluation of plutonium disposition alternatives using relevant criteria. Based on what has happened in the last year and our current observations, this is not happening. We believe that a document is being constructed to justify a previously drawn conclusion. If this is the case, it opens the Record of Decision up to legal challenges and accompanying programmatic delays. We stand ready to appeal if it becomes necessary, but hope that such a legal challenge is not required.

We have been informed that last December you indicated to your future staff that you were not happy about the lack of consideration that was given to the role FFTF can play in plutonium disposition and that you would require full, fair evaluation of alternatives in the future. We believe that your personal involvement will be required to be sure that this EIS process involves a full and complete analysis of options. Many studies and reports have been written about the capabilities of FMEF. Jim Mecca and his staff from the Richland Operations Office can easily answer any questions you may have about the facility. 11

We appreciate your attention to this issue and the opportunity to provide information directly to you about the advantages of using Hanford facilities for plutonium disposition.

Sincerely,

Larry Haler
Mayor

Enclosures

WAD04

WAD04–10 **General SPD EIS and NEPA Process**

As discussed in response WAD04–1, DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

WAD04–11 **General SPD EIS and NEPA Process**

Close coordination with the Richland Operations Office was maintained during the preparation of this SPD EIS to ensure that the best possible information was used. Furthermore, personnel from that office participated in detailed reviews and revision of the EIS prior to its approval and release. Liaison with the Richland Operations Office on the disposition of surplus plutonium would continue until such time as all of the surplus plutonium at Hanford had been dispositioned.

TESTIMONY OF
LARRY HALER, CHAIRMAN,
HANFORD COMMUNITIES GOVERNING BOARD

Regarding the Surplus Plutonium Disposition
Draft Environmental Impact statement

I am Richland Mayor Larry Haler, speaking on behalf of the Hanford Communities regarding the draft surplus Plutonium Disposition Environmental Impact Statement.

The "Hanford Communities" is an intergovernmental organization formed by the cities of Richland, Kennewick, Pasco, West Richland, Benton City and Benton County to deal with Hanford related issues that affect our community.

Before I begin, please allow me to express our appreciation to the Department of Energy for holding a Public Hearing in our community. However, I must say that we were very disappointed that the new Director of the Office of Material Disposition did not choose to attend this hearing and hear the views of the people who live in this region. 1

Hanford Communities Position

The five cities and county that comprise the Hanford Communities have done a careful evaluation of the possibility of Hanford playing a role in the disposition of this nation's excess plutonium. We formed an advisory group over two years ago, comprised of 30 people with diverse backgrounds and interests, to study this issue. They divided up into subcommittees to carefully study such topics as transportation, health & safety, MOX fuel & plutonium conversion, reactor burn options, vitrification, socioeconomic issues and national security issues. As a result of their efforts and recommendations, the Hanford Communities collectively and through the unanimous votes of the five city councils and the Benton County Board of Commissioners, have taken the following positions: 2

* We strongly support the reactor burn option as the preferred plutonium disposition alternative.

WAD02

WAD02–1 **General SPD EIS and NEPA Process**

Because of scheduling conflicts, it was not possible for the Director to attend all public hearings. Please be assured, however, that MD will review and consider all public comments made on the SPD Draft EIS regardless of how they were submitted: public hearings, mail, a toll-free telephone or fax line, or the MD Web site.

WAD02–2 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

HANFORD COMMUNITIES GOVERNING BOARD
HONORABLE LARRY HALER
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* We believe Hanford offers the best and most compelling cost and schedule advantage with the least environmental, health and safety and proliferation risks for plutonium processing and mixed oxide fuel assembly. 2

* Not only can mixed oxide fuel be manufactured here at Hanford, it can also be used in our Fast Flux Test Facility and in the reactor owned by the Washington Public Power Supply System. 3

EIS Process

A year ago at the scoping meeting that you held in our city, we asked you to conduct a fair analysis of the facts to determine the best location for plutonium disposition facilities.

We were aware that the Department had a strong bias to locate all of these functions at Savannah River.

We presented strong testimony supported by factual information pointing out the significant cost savings of using the only facility in the country designed and built to manufacture mixed oxide fuel. 4

We pointed out the cost savings of locating two or three Pu disposition functions in one facility. We discussed the fact that MOX fuel has been produced here before and that our workforce has the skills and experience to produce fuel again.

We defined for you the schedule savings of using an existing facility verses designing, permitting and building a new greenfield facility.

Our arguments fell on deaf ears.

The arguments you used to discredit Hanford evolved as they were proven wrong. First you said the Nuclear Regulatory Commission would never license more than one function in one facility. They disagreed. 5

Then you interpreted a letter from our Governor stressing his concern about progress on the Hanford cleanup to say that he would not accept new 6

WAD02

WAD02–3 **MOX RFP**

DOE acknowledges the commentor's support for using MOX fuel in FFTF at Hanford and in the Washington Public Power Supply System reactor. As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. As a result of this procurement process, DOE identified Catawba, McGuire, and North Anna as the reactors proposed to irradiate MOX fuel as part of the proposed action in this SPD EIS. Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents.

WAD02–4 **General SPD EIS and NEPA Process**

The purpose of this SPD EIS is to evaluate the environmental impacts of siting and operating the proposed surplus plutonium disposition facilities at the candidate sites. Although cost will be a factor in the decisionmaking process, this EIS contains environmental impact data and does not address the costs associated with the various alternatives. Because cost issues are beyond the scope of this EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

WAD02–5 **NRC Licensing**

This DOE statement regarding the potential difficulty of NRC licensing facilities collocated in one building was based on DOE's understanding of NRC's regulatory requirements at the time of the Richland scoping hearing. Because a number of attendees at the Richland hearing indicated that there were precedents for NRC licensing collocated facilities, DOE met with NRC to

discuss the issue. As a result, DOE included several alternatives (4B, 6B, and 6D) in the SPD Draft EIS that collocated the MOX facility with one of the other proposed surplus plutonium disposition facilities in FMEF at Hanford. The decision that all three facilities would not be collocated in FMEF was made not because of potential NRC licensing issues, but rather because there is not enough space in FMEF to accommodate all three facilities. While no specific issues were identified for FMEF, NRC indicated that overall regulation of a collocated facility may be complicated and burdensome, depending on the degree of integration of the MOX facility and other nuclear facilities that would not be regulated by NRC.

WAD02–6 **Alternatives**

This comment is addressed in response WAD02–2.

HANFORD COMMUNITIES GOVERNING BOARD
HONORABLE LARRY HALER
PAGE 4 OF 4

missions. This spring he wrote a new letter to the Secretary of Energy to clarify what was clearly his intent in the first letter. 6

You said FMEF was not large enough to accommodate multiple functions. Documents prepared by nuclear fuel manufacturers disagreed. 7

While **understating** Hanford's capabilities and refusing to acknowledge documentation paid for by your own Department, some believe that you have clearly **overstated** capabilities of other sites. 8

Meeting with Secretary Pena

Last September our community officials met with Secretary Pena to discuss several issues of concern to us. At that time we notified him that he could anticipate that this draft EIS would fail to acknowledge the cost and schedule savings that Hanford offers. We told him that there was a clear bias towards Savannah River that could be identified in the technical documents supporting this EIS process. He asked us to document these concerns and provide the information directly to him. We did. 9

We provided him with a notebook of information. Much of the material we cited was prepared by the Department of Energy. We never received the courtesy of a response. I am now submitting this information for the record and I want a response.

Conclusion

The preferred alternatives you have identified will cost U.S. taxpayers hundreds of millions of dollars more than the Hanford alternative. Where do you plan to get this money? Do you plan to take these dollars out of the funds required for environmental cleanup? We are already anticipating a significant shortfall in funding needed in FY 2000 to meet compliance agreements around the country. 10 11

We will take our arguments to the new Secretary of Energy and the new Director of the Office of Fissile Materials Disposition. Perhaps they will bring reason and common sense to this process.

WAD02

WAD02–7 **Alternatives**

Based on all available data, DOE determined that the proposed surplus plutonium disposition facilities can not be located in FMEF because there is not enough space, even if common support functions were shared. See Sections 2.4.1.1, 2.4.2.1, and 2.4.3.1 for design layouts and the amount of space required for each facility is discussed in Section 2.6. Because of space limitations, two facilities would be located in FMEF—in the case of Alternative 2, pit conversion and immobilization. The MOX facility would be located in a new building.

WAD02–8 **Alternatives**

DOE acknowledges the commentor's concern regarding DOE's assessment of Hanford's capabilities relative to the other candidate sites.

WAD02–9 **General SPD EIS and NEPA Process**

For this SPD EIS, DOE carefully obtained comparable data on all of the alternatives, analyzed the data in a consistent manner using well-recognized and accepted procedures, and presented the results in a full and open manner. To properly address this comment, DOE again reviewed the subject notebook together with the source materials provided by the Richland Operations Office. The review indicated that all information from Hanford and SRS had been evaluated and used in a consistent, unbiased manner.

WAD02–10 **Cost**

This comment is addressed in response WAD02–4.

WAD02–11 **DOE Policy**

Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably.

My name is Barry Haus. I am a resident of Richland, WA. I am calling and commenting on your plans for processing spent fuel, specifically the plutonium and processing it into commercial fuel. My comment is that Hanford, the Hanford Site would be more suited for one of the missions which should be, although it is probably not currently planned to reprocess the N Reactor fuel. As I understand, it is probably 1600 tons of spent fuel in the K Reactor basins that needs to be processed, at least handled. I believe if you check into it you will find that approximately 2% of the weight of the fuel is fissile material which would just as well be used for commercial spent fuel, excuse me, new spent, new commercial fuel elements. Anyway you might factor in your thinking that particular problem the 1600 tons of N Reactor fuel that has to be dealt with somehow. Thank you very much. 1

PD011

PD011–1 **DOE Policy**

DOE acknowledges the commentor's support of reprocessing N Reactor spent fuel. However, the U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. Therefore, reprocessing would not be an option for disposing of the N Reactor spent fuel.

HOLTZ, TED
PAGE 1 OF 1

Hello. My name is Ted Holtz and I live along the Columbia River. I built a house there and I would like to express my concerns about (being) directly affected by Hanford not being cleaned up. Express my concerns about how the issue seems to be confounded by corporate interests in creating this MOX uranium or MOX fuel. I think the focus should be on clean up and just cleanup, and proper storage and disposal of the waste and not trying to make a corporate kind of welfare system that will support the failing nuclear industry by creating a sort of taxed corporate welfare system for that industry. So I just want to express that and a household of five and everybody in my household agrees with this statement. Thank you very much. My phone number is (360) 837-3022 if there is any response or questions directed towards me. Thank you very much. Bye. 1

PD035

PD035–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach and to siting the MOX facility at Hanford. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

United States Department of Energy

Comment Form

NAME: (Optional) Leslie Johnson
ADDRESS: 43604 E Shannon Lane
TELEPHONE: (509) 967-3258
E-MAIL: beegbyte@aol.com

Over the years we have spent trillions of taxpayer dollars on making Plutonium. Now is the time for our country to reclaim some of those taxpayer dollars by conversion of surplus Plutonium into MOX. MOX fuel should be burned in commericial reactors so the citizens of this country can receive cheap electricity. After all it is their money. 1

The DOE should avail itself to the use of existing facilities to process excess Plutonium. New facilities are not required. 2

DOE has demonstrated a continual pattern to make decisions based on politics. I implore the DOE to make decisions based on economics and common sense. 3
PLEASE ACT RESPONSIBLY FOR A CHANGE

WAD01

WAD01–1 **MOX Approach**

DOE acknowledges the commentor's support for the MOX approach. The use of MOX fuel in domestic, commercial reactors is not proposed in order to produce electricity. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

WAD01–2 **Alternatives**

DOE evaluated the use of existing facilities and identified potential facilities at Hanford (FMEF) and INEEL. Of the alternatives considered, only Hanford had existing facilities suitable for MOX fuel fabrication. After further evaluation of space requirements, DOE concluded that there is not enough space in FMEF to accommodate all three of the proposed surplus plutonium disposition facilities. Therefore, the alternatives include siting one or two of the three proposed facilities in existing facilities at Hanford, and the pit conversion facility in an existing facility at INEEL.

WAD01–3 **General SPD EIS and NEPA Process**

Siting of the proposed surplus plutonium disposition facilities is not a political decision. Decisions on the surplus plutonium disposition program will be based on technical and cost reports, environmental analyses, national policy and nonproliferation considerations, and public input.

KILBURY, CHARLES D.
PAGE 1 OF 1

Good afternoon, ladies and gentlemen:

I am Charles D. Kilbury, mayor of the city of Pasco, but I am speaking for myself only:

It is hard to justify action taken in the Draft Plutonium Disposition Environmental Impact statement. The Record of Decision for the storage and disposition of Weapons - Usable Fissile Materials Programmatic EIS included the Hanford Project for both plutonium disposition options. And certainly the Fuels and Materials Examination Facility is the best and most efficient production of the "burn" as mixed oxide fuel, and the presence of considerable Plutonium on the Hanford Project makes it much more expedient than transporting in all directions over the far reaches of the United States.

The FMEF is an existing, unused facility that has been evaluated for performing a combination of the disposition activities.

- The FMEF is operationally complete with 120,000 square feet of process space.
- Designed and constructed to NRC reactor standards and is deemed capable of NRC licensing. 1
- Hazardous or radioactive materials have never been used in the FMEF making it easy to install a plutonium disposition mission.
- An FFTF MOX fuel fabrication line was installed, but has never been used.

The evaluation by the Office of Fissile Materials Dispostion indicates that FMEF has sufficient space within the exisiting structure to perform both of the disposition functions (e.g., pit disassembly and MOX Fuel fabrication).

All this can be done cheaper than anywhere else; there is a supply of surplus Plutonium on the Hanford Project, and even reactors to accomplish the burn. It will certainly be difficult to justify not using this magnificant facility built just for this purpose.

WAD05

WAD05–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

US DOE needs to hear your voice NOW!

1. Should Clean Up be the sole mission at Hanford? 1
   Yes No
2. Should the United States Government maintain its longstanding policy against the use of weapons Plutonium to fuel civilian nuclear reactors? 2
   Yes No
3. Which alternative would you prefer to see the US Department of Energy pursue: 3
   Immobilization (encasement of plutonium in glass-like tombs)
   Or
   The MOX plan (burning plutonium to fabricate fuel for use in a civilian nuclear reactor)?
4. Should Plutonium, to be used for processing and fabrication of MOX fuel, be imported to the Hanford site along the Columbia River? 4
   Yes No
5. How concerned are you about the transportation of Plutonium through the Northwest?
   Not concerned slightly concerned very concerned completely opposed
   B. How concerned are you about the transport through the Northwest of fuel containing weapons Plutonium?
   Not concerned Slightly concerned Very concerned Completely opposed
6. Should commercial nuclear power plants be allowed to run on MOX fuel containing weapons Plutonium? 5
   Yes No
   B. Should they be subsidized with tax dollars to do so?
   Yes No
7. Should MOX fuel containing weapons Plutonium be used to restart the FFTF reactor at Hanford to produce Tritium for nuclear bombs? 6
   Yes No

Name IAN & AIKO LOW
Address PO BOX 651
Phone STEVENSON, WA 98648
USA

Please return this to:
Hanford Action
25-6 NW 23rd Place #406
Portland, OR 97214
(503) 235-2531

Let's not make anymore mistakes. Lets clean-up Hanford now without fail!
Aiko & Low & family
we live and recreate in and along the Columbia 7

MD288

MD288–1 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD288–2 **Nonproliferation**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

MD288–3 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest

possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. DOE has determined that 17 t (19 tons) of the surplus plutonium would be immobilized due to the complexity, timing, and cost that would be involved in purifying those plutonium materials to make them suitable for use in MOX fuel. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not considered a reasonable alternative at this time and is not analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

MD288–4 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD288–5 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MD288–6 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

MD288–7 **DOE Policy**

As described in Section 4.26.1.2, surface water would not be used in construction and operation of proposed surplus plutonium disposition facilities at Hanford Due to the dilution capability of the Columbia River, as well as FMEF's location relative to the Columbia River, there would be no discernible contamination of aquatic biota (fish) or drinking water resulting from the proposed facilities at Hanford, either from minute quantities of air deposition into the river or from any other potential wastewater releases. Therefore, no discernible impacts on the Columbia River would be expected.

The remainder of this comment is addressed in response MD288–1.

RESPONCE TO

SPD EIS

BY

CHARLES L. LUMPKIN

Charles L. Lumpkin
603 N. 48th Ave.

FD114

Yakima, wa 98908
Ph.(509)965-8707

August 18,1998

To Whom it may concern;

After reviewing the S.P.D. E.I.S, It is my belief that the decisions to not name Hanford as the primary site for either or both the sites for the MOX Fuels and Immobilization is based solely on POLITICS! It is my opinion that the politicians and D.O.E. department heads that reside in Washington D.C., have once again failed to recognize the true assets of the Hanford Works Area, these being the people and the contributions that they have made to our country over the last fifty years! It is my contention that the bureaucrats in D.C. are afraid to take on the State of Washington, And the Washington Department of Ecology. Since the Honorable Henry M. Jackson passed away, thier have been no new projects at the Hanford Works area related to defense, and all the environmental projects have been delayed or refered to other D.O.E. sites, this political environment has allowed numerous technically advanced projects and facilities to decay to their ruin, F.F.T.F. and F.M.E.F. etc..

To the mater at hand, since F.F.T.F., F.M.E.F. and an already existing D&D work force are already in existence and the vitrification plant slated to be built and on line by the year 2003, I cant understand economically why the Hanford Works wouldn't be the preferred choice site for the MOX Fuels and Immobilization projects. It amazes me that across the river in Oregon a project is on going that poses more danger to the environment and health of people, (Umatilla Army Depot Incinerator Project) than the Hanford works projects now poses, or any future projects will pose! 1

I would like to point out that since 1987, the Hanford works Project has changed its mission from a Department of Defense complex to an Environmental clean-up project, this I believe makes us the leaders in environmental issues and Hanford has a better working knowledge and understanding about environmental issues, I believe that we meet or exceed the other sites in the topics analyzed criteria for the SPD EIS (S.5) pg.S-21 of the summary and should be reconsidered for these projects.

Thank you

Charles L. Lumpkin

FD114

FD114–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

MADISON, JIM
PAGE 1 OF 1

Hello, this is Jim Madison from West Pasco. Of course, I grew up as a kid in Richland and stuff like that and spent most of my life there. I personally see no problem with bringing the material back here to dispose of it or whatever. I don't see any problems with transportation and stuff like this, that some of the worry warts are really concerned about because after all the majority of that material originated here. The biggest majority of it got shipped out OK to wherever it went. And I would assume it could be shipped back here the same way with the same care and accident free manner. So I know that some of the hand wringers are going to be all fluttered and everything else, but I hope you really don't pay too much attention to them because most of them really 1
don't know anything about anything anyway except they do make noises on the media. But practically speaking, its the only place to take it. And you will be foolish to take it somewhere else and then have to stockpile it somewhere and build, reduplicate the money for building a building like in the 400 Area that is equipped to do that plus the lead time to wait for the building to be designed and built. So that would push any disposal process several years down the road. And that I think is probably not the best process, not the best procedure either. So all in all, the only thing that makes any sense is to use what you got where it is, which is here. Thank you.

PD008

PD008–1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

I believe that it would be a travesty to bury this very valuable fuel source. DOE would spend billions to prepare it for storage when it could be processed into fuel for commerical nuclear reactors, benefiting all Americans. Various MOX projects are ready to go and should be used to turn weapons materials into electricity. In concept, this is no different than the demobilization of ships, tanks, and planes into commercial materials after WW2. 1

WD004

WD004–1 **MOX Approach**

DOE acknowledges the commentor's support of the MOX approach. The use of MOX fuel in domestic, commercial reactors is not proposed in order to produce electricity. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

MERRILL, DAVID M.
PAGE 1 OF 1

David M. Merrill
513 Wagon Court
Richland, WA 99352
phone: 509 375-8408
E-mail: david_merrill@nfuel.com
4 August 1998

Dear Sirs

I feel the Plutonium Mixed Oxide Fuel fabrication facility should be located on or near the Hanford site, for the following reasons.

First as a chemist and member of the American Chemical Society I am familiar with the talent and skills of many of my colleges who live in this area. Many of these chemists have had experience working with plutonium, and know the safety and handling procedures for both the chemical hazards and criticality safety issues.

Please consider the talent base from which to draw employees when considering where to locate the MOX facility.

Second as Co-president of the "Citizens Advisory Committee to the Richland School Board" I am familiar with the educational concerns and desires of many of the Richland parents. I have worked with parent volunteers to assure our children are given a good education. In this association I have noticed that many of the parents are very interested in providing their children with mathematical, engineering and scientific skills. We would like to see challenging jobs provided for them here. I see the MOX facility as an opportunity for our children to work in an industry we believe in. 1

Please consider the education base of the future employees when considering where to locate the MOX facility.

Third as a quality control chemist I know how important a dry climate is when working with various hygroscopic materials. I realize all facilities handling plutonium use extensive air conditioning systems, but a dry climate provides a much better starting point for facilities which require large amounts of conditioned air. It makes physical sense to locate the MOX facility in this dry climate area where power is inexpensive. As an Example the Siemen's Power Corporation - Nuclear Division facility requires over $1,000,000/year in electricity to operate. A similar MOX facility here would require close to that same amount, but in the south where electricity is more expensive and air conditioning more severe I would guess you are looking at more than 3 times the cost in electricity. 2

Please consider these types of technical and cost details as you review the location for a new MOX facility.

Sincerely
David M. Merrill
David M. Merrill

WAD22

WAD22–1 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

Although the education base of the community is not a factor in facility siting selection, site workforce expertise and the existence of complementary activities and missions are considered. Decisions on the surplus plutonium disposition program at Hanford will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

WAD22–2 **Cost**

Power requirements at each of the candidate sites were taken into consideration, and it was determined that the sites under consideration had sufficient available capacity to cover the needs of the proposed MOX facility.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

Hello my name is David M. Merrill. I live at 513 Wagon Court, Richland WA 99352. I'm interested in the MOX facility and in the documentation of that MOX facility. I would like to attend the meeting scheduled for tomorrow evening at the Hotel here in Richland. I have some opinions about the plutonium mixed oxide fuel fabrication facility and feel it should be located on or near the Hanford Site for the following reasons: First, as a chemist and member of the American Chemical Society, ACS, I am familiar with the talent and skills of many of my colleagues who live in this area. Many of these chemist have had experience working with plutonium and know the safety in handling procedures for both the chemical hazards and criticality safety issues. Please consider the talent base from which to draw employees when considering where to locate the MOX facility. Second, as co-president of the Citizens Advisory Committee to the Richland School Board, I am familiar with the educational concerns and desires of many of the Richland parents. We love this area and would like to see our children given a broad base education, however, we have a large percentage of parents very interested in providing their children with mathematical, engineering, and scientific skills. We would like to see challenging jobs provided for them here and we see the MOX facility as an opportunity for our children to work in an industry we believe in. Please consider the education base of the future employees when considering where to locate the MOX facility. Third, as a quality control chemist, I know how important a dry climate is when working with various hygroscopic materials. I realize all facilities handling plutonium use extensive air conditioning systems. 1 2

PD006

PD006–1 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

Although the education base of the community is not a factor in facility siting selection, site workforce expertise and the existence of complementary activities and missions are considered. Decisions on the surplus plutonium disposition program at Hanford will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PD006–2 **Cost**

Power requirements at each of the candidate sites were taken into consideration, and it was determined that the sites under consideration had sufficient available capacity to cover the needs of the proposed MOX facility.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MERRILL, DAVID M.
PAGE 2 OF 2

But a dry climate provides a much better starting point for which, for facilities which require large amounts of conditioned air. It makes physical sense to locate MOX facility in this dry climate area where power is less expensive than say down south. As an example, the Seiman's Facility requires over a million dollars per year in electricity to operate. A similar MOX facility here would require close to that same amount. But in the south where electricity is more expensive and air conditioning more severe, I would guess you are looking at three times the cost in electricity. Please consider these types of technical details as a review for location for a new MOX facility. 2

PD006

MERRILL, DAVID M.
PAGE 1 OF 1

United States Department of Energy

Comment Form

NAME: (Optional) David M Merrill
ADDRESS: 513 Wagon Ct
TELEPHONE: (509) 375-8408
E-MAIL: david_merrill@nfuel.com

1) Did you consider converting to oxide at Pantex and using the comercial work force to run the MOX facility at FMEF, and sending immobilization to SRS? 1

2) Is there a potential for much more Pu either from within the US or even offer to convert foreign Pu to MOX. 2

For further information contact:
Department of Energy, Office of Fissile Materials Disposition
Forrestal Building, 1000 Independence Ave., SW, Washington, DC 20585
1-800-820-5116

WAD09

WAD09–1 **Alternatives**

The range of reasonable alternatives analyzed in this SPD EIS were developed using criteria listed in Section 2.3.1. The alternative suggested by the commentor was considered and eliminated because it involves placing the three proposed surplus plutonium disposition facilities at three different sites.

WAD09–2 **DOE Policy**

The end of the Cold War has resulted in unprecedented reductions in nuclear arms in both the United States and Russia. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. Further agreements on disarmament between the two nations may increase the amount of surplus plutonium in the future.

Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

MOORE, VICTOR AND ROBERTA
PAGE 1 OF 1

FROM Victor + Roberta Moore
8149 W. Clearwater Pl.
Kennewick, WA. 99336
8/4/98

Concerning a Draft Environmental Impact statement to expand the Role of Hanford in plutonium Disposition.

After years of inadequate funding to clean up Hanford – Why would Anyone want to expand [redacted] Facilities to accomodate Materials sent from other places? 1

What evidence does anyone have that by getting more processes + more materials, that the old waste Disposal problems will be addressed + funded?

Contaminated Environments should Not be Looking for MORE Contaminates if clean up is a priority.

WAD06

WAD06–1 **Alternatives**

DOE acknowledges the commentor's opposition to the surplus plutonium disposition program at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

August 4, 1998 Public Meeting Comments on
Surplus Plutonium Disposition Draft Environmental Impact Statement

Good Evening. My name is Walt Apley and I am the Deputy Director for Operations at the Pacific Northwest National Laboratory. One of the Laboratory's primary missions is to help apply Hanford Site assets to emerging national and international needs as well as new science-based missions. Given that role, I would like to offer three specific comments on the Surplus Plutonium Disposition Draft Environmental Impact Statement:

(1) Importance of Plutonium Disposition

There are few issues today in the world as important as safely and securely withdrawing plutonium from nuclear military programs and taking steps to ensure that such material can never again be used to build a nuclear weapon. To that end, Pacific Northwest National Laboratory staff are working in a wide range of technical areas, including detection, safe handling, and disposition - both in the United States and internationally. The EIS for Surplus Plutonium Disposition is an extremely important document that we all want to see completed as a sound, technically-defensible basis for moving forward for the timely disposition of this material. 1

(2) Role of Hanford

Currently the Draft EIS states a preference for using the Savannah River Site. Hanford was not selected, with one of the arguments being that DOE prefers that the cleanup mission remain Hanford's top priority. The cleanup mission is and will remain this site's #1 and overriding priority. But Hanford does have major assets (both physical and personnel) which are capable of making major contributions to the surplus plutonium disposition mission. The DOE budget will continue to face significant pressure and since existing facilities such as the Fuels and Materials Examination Facility may be able to do the job sooner and at a lower cost, we must retain the ability to use those resources. 2

(3) Fast Flux Test Facility

Currently the draft EIS states that DOE's preference is to produce MOX fuel and "irradiate in existing, commercial reactors". However, the U.S. - Russian Agreement on Management of Used Plutonium announced at the Gore-Kiriyenko working meeting on July 23-24, 1998 called for using "MOX fuel for nuclear power reactors of various types". Studies have shown that the Fast Flux Test Facility, if dedicated to the mission, could disposition the 33 *t* of surplus weapons plutonium well within the 25 year *Storage and Disposition Final PEIS* criterion using traditional enrichments and a standard core configuration, as well as produce valuable and needed medical isotopes. The FFTF disposition option should be given strong consideration. 3

I'd like to thank the people putting together this draft EIS: I know that it is both a challenge and an ordeal. But it is also critically important to a safe and secure future for all of us. Thank you.

WAD21

WAD21–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's reviews on the importance of this SPD EIS.

WAD21–2 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

WAD21–3 **Alternatives**

DOE acknowledges the commentor's support of using MOX fuel to restart FFTF at Hanford. As discussed in Appendix D of the SPD Draft EIS, DOE did consider FFTF in the Storage and Disposition PEIS, but it was eliminated from further study because it was in a standby status and it could not satisfy the criterion of completing the disposition mission within 25 years using the historic FFTF plutonium enrichment specifications. Further, compared with the 2-3 percent plutonium content of spent fuel from commercial reactors, the spent fuel from FFTF would contain approximately 35 percent plutonium by weight. It is questionable whether this greater concentration of plutonium in the FFTF MOX spent fuel would meet repository acceptance criteria. Also, the FFTF liquid-metal reactor would not produce electricity, whereas using commercial light water reactors to dispose of surplus plutonium would generate revenues from the sale of electricity, which in turn would help defray the overall cost of using the MOX approach. As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source.

PEARSON, CHRISTINE
PAGE 1 OF 4

US DOE needs to hear your voice NOW!

1. Should Clean Up be the sole mission at Hanford? 1
   Yes No

2. Should the United States Government maintain its longstanding policy against the use of weapons Plutonium to fuel civilian nuclear reactors? 2
   Yes No

3. Which alternative would you prefer to see the US Department of Energy pursue: 3
   Immobilization (encasement of plutonium in glass-like tombs) Immobilization !!
   Or
   ~~The MOX plan (burning plutonium to fabricate fuel for use in a civilian nuclear reactor)~~?

4. Should Plutonium, to be used for processing and fabrication of MOX fuel, be imported to the Hanford site along the Columbia River?
   Yes No

5. How concerned are you about the transportation of Plutonium ~~through~~ the Northwest? 4
   Not concerned slightly concerned very concerned completely opposed
   B. How concerned are you about the transport through the Northwest of fuel containing weapons Plutonium?
   Not concerned Slightly concerned Very concerned Completely opposed

6. Should commercial nuclear power plants be allowed to run on MOX fuel containing weapons Plutonium? 5
   Yes No
   B. Should they be subsidized with tax dollars to do so?
   Yes No

7. Should MOX fuel containing weapons Plutonium be used to restart the FFTF reactor at Hanford to produce Tritium for nuclear bombs? 6
   Yes No

Name Christine Pearson
Address #8 Strong Rd.
Phone Trout Lake, Wa. 98650

Please return this to:
Hanford Action
25-6 NW 23rd Place #406
Portland, OR 97214
(503) 235-2531

MD296

MD296–1 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

MD296–2 **Nonproliferation**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

MD296–3 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. DOE has determined that 17 t (19 tons) of the surplus plutonium would be immobilized due to the complexity, timing, and cost that would be involved in purifying those plutonium materials to make them suitable for use in MOX fuel. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not considered a reasonable alternative at this time and is not analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

MD296–4 **Transportation**

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

MD296–5 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MD296–6 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

Additional Comments:

We need to continue to stop the madness of Nuclear proliferation & spend $s on Research on cleaning up waste sites. 7
The Tri cities area is one of the highest incidence areas of Cancer in the Nation. The Hanford being so close to the River is and has created a distribution system for Nuclear leaks & waste products.

More energy needs to be devoted to alternative power sources such as, solar & wind generated power. Also we need more education to help people understand how to use less energy & conserve more energy so there is not as much demand for Nuclear power. 8

MD296

MD296–7 **DOE Policy**

DOE is implementing the President's nonproliferation policy by converting surplus plutonium to forms that cannot be reused in nuclear weapons again. Cleanup of DOE's former weapons production sites including research and development has continued to receive substantial funding allocations from the U.S. Congress every year. Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably.

MD296–8 **DOE Policy**

DOE acknowledges the commentor's support for alternative energy sources. The purpose of the surplus plutonium disposition program is not to provide an alternative source of energy but to disposition plutonium in an environmentally safe and timely manner. Further, DOE acknowledges and supports the importance of public education. DOE has established reading rooms near DOE sites to provide easy access to information about DOE programs and encourages the use of this source of information. DOE has numerous Web sites, including one for MD (http://www.doe-md.com), that also provide up-to-date information about DOE programs. Likewise, a number of utilities also have their own Web sites with educational material.

RICHLAND
PAM BROWN
PAGE 1 OF 1

MEMORANDUM *CITY OF RICHLAND*
City Manager's Office

TO: Brook Anderson

FROM: Pam Brown, Hanford Analyst

SUBJECT: Response to an Invitation From Secretary Peña to Send Him Information about Cost & Schedule Savings of Locating Plutonium Disposition Functions at Hanford and Documentation of a DOE-HQ Bias Towards Savannah River in the Previous Fissile Material EIS

DATE: October 17, 1997

When Secretary Peña visited Hanford, the local elected officials discussed our strong interest in seeing existing Hanford facilities used for plutonium disposition functions. We pointed out the significant time and schedule savings of using existing Hanford facilities that were built to house mixed oxide fuel fabrication, rather that build new facilities at another site.

We explained that in observing the process followed in developing the Fissile Material Environmental Impact Statement (EIS) last year, we believe that there was a clear bias on the part of Materials Disposition Staff towards placing these functions at the Savannah River Site. In the current EIS process, MD staff are discrediting the usefulness of our Fuels & Materials Examination Facility (FMEF) by ignoring and even denying the existence of reports that explain in detail the capabilities of FMEF. 1

Secretary Peña invited us to send him a package of material documenting the capabilities of our Hanford facilities. He also asked that we provide documentation of what we believe is a clear bias by DOE-HQ staff in favor of the Savannah River Site. He asked that we send this package to you so that it would actually get to him.

The documents enclosed have been submitted by our communities, DOE-Richland and the Siemens Power Corporation to the Office of Fissile Materials Disposition over the last year and a half. Due to the large volume of material we are sending, I have tried to highlight the information that is of most concern. If you have any questions about our position or the documents enclosed please call me at 509-943-7348.

WAD16

WAD16–1 **Alternatives**

DOE acknowledges and appreciates the commentor's continued interest in the surplus plutonium disposition program, and support for siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities. The use of FMEF in the surplus plutonium disposition program is considered in this EIS under Alternatives 2, 4, 6, 8, 10, and 11. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

The attachments to the commentor's letter represent comments previously submitted and reviewed by MD, and thus addressed in separate responses at that time.

Gordon J. Rogers
1108 N Road 36
Pasco, WA 99301
Phone/ Fax 509 547-7403

September 16, 1998

Mr. Howard R. Canter
Acting Director
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

Dear Mr. Canter:

I submit the following comments on the Surplus Plutonium Disposition Draft Environmental Impact Statement.

I find the preferred alternatives for the subject EIS to be fatally flawed and completely unacceptable for the following reasons.

- Cost savings from the use of the FMEF at Hanford are not considered.
- The cleanup mission is critical at all the candidate sites. No evidence is given to support the dismissal of Hanford, and the implication is that cleanup at SRS is not equally vital. New missions at a site are accommodated by management actions, and are not an environmental issue.
- There is essentially no difference between the sites in terms of environmental impacts. Therefore, we taxpayers demand that least cost to the government should be the deciding factor. 1
- The transportation impacts are essentially the same if the pit disassembly and conversion and the MOX fuel fabrication are located at the same site. The statement that the FMEF cannot house both function without new construction is not supported by available studies.

The draft EIS is not a balanced and objective assessment and does not provide a legitimate basis for a decision. Instead, it omits comparative costs and makes unjustified assumptions favoring the SRS site. An objective evaluation of comparative costs must be made; and the document 2

MD241

MD241–1 **Alternatives**

DOE acknowledges the commentor's opposition to the announced preference for siting immobilization and MOX facilities at SRS rather than at Hanford. The preferred alternative was chosen based on the best information and analyses available; all sites were equally considered based on this information. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MD241–2 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for proposed surplus plutonium disposition facilities.

ROGERS, GORDON J.
PAGE 2 OF 2

must be extensively revised to have a credible basis for site selection. | 2

I will appreciate receiving a copy of the response to comments and any future documents on this subject.

Sincerely,

Gordon J. Rogers

MD241

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. Cost impacts are addressed in the reports identified in response MD241–1.

United States Department of Energy

Comment Form

AUG 23, 1998

NAME: (Optional) STEVE ROYAL
ADDRESS: PO BOX 4821 VANCOUVER, WA 98662
TELEPHONE: ( )
E-MAIL:
RE: SURPLUS PLUTONIUM DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT
U.S. DOE OFFICE OF FISSILE MATERIAL DISPOSITION

I'm TELLING YOU THIS:

1) I DO NOT WANT NOR NEED A UNITED STATES WHICH IS ENGAGING, DANGEROUSLY, IN THE PROLIFERATION OF NEUCLER (LONG ½ LIVES) MATERIAL WHICH HAS NO ABILITY TO BREAKDOWN & BE ERADICATED AFTER ASSEMBLY.

2) I DO NOT WANT NOR NEED A UNITED STATES WHICH IS ENGAGING & OR APEARS TO BE ENGAGING IN THE COMINGLING OF NEUCLEAR (LONG ½ LIVES) MATERIAL.

3) I DO NOT WANT NOR NEED A UNITED STATES WHICH IS ENGAGING & OR APEARS TO BE ENGAGING IN THE MOVEMENT OF NEUCLEAR (LONG ½ LIVES) MATERIAL ON THE U.S. INTERSTATE ROADS, HIGHWAYS, & COUNTY ROADS; ON U.S. WATERWAYS OR INTERNATIONAL WATERWAYS; ON RAILROAD LINES; OR IN THE AIR TRAFFIC LANES ANYWHERE. 1

4) GET OUT OF THE U.S. MILITARY/MONOPOLY ENERGY/GRADUATE COLLEGE RESEARCH/CORPORATE WELFARE INDUSTRIAL COMPLEX SYNDROM BUSINESS, IN ORDER TO SAVE OUR ONE & ONLY EARTH FROM THE MOST LETHAL POISION KNOWN.

S.R.

FD143

FD143–1 **DOE Policy**

DOE acknowledges the commentor's opposition to nuclear material management. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. This would require the handling and transportation of the surplus plutonium. Transportation of special nuclear materials would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material.

SEYER, SAUL
PAGE 1 OF 1

Saul Seyler
Holden Village
HC00 Stop 2
Chelan, WA 98816

Secretary of Energy;
U.S. Department of Energy
1000 Independence Avenue, SW
Washington D.C. 20585

Dear Secretary:

I'm writing in concern to the burning of MOX Fuels, at sites such as Hanford. This is unacceptable and cannot continue. The preservation of our environment is by far more important than the additional energy that can be gained. It is better to dispose of the stuff now instead of increasing the toxicness of it. Thank you for your understanding in the matter. 1

Sincerely, A concerned voter,

Saul Seyler

FD330

FD330–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. Use of MOX fuel in domestic, commercial reactors is not proposed in order to produce electricity. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. With immobilization or MOX, the material would be disposed of in the same potential geologic repository.

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

STMC Sisu Technical and Management Consulting
Ronald C. Liikala
Page 1 of 3

Re: Comments on the Plutonium Disposition Draft Environmental Impact Statement

I provided oral comments at the meeting in Richland, Washington on the Draft EIS and stated that I would submit my comments in writing, which are on the attached 2 pages.

Ronald C. Liikala
STMC Sisu Technical and Management Consulting
716 Lynnwood Loop
Richland, WA. 99352

FD320

STMC SISU TECHNICAL AND MANAGEMENT CONSULTING
RONALD C. LIIKALA
PAGE 2 OF 3

My three principal concerns about the draft EIS are 1) the alternatives selected for evaluation, 2) omission of a cost-benefit analysis, and 3) the justification for locating the MOX fuel fabrication facility at SRS.

1) The alternatives evaluated omits what appears to me to be a reasonable alternative, namely:
   - Pu Disassembly and Conversion at Pantex;
   - MOX Fuel Fabrication in the FMEF at Hanford;
   - Pu Conversion and Immobilization at SRS.

Section 1502.14 of 40 CFR Chapter V states, "agencies shall rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their being eliminated." 1

The reason why I believe it is reasonable is because it takes advantage of existing infrastructure (i.e., Pit storage at Pantex, the FMEF at Hanford, and the capabilities at SRS for storing and converting nonpit plutonium materials into plutonium dioxide suitable for immobilization coupled along with the immobilization capabilities at SRS. Completion of the existing FMEF for fabricating MOX fuel should cost less than building a new fuel fabrication facility at any of the DOE sites.

2) A cost-benefit analysis was not included in the draft EIS. I question whether the omission of such analysis is in keeping with the letter/spirit of NEPA.

I refer you to the Final Generic Environmental Statement on Use of Recycle Plutonium in Mixed Oxide Fuel in Light Water Cooled Reactors issued by the NRC in August 1976.

In a January 20, 1975 letter to the NRC, the Presidents Council on Environmental Quality expressed the view that, the draft EIS was incomplete because it failed to present a detailed and comprehensive analysis of the environmental impacts of potential diversion of special nuclear materials and of alternative safeguards programs to protect the public from such a threat. The Council believed that such a presentation should be made by the NRC before its final decisions on plutonium recycle. Reflecting on this, the NRC took the position that a cost-benefit analysis of alternative safeguards programs should be prepared and set forth in draft and final environmental impact statements before any Commission is reached in draft and final environmental impact statements. 2

FD320

FD320–1 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities.

As discussed in Section 2.3.1 of the SPD Draft EIS, the range of reasonable alternatives analyzed was developed using equally weighted screening criteria. Over 64 options were evaluated, yielding a range of 23 reasonable alternatives that met all the criteria. Options that involved siting the proposed surplus plutonium disposition facilities at three different sites were eliminated because the goals of minimizing worker and public exposure to radiation, minimizing proliferation concerns associated with transportation, and reducing infrastructure costs would not be met.

FD320–2 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

I believe that the draft EIS is incomplete without including the alternative on Pit Disassembly and Conversion at Pantex, MOX fabrication in FMEF at Hanford and Pu Conversion and Immobilization at SRS and by not including a cost-benefit analysis of alternatives. 2

3) The draft EIS makes mention SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage or existing infrastructure and staff expertise. There was no delineation of in the draft EIS how it compliments existing missions or takes advantage of existing infrastructure and staff expertise. Since the MOX facility will be leased to the contractor and the contractor is responsible for obtaining a license from the Nuclear Regulatory Commission (NRC), I am wondering about why DOE feels its field office and current site contractors will have a significant role in the construction and operation of the MOX facility. For example, here at Hanford, the Washington Power Supply System (WPPSS) leases the site for its plants from DOE and the role of the field operations office is basically limited to site-wide emergency planning. Safety, safeguards and security at the WPPSS site at Hanford are the under the purview of NRC. 3

FD320

FD320–3 **Alternatives**

DOE does not plan for facility site contractors to have a significant role in the construction and operation of the MOX facility. The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

DOE entered into a contract with DCS to construct and operate the MOX facility at one of the four candidate sites evaluated in this SPD EIS. This contract was awarded through a competitive procurement process. Since the MOX facility would use existing site services and infrastructure, the site contractor would be responsible for supporting the construction and operation of the facility to the extent required to ensure availability of those services. The DOE field office would also be involved to a limited extent, in its oversight role for the entire DOE site, and for services such as those identified by the commentor.

SUNDSTROM, GLENN
PAGE 1 OF 1

8/13/98

DEPT. OF ENERGY
Office of Fissile Materials Disposition
P.O. Box 23786
WASHINGTON, D.C. 20026-3786

GENTLEPEOPLE:

I OPPOSE ANY USE OF MOX FUEL IN CIVILIAN OR COMMERCIAL REACTORS IN THE UNITED STATES, AS LONG AS THE LIMIT OF LIABILITY CLAUSE IS INCLUDED IN ANY FEDERAL LEGISLATION SUCH AS THE PRICE ANDERSON ACT.

PUBLIC REACTION WAS DECISIVE IN 1994 WHEN MR. FERGUSON AND HIS "ISSIAH" PROJECT WERE TOLD TO COME BACK TO GRAYS HARBOR WITH THEIR PROPOSAL TO "BURN" PLUTONIUM, AT THE THEN DECOMISSIONED WPPSS #3 AND #5 SITE AT SATSOP, WHEN THEY (COLUMBIA NUCLEAR) HAVE BECOME SUCCESSFUL IN REMOVING THE LIMIT OF LIABILITY CLAUSE IN THE PRICE ANDERSON ACT. 1

EVERY CITY COUNCIL, HOQUIAM, ABERDEEN, MONTESANO, ELMA AND McCLEARY GAVE MR. FERGESON THE SAME MESSAGE. "WHEN YOU THE BONDHOLDERS, STOCKHOLDERS AND CEO'S ASSUME THE LIABILITY LIKE ANY OTHER AMERICAN INDUSTRY, THEN WE WILL WELCOME YOU WITH OPEN ARMS."

SINCERELY, Glenn Sundstrom O.D.
45 E SATSOP RD.
ELMA, WA. 98541

360 482 5720

MD088

MD088–1 **MOX Approach**

DOE acknowledges commentor's opposition to the use of MOX fuel in domestic, commercial reactors.

TEAL, JOSEPH
PAGE 1 OF 2

United States Department of Energy

TO: OFFICE OF FISSILE MATERIALS DISPOSITION
@ fax 1-800-820-5156

Comment Form

Page 1

NAME: (Optional) Joseph Teal
ADDRESS: 86103 N. YAKIMA RIVER DRIVE ; WEST RICHLAND, WA. 99353
TELEPHONE: (–) —
E-MAIL: —

COMMENTS ON THE DRAFT SURPLUS PLUTONIUM DISPOSITION ENVIRONMENTAL IMPACT STATEMENT

These comments document my amazement at and protest of the recent decision to construct new facilities for pit disassembly and mixed-oxide fuel fabrication at Pantex and Savannah River rather than take advantage of existing facilities. The justifications for construction of new facilities that were presented in the PEIS, particularly the cost estimates and transportation issues, are so notably wrong as to display departure from sound judgment and common sense. Careful review of the analyses in these two areas may reveal a contrived backfit to justify a predetermined decision. It is requested that an unbiased independent review of these two justifications be performed by an agency such as the OMB.

Over the past 20 or so years, the U.S. Department of Energy has launched projects involving approximately one hundred new major facilities. Of these, perhaps twenty-five have actually been started, a dozen have been completed, and of the twelve, over half have either failed to perform due to technical inadequacies or have never been used due to program direction change. Notable examples of plans and/or intentions gone awry include the 371/374 buildings at Rocky Flats, the PC-41 Storage Vault at Los Alamos, the Fuels and Materials Examination Facility (FMEF) at Hanford, the Fuel Processing Facility at INEEL, the New Special Recovery Facility at SRS, etc. It is hoped that DOE does not repeat or continue this cycle. 1

(continued on page 2 →)

FD301

FD301–1 **Cost**

DOE acknowledges the commentor's support for involving existing facilities such as FMEF at Hanford to disposition surplus plutonium. However, according to a technical review of available facilities and an independent cost study, constructing new facilities is the option involving the least risk and the best use of DOE's limited resources. Frequently it is more expensive to try to retrofit for a particular mission a building that was originally designed for another mission. While it is true that FMEF was originally designed to produce MOX fuel for FFTF, it was not designed to accommodate a pit conversion facility as well. Space requirements would make it extremely difficult to use the facility for two missions.

Location of the MOX facility in FMEF by itself was never considered because locating a single proposed facility at three different sites would not meet the screening criteria of minimizing worker and public exposure to radiation, minimizing proliferation concerns associated with transportation, and reducing infrastructure costs.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

TEAL, JOSEPH
PAGE 2 OF 2

United States Department of Energy

Comment Form
Page 2

NAME: (Optional) Joseph Teal
ADDRESS: —
TELEPHONE: (–) —
E-MAIL: —

These major facility acquisition efforts have averaged expenditures in the range of one-half billion dollars per year for the last twenty years.

How comes another acquisition program to build all-new facilities for disassembly of weapons pits, fabrication of mixed-oxide fuel, and storage of plutonium. 1

DOE's failure to make use of existing facilities, particularly the FMEF at Hanford, for this work displays egregious disregard and departure from common sense and sound conduct of business.

Additionally, the DOE arbitrarily refused to consider and analyze the use of the WNP-1 Support Building for this work. This facility, in combination with the FMEF offers an abundance of readily available, clean, hardened, NRC licensable space that eliminates the need for any new construction and thus poses very substantial cost savings with no environmental impacts. 2

CC: ATTENTION: DOC HASTINGS
@fax 1-202 225-3251 [redacted]

FD301

FD301–2 **Alternatives**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

TRI-CITY INDUSTRIAL DEVELOPMENT COUNCIL
PAGE 1 OF 6

TRIDEC TRI-CITY INDUSTRIAL DEVELOPMENT COUNCIL

901 N. Colorado, Kennewick, WA 99336-7685 USA 1-800-TRI-CITY 509-735-1000 509-735-6609 fax tridec@owt.com www.owt.com/tride

STATEMENT REGARDING THE
DEPARTMENT OF ENERGY'S DRAFT
ENVIRONMENTAL IMPACT STATEMENT
FOR
SURPLUS PLUTONIUM DISPOSITION
RICHLAND, WASHINGTON
AUGUST 4, 1998

Thank you for the opportunity to present the views of our organization on this issue, which is of great importance to the Tri-City area. The Tri-City Industrial Development Council (TRIDEC) is a local non-profit organization whose interests are in the economic development and vitality of this area. Our membership is composed of over 500 local business firms, individuals and organizations having a commitment to the Tri-City area.

As we have indicated in previous statements and testimony on this subject, we support the plans to vitrify and dispose of the scrap plutonium containing materials in a national repository. We also support the Department's plans to dispose of the excess plutonium by irradiation in a commercial power reactor through the use of a mixed oxide fuel (MOX). 1

However, we have substantial and significant concerns with the adequacy, objectivity, and balance evident in the Draft EIS that we are commenting on tonight. This document as written is so faulted that it should be withdrawn and extensively revised to reflect a comprehensive and balanced assessment of the siting alternatives for the plutonium disposal program in accordance with NEPA program requirements. The document as written does not provide such an assessment. I will illustrate some of our concerns in this regard. 2

- Scrap Plutonium Immobilization Facility

The draft EIS states that a selection of Savannah River as the site for this facility was made in 1997 in the NOI for this EIS. This selection decision was made in effect without the performance of EIS evaluations. A review of the site impacts contained in this Draft EIS does not show any significant difference between the sites from the construction of new immobilization facilities. Consideration was not given in this Draft EIS to the construction of new plutonium storage facilities at Savannah River to support the scrap disposal program. 3

It is recognized that Savannah River currently has a waste vitrification facility, the DWPF, in operation, which would be utilized to encase the solidified plutonium disposal capsules. 4

1

WAD18

WAD18–1 **Alternatives**

DOE acknowledges commentors' support for the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself.

WAD18–2 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities.

WAD18–3 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). In accordance with CEQ Section 1502.14(e), DOE identified its preferred alternative in the SPD Draft EIS so the public could understand DOE's orientation and provide comment. Prior to the SPD Draft EIS being published, DOE indicated using the can-in-canister technology at SRS would be part of DOE's preferred alternative for immobilization. Although SRS has been identified as the preferred site for the immobilization facility, this is only DOE's preference; it is not a decision. Decisions on the surplus plutonium disposition program at INEEL will be based on public input, environmental analyses, technical and cost reports, and national policy and nonproliferation considerations. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

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Hanford is in the process of awarding contracts for the construction of a waste vitrification facility for the processing of its tank wastes, which could perform this same function. 4

The comparative environmental impacts at the two sites for the new facilities were essentially equal. The additional cost for new plutonium storage facilities at Savannah River were apparently not a factor in this evaluation. 5

- MOX Fuel Fabrication Facility

The decision to locate this facility at Savannah River in preference to Hanford is based upon the administrative decision that this program would complement other Savannah River site missions and utilize existing site infrastructure and site expertise. Since DOE is currently soliciting proposals from vendors for the installation and operation of the MOX process in DOE provided facilities, this logic is questionable to say the least since Savannah River has not had previous experience with either MOX fuels or commercial reactor fuel development or manufacturing. 6

Another example of the lack of objectivity in this report is the utilization of a commercial $UF_6 - UO_2$ commercial facilities located in North Carolina in the evaluations of Hanford. Commercial facilities, which are located in Richland, should have been utilized in the Hanford evaluations to provide a balanced perspective. 7

The most significant issue; however, is the lack of a cost comparison between utilization of the existing Fuels and Materials Examination Facility (FMEF) at Hanford and the construction of a new MOX manufacturing facility at Savannah River. In a time of limited DOE budget the added costs for new unnecessary facilities can only reduce the already constrained Environmental Management cleanup program funding. We understand that DOE has studies available, which identify the potential cost savings available from the siting of this facility in the FMEF. These studies should be available for public review, rather than not addressing this issue in the Draft EIS. 8

A final issue is the rationale that the Hanford cleanup program is critical and should not be distracted by new programs at Hanford. Savannah River has a critical cleanup program underway which is of approximately the same yearly size as the Hanford program. What we are really addressing in this case is management effectiveness and available EM program funding. 9

The Governor of the State of Washington, Gary Locke, has stated in a letter to Secretary Peña that he would accept a MOX program at Hanford so long as DOE cleanup program commitments under the TPA are met. (Copy attached for entry into hearing record.)

WAD18

WAD18–4 **Alternatives**

For immobilization alternatives, modification of FMEF at Hanford was considered, with construction of new immobilization facilities considered only at SRS. In addition, this SPD EIS analyses assume that either the SRS DWPF or the Hanford HLWVF would be available to support canister-filling immobilization operations associated with the surplus plutonium disposition program. DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared.

WAD18–5 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

WAD18–6 **Alternatives**

The preferred alternative for siting the MOX facility at SRS was chosen based on the best information and analyses available; all sites were equally considered based on this information.

WAD18–7 **MOX Approach**

Depleted uranium dioxide is required for the ceramic immobilization of plutonium, and can be used for the fabrication of MOX fuel. It could be produced at a commercial site by the conversion of uranium hexafluoride shipped from one of DOE's storage areas at a gaseous diffusion plant in Kentucky, Ohio, or Tennessee. The GE Nuclear facility in Wilmington, North Carolina was used for the purpose of determining the potential environmental impacts of the conversion of uranium hexafluoride to uranium dioxide as part of the surplus plutonium disposition program (see Section 1.5). Results of the environmental analysis indicate that the radiological risks of shipping either depleted uranium hexafluoride or depleted uranium dioxide would likely be minor, and would contribute little to the total risk of any alternative. The decision on the source of uranium dioxide will depend on DCS, the team selected by DOE to provide the MOX fuel fabrication and irradiation services.

WAD18–8 **Cost**

Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. The remainder of this comment is addressed in response WAD18–5.

WAD18–9 **Alternatives**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

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- Pit Disassembly and Conversion

  Hanford was again not considered for this portion of the plutonium disposition program on the bases of site cleanup and transportation issues. We have addressed the site cleanup program issue above. 9

  In regards to transportation, the Draft EIS displays an unusual display of creative but fallacious logic in regards to transportation. By making the decision to site the MOX facility at Savannah River, the location of the Pit facility at Hanford would entail an extra transportation step to move the pits from storage at Pantex to Hanford for disassembly and conversion and then to Savannah River for MOX fuel manufacturing. This ignores the more logical and economical approach of co-locating both the MOX fuel manufacturing and pit conversion facilities in the FMEF at Hanford. This dual utilization of both processes at Hanford would provide capital cost savings of over $500M. This potential cost savings cannot be ignored. The current Draft EIS does not address the cost issue. We understand that there is adequate space available in the FMEF for both of these process facilities with appropriate separation to meet anticipated security and safeguards requirements. 10

We wish to make the following general statements in regards to this Draft EIS.

- The draft EIS statement does not address the comparative costs of the preferred alternatives. By eliminating this analysis the capital cost savings, which could be realized by use of the Fuels and Materials Examination Facility (FMEF) at Hanford for the pit conversion and MOX fuel manufacturing operations, have been ignored. Previous studies have identified these savings at over $500 M in capital cost alone. 11
- In considering inter-site transportation issues the EIS identifies an additional 2300 truck shipments which would be required over the 15 year estimated life of the program for location of the plutonium disposition facilities at Hanford. The comparable number of shipments to the Savannah River site is estimated at 2500 over the same 15-year program life. This leads to the conclusion that with both the new MOX and pit conversion facilities located at one site there are no differences between the sites. 12
- The draft EIS analyses a number of environmental issues for each of the four sites, Hanford, Savannah River, INEEL, and Pantex. Although there are some differences between the sites for the various environmental impacts considered, these differences are not significant and no site is clearly less or more acceptable than the others from an environmental standpoint. 13
- In the case of Hanford, the report assumes that a new spent MOX facility will be required to be constructed adjacent to the FMEF, with the pit conversion process installed in the FMEF. Previous Hanford studies have shown that both of these operations can be accommodated within the FMEF with an adequate degree of security and process isolation provided. 14
- Based upon current congressional budget policies the total DOE budget will be held essentially flat or decreasing for the foreseeable future. In order to accommodate potentially expensive programs such as the plutonium disposition and tritium production programs, it is 8

WAD18

WAD18–10 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion and MOX facilities using FMEF at Hanford. Of all the alternatives analyzed in this SPD EIS, none include siting the pit conversion facility at Hanford and the MOX facility at SRS.

The remainder of this comment is addressed in response WAD18–5.

WAD18–11 **Cost**

This comment is addressed in response WAD18–5.

WAD18–12 **Transportation**

DOE recognizes that there is not a significant difference in the number of intersite truck shipments if all of the proposed surplus plutonium disposition facilities were located at one site, either Hanford or SRS. However, there are larger differences, but still not significant, between some of the other alternatives analyzed in this SPD EIS.

WAD18–13 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's position on the lack of significant differences in the environmental impacts of the alternatives reflected in this SPD EIS. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), analyzes the cost and schedule estimates for each alternative, and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), covers recent life-cycle cost analyses associated with the preferred alternative. These reports, along with the SPD EIS and other relevant documents, will be available to the decisionmaker and the public. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

WAD18–14 **Alternatives**

DOE agrees that both the pit conversion and MOX facilities could be collocated in FMEF at Hanford, and has analyzed this scenario as Alternative 6B (see Sections 2.10.2 and 4.11). Also analyzed, as Alternative 6A, is a scenario that involves siting the pit conversion facility in FMEF and the MOX facility in new construction adjacent to FMEF.

expected that the Environmental Management budget, which is a major portion of the total DOE budget will be utilized in part for the required funding for these programs. Reductions in the EM budget will impact Hanford cleanup programs, which are already underfunded. Therefore, we do not see how the issue added program costs for the plutonium disposition program can be ignored in an environmental assessment of the plutonium disposition program. 8

- There are a number of other issues in the Draft EIS where assumptions have been made which are clearly prejudicial to a balanced and objective evaluation of the alternatives. In the case of the supporting depleted uranium UF_6 to UO_2 conversion process it would be located in North Carolina at an existing commercial facility due to its proximity to Savannah River. A similar facility located at the Siemens plant in Richland was not considered in the Hanford or INEEL evaluations. 7

- The rationale for focusing on Savannah River or Pantex for the proposed facilities was based upon the need for DOE management to focus on cleanup program issues at Hanford and INEEL. This is an issue of requiring effective site management performance at these sites, which should not be an issue in selecting a site based upon the EIS process. Governor Locke supports Hanford for this mission. 9

This Draft EIS must be revised to give balanced consideration to the following issues:

- Potential cost savings resulting from the use of the FMEF at Hanford must be considered. The EIS is not credible without consideration of this issue. 11

- The avoidance of new program assignments to Hanford in order to avoid the diversion of effort from the cleanup program is a management issue – not an environmental assessment issue. 9

- There is no essential difference between the environmental impacts between the sites; therefore, the least cost for the program is an environmental issue. 13

- The data in the draft EIS clearly shows that actual transportation impacts between sites are not significant. 12

- The document as written clearly does not provide a basis for a selection decision between sites. Only by omitting comparative costs and making assumptions favoring a specific site can the preferred site conclusion contained in the draft assessment be supported. 11

- The draft EIS is not a balanced and objective assessment. It must be extensively revised to reflect an objective evaluation for it to be acceptable and without challenge. 2

- An objective evaluation of comparative plutonium disposal program costs including facility comparisons must be made. Current DOE studies and documentation regarding these costs must be made available for public review. 8

WAD18

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The Draft EIS as written does not comply with the legal requirements of the National Environmental Policy Act for a balanced evaluation of all feasible alternatives. This document could be the subject of litigation if it is not withdrawn and ~~reviewed~~ revised to comply in all respects with the National Environmental Policy Act. 2

WAD18

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SAM VOLPENTEST
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TRIDEC TRI-CITY INDUSTRIAL DEVELOPMENT COUNCIL

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September 15, 1998

Mr. Howard Canter, Acting Director
Office of Fissle Materials Disposition
U.S. Department of Energy
PO Box 23786
Washington, D.C. 20026-3786

Surplus Plutonium Disposition
Draft Environmental Impact Statement

During the August 4, 1998 public meeting in Richland, Washington we submitted a statement regarding the subject EIS. In this statement we identified a number of issues with the EIS related to siting this program at Hanford which resulted from erroneous costing data faulty logic and unsupported assumptions contained in the draft EIS. Specifically we were astonished at the cost estimates contained in the EIS, which did not identify the savings which would result from use of the FMEF at Hanford for the plutonium disposition program. 1

The purpose of the Environmental Impact Statement process is to provide an objective, balanced, and defensible evaluation of all viable alternatives to the proposed governmental action. Environmental Impact Statements that are severely flawed and which do not meet the criteria for the evaluation of feasible alternatives, are subject to legal challenges and significant programmatic delays. This EIS and its supporting documentation such as DOE/MO-0009 Rev.0 "Cost Analysis in Support of Site Selection for Surplus Weapons Usable Plutonium Disposition" does not meet any criteria for an objective evaluation of reasonable program alternatives. 2

This document has a publication date of July 22, 1998, yet it was not made available for public review and comment prior to the August 4 hearing in Richland. It has not been widely made available to the public since that date. Perhaps due to the erroneous and faulty analysis contained in this document your office has been reluctant to have it reviewed and commented on by the public. 3

We have worked with local firms and individuals who are knowledgeable regarding the FMEF in the review of the cost data contained in your documentation. These reviews indicated that the cost estimates for surplus plutonium disposition alternatives are biased against the Fuels and Materials Examination Facility at Hanford. Because of this estimates are of limited value for comparing costs of different alternatives. 4

MD326

MD326–1 **Cost Report**

Neither the SPD Draft EIS nor the SPD Final EIS contain cost estimates. It is assumed the cost estimates referred to were observed in the associated cost analysis report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998). This comment has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. The information presented in the cost report was based on the best information available from the candidate sites at the time it was published. DOE continues to gather information on the costs associated with constructing the proposed surplus plutonium disposition facilities and has prepared the life-cycle costs document to address changes in the expected costs as well as respond to public comment.

Responses to the issues identified in the August 4, 1998, statement can be found under the comment identification code WAD18.

MD326–2 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities. Use of FMEF in the surplus plutonium disposition program is considered in this SPD EIS under Alternatives 2, 4, 6, 8, 10, and 11. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

TRI-CITY INDUSTRIAL DEVELOPMENT COUNCIL
SAM VOLENTEST
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Our analysis of your documentation indicates that installing a MOX line in the FMEF would save just $40 million compared to building a new, stand-alone facility. It is not reasonable that using an existing facility would save less than 10% of total Design and Construction Costs (estimated at $530 million for a new, stand-alone facility).

Examination of the engineering documents from which these figures were derived indicates that Total Estimated Cost (TEC) for Design and Construction of MOX at Hanford is $410 M for a new facility and $340 M for the FMEF. This is less than a 20% reduction for avoiding the construction of a 140,000 S.F. earthquake and tornado resistant, Category 1 facility.

Detailed analysis of the estimates reveals that they are based upon erroneous assumptions. For example, both estimates assume a completely new HVAC system is required for the FMEF at a cost of $36 M. This may be reasonable for a new facility but is not applicable to FMEF, which already has a complete HVAC system for a MOX line.

The cost of upgrading the FMEF is estimated to be 65% of the cost of a new facility. This is not reasonable with the FMEF costs significantly overstated. Previous detailed cost estimates prepared at Hanford indicate that $24 M is required to modify the FMEF to accommodate MOX program including $9 M in security upgrades.

The cost estimate for the FMEF alternative also includes $38 M for support equipment and facilities that are not needed. All of the required capabilities already exist for the FMEF alternative. Subtracting these costs from the FMEF estimate and substituting in the Hanford estimate for building modifications reduces the TEC for the FMEF alternative to about $250 M or about 60% of the cost of a new facility. 4

However, an independent estimate done at Hanford shows that the MOX process can be installed in the FMEF for about $160 M. This represents savings of $250 M compared to the estimates for a new, stand-alone facility. This estimate was prepared by staff knowledgeable of the facility and was based on detailed equipment lists and glove box layouts. It was prepared and reviewed by experienced estimators.

It is clear that using the FMEF would be substantially cheaper than building a new facility. There are also technical and programmatic risks involved with starting a new major systems acquisition (MSA) in the current federal budget situation. The contingency will be higher for a new facility than for an existing facility. The configuration of the FMEF is well defined and the available space is more than adequate.

The FMEF alternative can be implemented on a shorter schedule than the construction of a new facility. The design and construction of a new facility increases the risk of schedule delays and budget cuts that slow progress and add to the overall life-cycle costs. The FMEF alternative has the unrecognized benefit of being able to proceed immediately and the possibility of accelerating the schedule rather than delaying it.

Finally, in order to understand the best possible benefit to DOE and the taxpayers, it would be appropriate to allow the commercial fuel fabricators to provide their input regarding the

2

MD326

MD326–3 **Cost Report**

The cost analysis report and the life-cycle cost document are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. The cost analysis report was posted on the Internet for public review shortly after its release.

MD326–4 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team.

preferred option for a MOX fuel fabrication facility owned by DOE, but operated by the private sector. Economic factors clearly favor utilizing and existing facility and the private sector is best equipped to advise DOE on the relative cost advantages of using the FMEF. 4

Based on these identified deficiencies and erroneous conclusions in the EIS and its supporting documentation we recommend that the documents be withdrawn and rewritten to provide a factual, balanced, and objective evaluation of the program alternatives including utilization of the FMEF for both the pit disassembly and conversion process and the MOX fuel fabrication. 2

These actions on your part will avoid the potential programmatic delays resulting from potential stakeholder legal action and congressional inquiries.

Thank you for your consideration of these comments.

Very truly yours,

Sam Volpentest

Sam Volpentest
Executive Vice President

C: Secretary Richardson
Senator Slade Gorton
Senator Patty Murray
Congressman Doc Hastings
Congressman Norm Dicks

MD326

VENETZ, TED
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Public Comment to DOE's Materials Disposition EIS
Richland Public Meeting, August 4, 1998

I disagree with the statement that siting the MOX fuel fabrication facility at Hanford would interfere with the cleanup mission. I believe it would in fact complement it. For example:

> A continuing federal interest in the site, such as future site use for material Disposition Activities, is a definitive way to ensure a continued commitment to site cleanup. 1

> A new Materials Disposition mission would share some of the overhead and infrastructure costs for the site, freeing more of the site cleanup budget and resources for actual cleanup work.

> Use of the Hanford site FMEF facility would save hundred of millions of taxpayer dollars over the alternatives that involve construction of new facilities. As Congress appears unwilling to increase the overall DOE budget, this money would likely come out of existing budget at the expense of cleanup programs, including those at Hanford. 2

Ted Venetz
1101 So Irby
Kennewick, WA

WAD23

WAD23–1 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

WAD23–2 **Cost**

Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

WA MFG. SERVICES, WSU-TRICITIES
WILLIAM T. SELLERS
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I oppose the MOX facility at the Hanford Site for the folowing reasons:

1. Politically impossible to get approval in PacNW, the delays & ill-will would threaten the DOE itself.

2.Other than WPPSS who would burn the fuel? Transport out of here would be impossible 1

3. Other states (TX or SC) actually want the project, and have powerplants close by to burn it.

4. This dilutes the basic mission at the Hanford Site, which should be to "clean it up and shut it down", period.

WD005

WD005–1 **Alternatives**

DOE acknowledges the commentor's opposition to siting the MOX facility at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

WASHINGTON, OFFICE OF THE GOVERNOR
HONORABLE GARY LOCKE
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COPY

GARY LOCKE
Governor

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April 30, 1998

The Honorable Federico Peña, Secretary
U.S. Department of Energy
1000 Independence Avenue SW
Washington, D.C. 20585

Dear Secretary Peña:

This letter is a follow-up to our discussions earlier this year regarding Hanford.

Department of Energy (Department) compliance with the cleanup program commitments contained in the Tri-Party Agreement (TPA) is of overriding concern to the citizens of Washington state. As I have previously stated, the Department must demonstrate a commitment to the achievement of the TPA milestones and cleanup goals before we can support new programs at Hanford. In particular, effective progress must be made in the removal of spent fuel from the K-Reactor basins and treatment of the tank wastes. Washington State needs the Department to advocate strongly for budgets which will move us ahead in these areas and we need to see substantive progress in these areas this year. 1

I recognize Hanford is potentially a valuable asset for the Department of Energy. The Hanford site can continue to make a contribution, providing that new programs not interfere with the Department's cleanup responsibilities. Just as Hanford fulfilled a critical role for the nation during World War II and the Cold War, we know it could contribute toward international disarmament regarding plutonium disposition. I have also indicated my support for the medical isotope mission for the Fast Flux Test Facility, recognizing tritium production would serve as an interim bridge to meet this goal. 2

In looking ahead at these issues, it would be very helpful to see how the Department proposes to allocate new missions across its facilities nationwide. Washington has served as one of the nation's principal facilities for production of nuclear weapons, an activity that has left us with two-thirds of the Department's high level radioactive waste and seventy-five percent of its spent nuclear fuel. Washington is willing to do its share, but there must be a fully shared responsibility in this regard with other facilities across the country. 3

I look forward to working with the Department of Energy on these issues in the future.

Sincerely,

Gary Locke
Governor

WAD19

WAD19–1 **DOE Policy**

DOE acknowledges the Governor's concern that Tri-Party Agreement commitments be met before new programs at Hanford be initiated. As stated in Chapter 5, it is DOE's policy to conduct its operations in an environmentally safe manner in compliance with all applicable statutes, regulations, and standards, which include the Tri-Party Agreement.

WAD19–2 **DOE Policy**

DOE acknowledges the Governor's support for siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

WAD19–3 **DOE Policy**

Section 4.32.1 takes into consideration existing missions (e.g., cleanup at Hanford) at candidate sites, as well as analyzes the potential cumulative impacts of surplus plutonium disposition activities and other programs' current (as well as past and reasonably foreseeable future) activities at the sites. DOE's various program offices individually develop strategic planning documents for their programs. For example, the Office of Environmental Management, whose mission is to manage the HLW and spent nuclear fuel, recently issued *Accelerating Cleanup: Paths to Closure* (DOE/EM-0362, June 1998).

WEST RICHLAND
HONORABLE KEN DOBBIN
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Pu Disposition EIS Public Hearing in Richland WA **8-4-98**

I am Ken Dobbin, Councilman from the City of West Richland.

I represent a public fed up with government tax and squander policies.

DOE, what part of NO don't you understand?

The public says NO to ignoring Hanford facilities just to rebuild them in another state.

The Fuels and Materials Examination Facility (FMEF) here at Hanford is well suited to the MOX mission and represents at least $500M of the taxpayers' resources that they want you to utilize.

Those of us who have spent the last 4 years working on restarting the Fast Flux Test Facility (FFTF) in the battle on cancer continue to hear that the DOE funding is a zero-sum game. 1

If so, where will the funds come from you plan to squander on the MOX mission?

Will you eventually tell us cancer fighters that there is no money to restart the FFTF?

The resources saved by using Hanford facilities for plutonium disposition could operate the FFTF in the fight on cancer for a decade. That takes us past the 8-year breakeven point on medical isotope revenues for the FFTF.

DOE, are you telling us cancer fighters that you have additional money to restart the FFTF, or are you telling us that you will let those with cancer continue to suffer and die?

I represent a public that wants answers!

WAD24

WAD24–1 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility in FMEF at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

WEST RICHLAND
HONORABLE JERRY A. PELTIER
PAGE 1 OF 1

CITY OF WEST RICHLAND

3801 Van Giesen St. ❖ West Richland, WA 99353 ❖ Tele: (509) 967-3431 ❖ FAX (509) 967-2251

TESTIMONY OF JERRY A. PELTIER, MAYOR
CITY OF WEST RICHLAND, WASHINGTON

Regarding the Draft Environmental Impact Statement for Plutonium Disposition

One year ago the Department of Energy held scoping meetings on the Surplus Plutonium Disposition Environmental Impact Statement. At those meetings in Richland, a clear message was delivered to the Department. "We want an objective, unbiased assessment of all of the Plutonium disposition challenges and opportunities. Pre-determined outcomes must not drive the EIS and Record of Decision process." The Draft EIS in front of us today is an excellent example of a technical justification of a pre-determined outcome. I would think, with the Department of Energy's current standings with the Congress of the United States, that every effort possible would have been made to write a balance and unbiased document. This draft EIS should be withdrawn and revised to give a fair evaluation of each of the alternatives.

- The EIS does NOT address comparable costs, especially the Fuels and Materials Examination Facility (FMEF) at Hanford.
- The EIS is clearly not a balanced and objective assessment.
- An objective evaluation of comparable disposal programs must be made.
- Misrepresents Hanford by a claim that an additional facility would be required, when in fact both the Pit Dissembly and MOX fuel could be performed in the same facility.
- Ignores the potential cost savings of co-locating the Pit Dissembly and Mox in the same facility.
- Does not address, with the current flat and/or declining budgets, how the additional costs of Plutonium disposition will be programed.

Let me conclude by saying once again I am very disappointed in the Department of Energy's process for developing this EIS. We pre-determined a year ago, based on the political climate, what this EIS was going to say. Believe me the Department has not let us down, this draft EIS is political statement that ignores the tax payers best interest. Hanford is a proud community and we have paid an enormous price in the name of National Defense. We feel that we deserve a fair and unbiased evaluation in regard to Plutonium Disposition. 1

WAD17

WAD17–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Hanford. DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities. Section 2.10.2 describes Alternative 6B which involves collocating the pit conversion and MOX facilities in FMEF and Section 4.11 presents the potential environmental impacts.

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for response. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

YOUNG, TIM, ET AL.
PAGE 1 OF 7

SEPT 16, 1998

TO: USDOE,Office of Fissile Materials Disposition,
MD-4 Forrestal Building
1000 Independence Ave., Washington , D.C. 20585

FROM: Tim Young and MB Condon
380 Ilsa Way,Goldendale, WA 98620

RE: Surplus Plutonium Draft EIS

Enclosed is a written text of our comments regarding the SPDEIS. These comments were left by voice on the answering machine at 1-800-820-5156 on Sept. 16,1998 after we were unable to transmit them by fax to your office. Clearer instructions for sending a fax in your message would be helpful.

Tim Young

MD246

YOUNG, TIM, ET AL.
PAGE 2 OF 7

FOR THE PUBLIC RECORD

SEPT 16, 1998

TO: USDOE,Office of Fissile Materials Disposition,
MD-4 Forrestal Building
1000 Independence Ave., Washington , D.C. 20585

FROM: Tim Young and MB Condon
380 Ilsa Way,Goldendale, WA 98620

RE: Surplus Plutonium Draft EIS

We want the following questions, concerns, and assumptions addressed in the SPD EIS:

1. What classified toxic elements are contained in nuclear warhead pits and how much toxic pollution is going to be created by the separation of those elements from plutonium? Where are the toxic waste products going to be stored and how are they going to be handled? 1

2. Which specific reactors in the US are going to be licensed to "burn" plutonium? How are reactors that were never designed for this fuel going to be tested and certified before allowing plutonium radiation to be generated by them? How are the safety records of commercial reactor operators going to be factored into the decisions to allow them to use plutonium as a reactor fuel? Why should reactors that are scheduled for de-commissioning be allowed to continue operating beyond their scheduled life span and then be allowed to utilize a fuel they were never designed to burn? 2

3.Specifically, how much radioactive waste will be created by each step of plutonium reprocessing, from the removal of plutonium oxide from bomb cores, the creation of MOX fuels, the transportation of all radioactive materials including the waste products, to the generation of electricity and possibly the production of tritium? How much more radioactive waste will be generated by each reactor that would be allowed to operate beyond its de-commissioning date ,compared to the amount of radioactive waste created if the reactors were retired on schedule? 3

4. How are DOE and the commercial reactor operators going to protect the public and the environment from the radioactive hazards posed by the generation of more nuclear waste from the burning of MOX fuels, when both the DOE and commercial operators have no idea of how to protect the public and the environment from the radiation hazards presently posed by the burning of uranium in reactors? 4

5. What specific transportation means and routes will be used to transport the weapons grade plutonium, MOX fuels, and the resulting nuclear and toxic waste? How will the public be notified, so their elected officials can participate in the creation of disaster plans in the case of a 5

MD246

MD246–1 **Pit Disassembly and Conversion**

A pit is made of plutonium, which consists mainly of the isotope plutonium 239. Pit plutonium can contain trace amounts of a variety of hazardous impurities such as beryllium and lead. These contaminants are expected to remain entrained in the plutonium dioxide material. The very low levels of contaminants do not adversely affect the immobilization and MOX approaches, and inclusion of the polishing step in the MOX facility would remove much of the contaminants. Some pits may also be contaminated with tritium, a radioisotope of hydrogen which can be removed by heating the pit material in a vacuum furnace to drive off the tritium gas. Another element which may be present in pit plutonium at low levels, but above trace amounts, is gallium, which is added as an alloying agent. Because high levels of gallium may adversely affect MOX fuel performance, it is largely removed during the pit conversion process, as discussed in Section 2.4.3.2. The pit conversion process would generate some LLW and TRU waste and a very small amount of mixed LLW and hazardous waste. These wastes include spent filters, used containers and equipment, paper and cloth wipes, protective clothing, shielding, solvents, and cleaning solutions. In general, these wastes contribute to less than 4 percent of the existing wastes at all the candidate sites and would be handled as part of the site waste management practice. A description of waste generation and management is provided in Appendix H.

MD246–2 **MOX Approach**

Although no U.S. commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily accommodate a partial MOX core. Therefore, DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. As a result of this procurement, DOE identified Catawba, McGuire, and North Anna as the reactors proposed to irradiate MOX fuel as part of the proposed action in this SPD EIS. In accordance with a stipulation of its RFP for MOX Fuel Fabrication and Reactor Irradiation Services, these are new reactors, that is, reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. The selected team, DCS, would have to apply for a reactor operating license amendment for each individual reactor

before it can use MOX fuel. For this amendment, the licensee would have to demonstrate that all safety, testing, and environmental impacts have been addressed as well as complete the public hearing process. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and the commercial reactors selected to use MOX fuel to ensure adequate margins of safety. Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents.

MD246–3 **Waste Management**

DOE acknowledges the commentors' concerns regarding waste generation and management. Waste streams that would be generated by the pit conversion, immobilization, and MOX facilities are detailed in the Waste Management sections in Chapter 4 of Volume I and Appendix H. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS. The shipment of waste will be done in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997).

The production of tritium in a commercial light water reactor is being evaluated in a separate DOE EIS, *Final EIS for the Production of Tritium in a Commercial Light Water Reactor* (DOE/EIS-0288, March 1999).

In choosing reactors to use the MOX fuel fabricated under the surplus plutonium disposition program, DOE looked at the criteria of reactor age. DOE chose only reactors whose planned operating life extended through the full life cycle of the surplus plutonium disposition program.

MD246–4 **Human Health Risk**

DOE and NRC are committed to protecting the health and safety of the public. This includes designing, constructing, and operating DOE- and NRC-regulated facilities (e.g., domestic, commercial reactors) in such a way as to continually provide a level of safety and reliability that meets or exceeds established standards. DOE and commercial reactors also have plans and programs for the safe management and ultimate disposal of their nuclear waste. Section 4.28 addresses the issue of waste generation by those domestic, commercial reactors designated to irradiate MOX fuel.

The remainder of this comment is addressed in the spent fuel portion of response MD246–3.

MD246–5 **Transportation**

DOE anticipates that transportation of plutonium pits, nonpit plutonium, MOX fuel, and HEU (i.e., special nuclear materials) required to disposition surplus plutonium would be done through the DOE Transportation Safeguards Division using SST/SGTs as described in Appendix L.3.2. The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. For emergency response planning, all shipments are coordinated with appropriate law enforcement and public safety agencies. If requested, DOE will assist these officials with response plans, and, if necessary, with resources in accordance with DOE Order 5530.3. DOE has developed and implemented a Radiological Assistance Program to provide assistance in all types of radiological accidents. Through this coordination and liaison program, DOE offers in-depth briefing at the State level.

The transportation of depleted uranium oxide and waste (i.e., non-special nuclear materials) would be done using commercial carriers. Nuclear material shipments must comply with both NRC and DOT regulatory requirements. Appendix L.3.3 provides details on the transportation of this type of materials and the transportation route selection process. DOT routing regulations require that shipments of radioactive material be transported over a preferred highway network including interstate highways, with preference toward bypasses around cities, and State-designated preferred routes.

mishap? What specific plans are in place for nuclear mishaps along the transportation routes and are they adequate to protect the public, crops, livestock, and the environment from exposure in the case of an accident or intentional destructive act? 5

We are totally opposed to the reprocessing of weapons-grade plutonium into MOX fuels to be burned in commercial nuclear reactors. Furthermore there should be no taxpayer subsidies to commercial operators to allow them to use MOX fuels in reactors that were never designed to do so and to allow the life of reactors to be extended beyond their scheduled de-commissioning date.

The DOE and the commercial nuclear industry should not be allowed to initiate any programs that will create more radioactive and toxic waste when the technology doesn't exist to deactivate and neutralize the waste created over the last fifty years by industry and the government. 6

We support the isolation and vitrification of weapons-grade plutonium. Although this is an inadequate solution to the radioactive waste problem, it at least, offers some assurance that these materials won't find their way into nuclear weapons in the future.

Finally, we have no confidence in the DOE's ability to safely and securely transport weapons-grade plutonium and MOX fuels to reactor sites. The public and their elected representatives are totally uninformed and unprepared for any nuclear mishaps that could result and we don't think that the DOE or the nuclear industry has the will or the resources to adequately prepare the public for the possible dangers that these materials represent to their communities. 7

We are also unwilling to give up any of our rights so that these materials can be moved "securely" through our communities.

Tim Young and MB Condon

Tim Young
MB Condon

MD246

The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http:\\www.doe-md.com.

MD246–6 **Alternatives**

DOE acknowledges the commentors' opposition to the MOX approach and support for the immobilization approach to surplus plutonium disposition.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose

operational life is expected to last beyond the life of the surplus plutonium disposition program.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the cost and schedule estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

MD246–7 **DOE Policy**

It is DOE's policy that plutonium shipments must comply with applicable DOT and NRC regulatory requirements. The highway routing of nuclear material is systematically determined according to DOT regulations 49 CFR 171 through 179 and 49 CFR 397 for commercial shipments. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. As indicated in

Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions would be expected for any of the surplus plutonium disposition alternatives proposed at the candidate sites. A description of the transportation activities is given in Section 2.4.4. Transportation risks and steps to mitigate the risks are analyzed in Chapter 4 of Volume I and Appendix L.

ZEPEDA, BARBARA
PAGE 1 OF 2

FOR: FORMAL COMMENT
DUE 9-16-98
ON SPD-EIS
PLEASE ADD
THIS 2 PAGE
~~LETTER~~

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

98-AMF-009

JUL 16 1998

JUL 27 1998

? WHY DOESN'T IAEA MONITOR CLEANUP ? 1

FROM
Ms. Barbara Zepeda
~~1937 25th~~ MOVED TO 308 E REPUBLICAN #708 98102
Seattle, Washington ~~98112~~
PHONE 206-324-8571

Dear Ms. Zepeda:

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA) ACTIVITIES AT HANFORD

Thank you for participating in the March 10, 1998, public meeting in Seattle, Washington, relating to Hanford's Fiscal Year 2000 budget. I am responding to your request for IAEA reports concerning Hanford plutonium-bearing inventories, which have been placed under the IAEA Safeguards regime through international agreement.

First, let me explain the IAEA's role at Hanford, since I believe it to be much more limited than you perceive. The IAEA routinely visits Hanford about once a month for about two days. They visit only the Plutonium Finishing Plant (PFP) complex and specifically, visit only one of the PFP buildings. Their only role at Hanford is to ensure that the quantity of plutonium-bearing materials, approximately one metric ton, placed under their safeguard regime by international agreement at the PFP is stored and monitored in a configuration which assures no possible diversion for weapons or other use. They employ a series of cameras, tamper-indicating seals, and other electronic monitoring systems to ensure that none of the plutonium has been tampered with since their last visit. As part of the IAEA and United States Agreement (INFCIRC 288), the IAEA has the option to do random selection and sampling of this inventory to further ensure that the containers still have the reported plutonium quantities.

The IAEA only verifies that the Hanford plutonium inventory under IAEA control is safe from diversion and is in the exact quantities as declared by the U. S. Department of Energy (DOE). The IAEA does not look at site safety. They do not oversee any waste operations or cleanup operations at Hanford or at any other DOE site. Their charter does not include "safety oversight," but is restricted by charter to international safeguards and nonproliferation. ?

To assist you further, I recommend a review of the IAEA's Information Circular (INFCIRC/288, dated December 1981), entitled "The Text of the Agreement of November 18, 1977, Between the United States of America and the Agency for the Application of Safeguards in the United States of America." This document will assist you in understanding the specific roles and responsibilities of both the IAEA and the United States. If you have internet access, you may visit the IAEA webpage at www.iaea.or.at/worldatom for information in acquiring unclassified IAEA reports. ?

INFCIRC/288 SHOULD BE AVAILABLE AT ALL PUBLIC MEETINGS ON HANFORD. 2

MD002

MD002–1 **General SPD EIS and NEPA Process**

IAEA serves as the world's intergovernmental forum for scientific and technical cooperation in the nuclear field, as well as the international inspector for the application of nuclear safeguards and the verification measures covering civilian nuclear programs. This includes verifying compliance with international nonproliferation policies. IAEA would monitor the surplus plutonium disposition program activities except those involving classified activities. Domestic, commercial reactors that would use MOX fuel are already subject to IAEA inspection.

IAEA also has a Radioactive Waste Safety Standards Programme and an International Waste Management Advisory Committee. DOE's Office of Environmental Management represents the United States on this committee, which oversees and directs the activities of RADWASS. RADWASS has produced standards for construction, operation, and closure of disposal facilities; standards for decommissioning nuclear power plants and nuclear research facilities; and standards for deriving cleanup levels for contaminated land areas. IAEA also provides an international peer review service for radioactive waste management, the Waste Management Assessment and Technical Review Program. Information on these programs can be found on the IAEA Web site for radioactive waste management at http://www.iaea.or.at/worldatom/inforesource/annual/anr9404.html.

MD002–2 **General SPD EIS and NEPA Process**

It is not possible to have every potential source of information about plutonium disposition in each DOE reading room. Therefore, DOE strives to have, as a minimum, a copy of each of its environmental documents (e.g., this SPD EIS). For cases in which a document is not available, the DOE reading room staff will attempt to obtain a copy or provide information on how a copy can be obtained.

JUL 16 1998

Ms. Barbara Zepeda -2-
98-AMF-009

The official DOE material balance reports to the IAEA are detailed listings of Hanford plutonium under the IAEA safeguard regime by discrete location. Official IAEA inspection reports to both the State Department and DOE are similarly detailed. I regret that, due to the specificity of the information, both the IAEA and DOE reports are not available for disclosure.

I hope that this information answers your questions regarding the IAEA role at Hanford. If you have any questions regarding this letter, please contact Mr. Angel Joy, of my staff, at (509) 373-7834.

Sincerely,

Peter M. Knollmeyer, Assistant Manager
for Facility Transition

AMF:PMK

MD002

NATURAL RESOURCES DEFENSE COUNCIL

15 September, 1998

Mr. Howard Canter, Acting Director
Office of Fissile Material Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, D.C. 20026-3786

Subject: **NRDC Comments on the Surplus Plutonium Disposition Draft Environmental Impact Statement**

Dear Mr. Canter:

We are writing to provide you with the Natural Resources Defense Council's (NRDC's) comments on the Department of Energy's (DOE's) *Surplus Plutonium Disposition Draft Environmental Impact Statement* (SPD DEIS) (DOE/EIS-0283-D), July 1998.

The SPD DEIS is deficient in the following respects:

I. The SPD DEIS fails to identify the current (and proposed future) locations, chemical and physical forms, isotopic mix, purity and related information concerning the various categories of plutonium that make up the 52.5 tonnes (t) of U.S. excess plutonium (Pu). Consequently, we are unable to judge whether the proposed disposition options are appropriate for each category of plutonium. 1

II. The United States and Russia completed a "Joint United States/Russian Plutonium Disposition Study" in September 1996. In this study Russia is on record as agreeing that, "The United States and Russia need not use the same [plutonium] disposition technology."[1] Thus, there is no compelling argument for allocating most of the U.S. excess plutonium to the mixed-oxide fuel (MOX) disposition alternative. The U.S. and Russian disposition options are not so inextricably linked to require the maximum possible amount of U.S. excess plutonium to be converted into MOX. NRDC believes that the United States should place a much higher priority on implementing the vitrification option in both countries. The SPD DEIS fails to discuss the process and criteria for deciding how much of the 33 t of Pu that is technically suitable for MOX will actually be fabricated into MOX, and it fails to discuss the timing of any decisions to vitrify any of this material. There is no discussion of the implications of this determination on the sizing of the 2

1. "U.S./Russian Plutonium Disposition Study," September 1996, Executive Summary, Sum-2.

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FD314

FD314–1 **DOE Policy**

The locations of the surplus plutonium were provided in the *Storage and Disposition PEIS*, and the information in that document has been summarized in Section 1.1 and incorporated by reference into this SPD EIS. The current locations, with the exception of the pits that were moved from RFETS to Pantex, are the same as those given in the *Storage and Disposition PEIS*. The future locations of the surplus plutonium are specified in the *Storage and Disposition PEIS* ROD and will be documented in the ROD for this EIS. The detailed chemical and physical forms, isotopic mix, purity, and related information on surplus plutonium exist in classified reports that were used as source material in preparing the Storage and Disposition PEIS and this SPD EIS. An unclassified version of this information was prepared and made available to the public in a report titled *Feed Materials Planning Basis for Surplus Weapons-Usable Plutonium Disposition* (MD-0013, April 1997). The bounding isotopic composition of surplus plutonium is provided in Appendix J of this EIS.

In order to support the early closure of RFETS and the early deactivation of plutonium storage facilities at Hanford, DOE modified some of the decisions made in its *Storage and Disposition PEIS* ROD. In the amended ROD for the *Storage and Disposition PEIS*, DOE announced the following actions: (1) the accelerated shipment of all nonpit, surplus weapons–usable plutonium (about 7 t [7.7 tons]) from RFETS to SRS beginning in about 2000 if SRS is selected as the site for the immobilization facility, and (2) the relocation of all Hanford surplus weapons–usable plutonium (about 4.6 t [5.1 tons]) to SRS between about 2002 and 2005.

FD314–2 **Nonproliferation**

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

DOE reviewed the chemical and isotopic composition of the surplus plutonium and determined in the *Storage and Disposition PEIS* ROD that about 8 t (9 tons) of surplus plutonium were not suitable for use in making MOX fuel. Furthermore, DOE has identified an additional 9 t (10 tons) for a total of 17 t (19 tons) that have such a variety of chemical and isotopic compositions that it is more reasonable to immobilize these materials and avert the processing complexity that would be added if these materials were made into MOX fuel. The criteria used in this identification included the level of impurities, processing requirements, and the ability to meet the MOX fuel specifications. If at any time it were determined that any of the 33 t (36 tons) currently proposed for MOX fuel fabrication was unsuitable, that portion would be sent to the immobilization facility. The addition of this material would not require the immobilization facility to operate longer because it is being designed to handle a throughput of up to 50 t (55 tons) over a 10-year period. Likewise, the MOX facility is being designed to handle up to 33 t (36 tons) of surplus plutonium, but would have the flexibility to operate at a lower throughput. Under either the immobilization-only approach or the hybrid approach, all 50 t (55 tons) of surplus plutonium would be processed out of the proposed plutonium disposition facilities over a 10– to 15–year period beginning in about 2006.

2

proposed MOX fabrication plant. In addition, the DEIS fails to provide the information needed respond to the following important questions: 2

1. Is the MOX option more or less expensive than the vitrification option? The SPD Final EIS should provide a comparative cost analysis of the vitrification and MOX methods that would clarify the relative costs of each to better inform future decisions on how much plutonium should be disposed of via each of these methods. 3

2. Does DOE agree that disposing of a given quantity of plutonium using the MOX disposition option is more likely to take longer than disposing of the same quantity of plutonium using the vitrification option? The SPD Final EIS should provide a comparison of the time required to dispose of a given quantity of plutonium by each option that would clarify the relative processing times of each to better inform future decisions on how much plutonium should be disposed of via each of these methods. 4

3. Does DOE agree that the MOX option is inherently more dangerous than the vitrification option? The SPD Final EIS should provide a comparison of nuclear material security and proliferation risks associated with each option that would clarify the relative magnitude of the dangers of each to better inform decisions on how much plutonium should be disposed of via each of these methods. 5

III. The current DOE policy makes construction of the U.S. MOX fabrication plant contingent on "significant progress with Russia on plans for plutonium disposition" by the end-FY 2000 [September 30, 2000].[2] There is no discussion in the SPD DEIS of this policy or its implications.

1. Exactly what is meant by "significant progress?"

2. What did the DOE have in mind when it adopted this policy? 6

3. Where in DOE's submissions to Congress is this policy set forth?

4. Will DOE move ahead with vitrification of the 17 t of Pu that is unsuitable for MOX even if there is no progress on the Russian side?

IV. In 1996, the U.S. and Russia agreed that "…disposition of U.S. and Russian excess weapons plutonium should proceed in parallel, with the goal of reductions to equal levels of military plutonium stockpiles."[3] However, the DEIS lacks the basic information needed to allow 7

[2] Statement of Howard Cantor, Acting Director, Office of Fissile Material Disposition, at the Council on Foreign Relations "The Management and Disposition of Excess Nuclear Weapons Material," March 9, 1998.

[3] "Joint U.S./Russian Plutonium Disposition Study," September 1996, Executive Summary, p. ExSum-2.

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FD314–3 **Cost**

As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons–Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach, which includes both immobilization and MOX fuel, would be more expensive than the immobilization–only approach. However, as discussed in response FD314–2, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing either approach by itself. For an update of the cost of the preferred alternative, see the new report, *Plutonium Disposition Life–Cycle Costs and Cost–Related Comment Resolution Document* (DOE/MD-0013, October 1999). These reports are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. DOE will continue to refine the cost estimates for the proposed surplus plutonium disposition facilities as decisions are made in the ROD and design of the facilities progresses.

FD314–4 **Alternatives**

Operation of the proposed surplus plutonium disposition facilities is expected to take approximately the same amount of time for either approach. The difference in timing for the hybrid approach is associated with the amount of time that MOX fuel would be irradiated in domestic, commercial reactors. However, none of the proposed reactors are expected to operate longer under the hybrid approach than they would if they continued to use LEU fuel.

FD314–5 **Nonproliferation**

DOE does not agree that the MOX approach is inherently more dangerous than the immobilization approach. DOE and NAS have conducted studies to compare risks, including the nuclear material security and proliferation risks of alternatives analyzed in this SPD EIS. These studies include the *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Materials Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), *Proliferation Vulnerability Red Team Report* (SAND 97-8203, October 1996), *Management and Disposition of Excess Weapons Plutonium* (March, 1994), and *Management and Disposition of*

Excess Weapons Plutonium, Reactor–Related Options (1995). As discussed in Section 4.28.2.5, studies by NAS have led it to the following conclusion: "no important overall adverse impact of MOX use on the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities will involve factors not related to fuel composition and hence unaffected by the use of MOX rather than LEU fuel."

FD314–6 **Nonproliferation**

The term "significant progress" is not intended to be a singular formulaic benchmark. Rather, it is intended to be used in judging progress in the Russian program by a combination of political actions and commitments, practical steps, and concrete plans and timetables such that the U.S. and Russian programs can reasonably be said to be heading in the same general direction in the same overall timeframe. The United States would not construct new surplus plutonium disposition facilities until that expectation was satisfied. While joint U.S. and Russian efforts to disposition surplus plutonium are part of DOE's mission and while this SPD EIS notes the U.S. policies, the U.S. policies on this issue are beyond the scope of this SPD EIS. The Secretary of Energy has testified on numerous occasions regarding those policies. A recent testimony, to the House Committee on Science on May 20, 1999, can be found on the DOE Web site at http://www.doe.gov. Regardless of Russia's progress, DOE would begin immobilizing surplus plutonium in accordance with the decisions made in the SPD EIS ROD.

FD314–7 **Nonproliferation**

During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. This document was added to Appendix A of this SPD EIS. The quantities and location of Russian plutonium, military or civil, are beyond the scope of this SPD EIS and are the subject of sensitive negotiations between the United States and Russia. It has never been a requirement or expectation of the United States that Russia's plans and programs for surplus plutonium

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Congress, the public, and other government agencies to assess whether disposition is in fact "proceeding in parallel."

1. Exactly what is required on the Russian side in this regard?

2. What is the U.S. Government's best estimate of the total inventory of plutonium in Russia, exclusive of that still in spent civil power reactor spent fuel?

3. What is the U.S. Government's best estimate of Russia's weapon-grade plutonium inventory?

4. What are the U.S. Government's best estimates of Russia's separated fuel-grade and reactor grade inventories?

5. What are the U.S. Government's best estimates of Russia's "military and non-military plutonium stockpiles?

6. Where are these materials located in Russia to the best of the U.S. Government's knowledge?

7. Is the plutonium recovered from Russian naval reactor fuel that is currently stored at Mayak (along with Pu separated from VVER-440 spent fuel) considered to be part of Russia's military or civil plutonium stockpile?

8. Is the plutonium currently being recovered from plutonium production reactor fuel at Tomsk-7 and Krasnoyarsk-26 considered to be part of Russia's military or civil plutonium stockpile?

9. The terms "military plutonium" or "weapons plutonium" need to be more precisely defined; in particular, do these terms include plutonium derived from research or civil reactors and how do these terms relate to U.S. and Russian plutonium stockpiles as they are currently defined.

10. Please elaborate on the what is military and what is civil plutonium in the two countries.

11. For example, is plutonium in FFTF spent fuel military or civil? 7

V. On September 2, 1998, Presidents Clinton and Yeltsin signed an agreement that directs officials in both countries to draw up detailed plans and schedules for each country to dispose of 50 t of excess plutonium. The DEIS fails to provide information regarding the following questions:

1. Has Russia identified the sources of its 50 t of excess plutonium? 8

2. What fraction is weapon-grade?

3. What fraction is from pits removed from dismantled nuclear weapons, and what fraction, if any, is in other forms?

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disposition would proceed in lock-step with the U.S. program. The intermediate steps of the two programs and their precise timing do not have to be the same, provided the Russians are drawing down their stocks of surplus plutonium along agreed paths and in general consonance with the timing of the U.S. program. What is required of Russia is a combination of political actions and commitments, practical steps, and concrete plans and timetables such that the two programs can reasonably be said to be heading in the same general direction in the same overall timeframe.

The terms "military plutonium" and "weapons plutonium" are not used in this EIS. Weapons-grade and weapons-usable material are defined in Chapter 6. All the plutonium that is the subject of this EIS is considered weapons usable. The vast majority of this material, with the exception of fuel for FFTF, was associated with military use.

FD314–8 **Nonproliferation**

The sources, composition, form, and quantities of Russian surplus plutonium are the subject of sensitive negotiations between the United States and Russia and are beyond the scope of this SPD EIS.

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4. Assuming it is all from pits, which is NRDC's current understanding, if the U.S. and Russia each completed the disposition of their respective 50 t of excess plutonium in accordance with the above cited presidential agreement but disposed of no more plutonium, would the U.S. and Russia have achieved approximately equal levels of military plutonium stockpiles, and therefore be in accord with the 1996 agreement cited above? 8

5. If the answer to V.4. above is "no," how much additional plutonium would Russia and/or the U.S. have to dispose of to achieve approximately equal military plutonium stockpiles?

VI. The SPD DEIS fails to discuss any of the important physical security, material accounting and control, or international safeguards issues that concern the facilities used under the MOX and vitrification options. With regard to physical security, what are the design-basis external-assault threats and internal threats that will be used to judge the adequacy of the physical security at the proposed MOX fabrication facility? 9

VII. For safeguards purposes, the IAEA defines a "significant quantity" (SQ) of nuclear material as "the approximate quantity of nuclear material in respect of which, taking into account any conversion process involved, the possibility of manufacturing a nuclear explosive device cannot be excluded."[4] For direct-use material, the IAEA currently assumes an SQ of 8 kilograms (kg) of plutonium.

The SQ values were recommended to the IAEA by a group of experts, namely, the IAEA's Standing Advisory Group for Safeguards Implementation (SAGSI), and "relate to the potential acquisition of a first nuclear explosive by a non-nuclear weapon state."[5] The direct-use values—8 kg of plutonium, 8 kg of uranium-233, or 25 kg of HEU—are also referred to by the IAEA as "threshold amounts," defined as "the approximate quantity of special fissionable material required for a single nuclear device."[6] The IAEA cites as a source for these threshold amounts a 1967 United Nations document.[7] The IAEA states: 10

> "These threshold amounts include the material that will unavoidably be lost in manufacturing a nuclear explosive device. They should not be confused with the minimum critical mass needed for an explosive chain reaction, which is smaller.[34]
> ----------

4 *IAEA Safeguards Glossary, 1987 Edition*, IAEA, IAEA/SG/TNF/1 (Rev. 1), 1987, p. 23.

5 Thomas Shea, "On the Application of IAEA Safeguards to Plutonium and Highly Enriched Uranium from Military Inventories," IAEA, (June 1992, with additions: December 1992).

6 *IAEA Safeguards Glossary*, p. 23.

7 *Effects of the Possible Use of Nuclear Weapons ...*, United Nations, A/6858, 6 October 1967.

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FD314–9 **DOE Policy**

DOE has studied these issues in the *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Materials Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997). As described in Chapter 2 (Volume I) of this SPD EIS, all of the proposed surplus plutonium disposition facilities would be built to DOE's highest security standards and are being proposed at sites where there is already a security force in place. Additional guards and security personnel would be hired to work at each of the facilities as needed and are included in the estimated workforce requirements evaluated in this EIS. Once it is determined where the proposed facilities would be located, a specific security plan would be developed and implemented, which considers all of the threats that could affect the facility. With regard to the MOX facility, physical security would be in accordance with NRC standards and be part of the NRC licensing process. The international safeguards associated with these facilities are the subject of ongoing sensitive negotiations between the United States and Russia. However, space has been allocated in each of the proposed facilities to accommodate such inspections.

FD314–10 **Nonproliferation**

As discussed in Section 2.4, it is likely that the United States would voluntarily offer to have the proposed surplus plutonium disposition facilities placed under international safeguards. However, the process of implementing international safeguards is not as yet fully defined. If these proposed facilities come under IAEA oversight, it is expected that the "significant quantity" as defined by IAEA in safeguarding the proposed facilities would be the same as that used by IAEA for safeguarding plutonium in other nations. Any discussion on the amount of plutonium needed to build a 1-kiloton weapon is classified and is beyond the scope of this SPD EIS.

The remainder of this comment is addressed in response FD314–9.

> [34] Using highly sophisticated techniques available to NW States, the critical mass and the corresponding threshold amount can also be significantly reduced, but these are special cases that need not be considered here."

For decades the IAEA has set invalid technical thresholds for the minimum quantity of nuclear material needed for a nuclear weapon, even for a low-technology first nuclear explosive by a non-nuclear weapon state, including consideration of unavoidable losses.

First, the current 8 kg SQ value for plutonium is consistent with assuming a 24 percent loss in fabricating a solid 6.1 kg plutonium core similar to the Trinity device or the Nagasaki bomb—equivalent to losing the outer 0.4 cm of the 4.5 cm core during casting and machining. This degree of imprecision seems exceptionally high for the numerically controlled techniques now available in the commercial marketplace.

Second, if one took the same *Fat Man* design, first tested at the *Trinity* site in New Mexico and dropped on Nagasaki in 1945, and simply substituted a three kg plutonium core for the 6.1 kg core that was used in 1945, the yield of this device would be on the order of one kiloton, still a very respectable atomic bomb that could create catastrophic losses in dense urban areas. Thus, based on this evidence alone, the IAEA is in error to assert that "highly sophisticated techniques available to NW States" are needed to make nuclear weapons with "significantly reduced" quantities of materials.

Third, since the early 1950's, the nuclear-weapon states have been producing nuclear explosives with yields in the several kiloton range from as little as 2 kg of plutonium. The so-called "highly sophisticated techniques available to NW States" referenced by the IAEA were known to U.S. weapons designers in the late-1940s and early 1950s—and are now available to anyone with the patience and skills to search the open technical literature. Nuclear devices using very small quantities of plutonium and HEU—so-called "fractional crit" weapons—with yields on the order of one Kt were tested during the Ranger series in 1951.

Finally, a well advised safeguards program for a given country or group of countries would set the "significant quantity" levels at values less than the minimum amount needed for a weapon, to guard against the fact that materials can be diverted from more than one source. The practice of setting higher levels to account for manufacturing losses is likewise imprudent, particularly in view of the fact that a significant fraction of these "losses" are technically recoverable. In sum, *safeguards apply to all non-weapons countries, irrespective of their technological sophistication, and safeguards effectiveness should be assessed with this fact in mind.*

Many IAEA-member countries, including Israel, India and Pakistan and several that are not declared nuclear weapon states, such as Japan, Germany, South Korea, have highly developed nuclear infrastructures, and must be considered technologically sophisticated. Israel is presumed to have deployed boosted fission weapons, and possibly two stage thermonuclear weapons. India claims to have tested a two-stage thermonuclear device this year. This claim is certainly credible given that it has been 24 years since its first nuclear weapon test in 1974. Even for countries that

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are in general not sophisticated technologically, such as North Korea, the key technical information needed to establish a program for achieving substantial compression via implosion techniques is now accessible in the unclassified literature. The quantities defining safeguards significance, therefore, must be based on the assumption that the proliferator has access to "advanced" technology (*i.e.*, at least 1950's era). Whatever the nonproliferation "disinformation benefit" that may have flowed from the under-protective IAEA SQ values in the past, it is now far too late in the proliferation game to base the international nuclear control regime on flawed technical premises. As a consequence, the IAEA's SQ value should be lowered to no more than one eighth of the current value.

In 1994, NRDC released a report, "The Amount of Plutonium and Highly-Enriched Uranium Needed for Pure Fission Nuclear Weapons" (NRDC, Revised April 1995). In this report and in accompanying letter to the IAEA, NRDC requested that the IAEA revise its SQ value downward by a factor of eight. At about the same time the NRDC also requested that the United States Government, represented on the IAEA Board of Governors, take appropriate action to have IAEA make this revision.

DOE never responded to NRDC's request. It is our understanding that DOE had drafted a letter to NRDC endorsing lowering the IAEA SQ value by a factor of two—to four kg of plutonium—but that the State Department objected to it and that it was never sent.[8] 10

1. Will the proposed MOX fabrication plant be subject to IAEA and/or bilateral safeguards?

2. What in DOE's view is the technically indicated SQ value that the IAEA should be using?

3. What in DOE's view is the technically indicated SQ value that DOE is, or should be, using?

4. What constitutes a "significant quantity" of plutonium for purposes of judging the adequacy of the material control and accounting measures at the MOX fabrication plant?

5. Is the SQ value for the MOX fabrication plant different from that used by the IAEA? If so, explain why.

6. Does DOE agree that a one-kiloton-yield fission weapon can be made with as little as one to three kilograms of weapon-grade plutonium?

[8] The letter was prepared for Mr. Ken Luongo, Director of the Office of Nonproliferation at DOE, and it was killed by Mr. Robert Einhorn at the State Department.

VIII. NRDC does not believe the proposed MOX fabrication plant can be operated with adequate material control and accounting procedures. In the parlance of nuclear material accounting, the inventory difference (ID) is defined as:

$$ID = BI + I - R - EI,$$

where BI is the beginning inventory, EI is the ending inventory, and I and R are, respectively, the material added and removed during the inventory period.[9] For the minimum amount of diverted plutonium (assumed by the IAEA to be the SQ value—currently 8 kg of plutonium) to be resolvable from measurement noise with detection and false alarm probabilities of 95% and 5%, respectively, it can be shown that 3.3 σ_{ID} must be less than the SQ value, where σ_{ID} is the uncertainty in the inventory difference.[10] For an SQ of 8 kg the σ_{ID} would have to be about 3 kg; and if the SQ value for plutonium were lowered to one kg, σ_{ID} should not exceed about 300 grams.

At Japan's Tokai Plutonium Fuel Production Facility (PFPF), where MOX fuel has been fabricated for Japan's Joyo and Monju fast-breeder reactors since 1988, the production line consisted of 17 interconnected glove boxes monitored by unattended, tamper-proof instruments, such as neutron coincidence counters. Following an April 1994 inspection conference with the IAEA, Japanese sources disclosed that on the order of 70 kg of plutonium was "held up" in the remotely monitored process line, and that the uncertainty in the hold-up material exceeded the 8 kg SQ value used by IAEA. 11

1. Identify the limit on σ_{ID} that DOE believes must be achieved in the MOX fabrication plant to provide technical detection with high confidence of the theft or diversion of a technically valid SQ of special nuclear material.

2. Explain how this limit will be achieved?

3. Please provide the historical ID data for other MOX and related facilities relevant to making an informed judgment as to whether technically adequate material control and accounting standards can be achieved at the proposed MOX plant.

4. What is the basis, if any, for believing that the proposed MOX plant would achieve inventory differences significantly less than those experienced at Japan's PFPF.

IX. To improve material control, large facilities that process or store nuclear weapon-usable materials are subdivided into numerous "material balance areas." The inventories and inventory differences within individual balance areas can be significantly smaller than those for the entire 12

9 In the literature "inventory difference" (ID) is sometimes called "material unaccounted for" (MUF).

10 Marvin Miller, "Are Safeguards at Bulk-Handling Facilities Effective?, Nuclear Control Institute, Washington, D.C., August 1990.

FD314–11 **Nonproliferation**

NRC material control and accountability requirements would apply to the MOX facility, or potentially a combination of NRC and DOE requirements. If the decision is made in the SPD EIS ROD to go forward with the MOX facility, a limit on σ_{ID} would be established based on discussions with NRC and the approved NRC facility design. Any material control and accountability requirements would have to also satisfy international safeguards requirements agreed to between the United States and Russia. Existing IAEA standards, which would likely be similar to those implemented at the proposed MOX facility, are in place at MOX fuel fabrication facilities in Europe. These facilities have been able to meet the IAEA standards supporting DOE's belief that the proposed MOX facility would be able to meet similar standards. DOE is aware of the issues surrounding the problems referred to by the commentor in the Japanese facility and would work to avoid similar problems at the MOX facility.

FD314–12 **Nonproliferation**

The specific arrangements for applying international safeguards (including significant quality limits) at the MOX facility have not been fully determined. As discussed in response FD314–9, international safeguards are part of the sensitive negotiations between the United States and Russia. Final arrangements would be made during design and construction of the facility. Safeguards and security requirements, as well as material control and accountability requirements, would take into consideration internal and external threats involving the theft and diversion of nuclear materials and limits would be set accordingly.

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facility. The SQ limits are often applied to the separate material balance areas. It must be recognized, however, that this approach does not afford adequate protection against state-sponsored diversions or a collusion of individuals removing materials from separate material balance areas. 12

1. In the SPD Final EIS indicate whether DOE agrees that the SQ limits should apply to the entire MOX facility? If not, explain why.

X. NRDC does not believe an adequate timely detection criterion can be met. Detection time (the maximum time that should elapse between diversion and detection of a significant quantity) should be in the same range as the conversion time, which is defined as the time required to convert different forms of nuclear material into components of nuclear weapons. For metallic plutonium, the conversion time is 7-10 days; for other forms of plutonium, it is 1-3 weeks. These conversion times are already much shorter than the period between inventories at any MOX plant operating today. Thus, there can be no assurance that the primary objective of safeguards—the timely detection of the theft, loss, or diversion of significant quantities of plutonium—will be met at the proposed MOX fabrication plant. 13

1. What timely warning criterion will be used for judging the adequacy of safeguards at the proposed MOX fabrication plant?

2. What is the basis for DOE's belief that the timely detection criterion can be met?

This concludes NRDC's comments on the SPD DEIS.

Sincerely,

Thomas B. Cochran
Director, Nuclear Program

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FD314–13 **Nonproliferation**

Specific domestic and international safeguards would be developed during design and construction of the MOX facility. Because the surplus plutonium is weapons usable, the safeguards would include physical inventories as well as several active and passive measures. A single, integrated system of material control measures and accountability measurements would be used to monitor storage, processing, and transfer of nuclear material in the MOX facility. The facility accountability program would include an accounting system, a measurement and measurement control program, physical inventory programs, a material transfer program, and a program to assess material control indicators.

The accounting system would be a near real–time system that would require the prompt reporting of any change in the accountable quantity, location, user, or form of the nuclear material. This system would include measurement subsystems, and both destructive and nondestructive assay to ensure that quantities of nuclear materials were stated with the timeliness, accuracy, and precision required in DOE/NRC regulations and any international agreements. These material control and accountability measures would ensure that potential theft, loss, or diversion of material would be detected well before that material could be converted into a nuclear weapon.

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September 16, 1998

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**Comments of the Nuclear Control Institute
on the Surplus Plutonium Disposition
Draft Environmental Impact Statement**

The Nuclear Control Institute ("NCI") submits the following comments on the Department of Energy's Surplus Plutonium Disposition Draft Environmental Impact Statement (DOE/EIS-0283-D, July 1998) ("draft EIS"). Bracketed page numbers in these comments refer to this document.

1. The Department of Energy should utilize exclusively the immobilization approach to surplus plutonium disposition in the United States. The MOX approach under the "dual track" disposition policy is not justified even if there is a need to proceed in parallel with Russia.

DOE's January 1997 Record of Decision on Plutonium Disposition outlined a "dual track" approach utilizing both immobilization and MOX. The Department has defended this approach as a prerequisite to working in parallel with Russian counterparts who view plutonium as "national treasure" and are unwilling to dispose of it as waste. NCI remains unconvinced by this argument, for reasons explained in detail elsewhere.[1] 1

However, DOE's rationale for the "dual track" was recently superseded by the plutonium disposition agreement signed by Presidents Clinton and Yeltsin at their Moscow summit meeting. This agreement marked Russia's first formal acknowledgement of the acceptability of the immobilization approach. The agreement specifies that "[t]he two governments will cooperate to pursue this goal [of each nation disposing of 50 metric tons of surplus weapons plutonium] through consumption of plutonium fuel in existing nuclear reactors (or reactors which may enter

[1] Edwin S. Lyman and Paul Leventhal, "Bury the Stuff," Bulletin of the Atomic Scientists, March/April 1997, pp. 45-48.

Strategies for stopping the spread and reversing the growth of nuclear arms.

Paul L. Leventhal, *President*, Peter A. Bradford, David Cohen, Denis A. Hayes, Julian Koenig, Sharon Tanzer, Roger Richter, Dr. Theodore B. Taylor
BOARD OF DIRECTORS

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FD327–1 **Nonproliferation**

DOE acknowledges the commentor's opposition to the use of plutonium in MOX fuel. Russian cooperation is not the only reason DOE has identified as its preferred alternative the hybrid approach for the disposition of U.S. surplus plutonium. The environmental impacts associated with the immobilization-only alternatives—as well as the hybrid (MOX and immobilization) and the no action alternatives—are discussed in this SPD EIS. Costs are discussed in two reports prepared by DOE, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, and *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative. These reports are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

DOE believes the hybrid approach provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Pursuing both the immobilization and MOX approaches also provides important insurance against potential disadvantages of implementing either approach by itself. DOE reserves the option to immobilize all the surplus plutonium as discussed in Alternatives 11 and 12 and has evaluated the environmental impacts of these alternatives (including considering the number of facilities, the number of processing stages, and the transportation requirements).

In regard to the MOX facility, DOE intends to design, construct, and operate it in such a fashion as to provide a level of safety that meets or exceeds applicable Federal, State, and local requirements. The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition

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into service during the duration of our cooperation) or the immobilization of plutonium in glass or ceramic form mixed with high-level radioactive waste."[2] [emphasis added]

In light of this agreement, and DOE's acknowledgement in both the ROD and draft EIS that it is technically feasible to immobilize all 50 tons of surplus U.S. weapons plutonium, there is no imperative to pursue a MOX approach in the United States at all. DOE's own studies demonstrate that immobilization would be cheaper, faster and safer than the MOX approach,[3] and is therefore the more desirable method now that it is clear MOX need not be pursued in the United States to satisfy Russian concerns. 1

In the most straightforward sense, immobilization has clear-cut environmental and safety advantages. Fewer processing stages, fewer facilities, and less transportation are involved with immobilization than with MOX. The immobilization-only approach also offers great flexibility for the U.S. disposition program. If desired, the United States could promptly and unilaterally immobilize all 50 tons of its surplus plutonium, as a demonstration and incentive to Russian disposition. If parallelism and Russian reciprocity were deemed important but did not materialize, a U.S. immobilization-only approach could be put on hold with far less disruption than a MOX/reactor approach.

2. The draft EIS comparison of MOX and immobilization is unfairly skewed in favor of MOX.

The draft EIS assesses site-specific environmental impacts of the immobilization process all the way through to production of the final waste form. The MOX approach, on the other hand, is only analyzed on a generic basis after the point at which fresh MOX fuel is fabricated. Analysis of environmental and safety questions related to use of specific reactors and storage of spent MOX fuel is relegated to a separate "environmental critique" which will not be available until the final EIS is released. This provides an unbalanced comparison of the MOX and immobilization options. NCI is preparing an in-depth technical analysis of safety issues related to the use of weapons-plutonium MOX fuel in light-water reactors, and this analysis would be greatly enhanced by the availability of reactor-specific data. Environmental impacts of MOX fuel use could vary widely from site to site (i.e., the North Anna plant vs. WNP-2). Therefore, issuance of the final EIS should be deferred until the public has a reasonable opportunity to 2

[2] Joint Statement of Principles for Management and Disposition of Plutonium Designated as No Longer Required for Defense Purposes," September 2, 1998.

[3] For example, ceramic can-in-canister immobilization could begin two years sooner than a MOX-immobilization "hybrid option," and be completed six years sooner. U.S. DOE, Office of Fissile Materials Disposition, Technical Summary Report for Surplus Weapons-Usable Plutonium Disposition, Rev. 1, October 31, 1996, Table ES-2, p. ES-11. DOE estimates that an immobilization-only alternative would cost from $1.7 to $1.9 billion, whereas the hybrid alternatives would cost from $1.8 billion to $2.1 billion (with fuel offset) or from $2.7 to $2.9 billion (without fuel offset). U.S. Department of Energy, Office of Fissile Materials Disposition, Cost Analysis and Support of Site Selection for Surplus Weapons Usable Plutonium Disposition, DOE/MD20009, July 22, 1998, Table 3-2, p. 3-17; Table 3-3, p. 3-18.

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of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provides general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

FD327–2 **MOX RFP**

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

review and comment upon the reactor-specific environmental critique. 2

3. Issues related to plutonium oxide "hold up" in the MOX fuel fabrication facility should be addressed.

In modern MOX fuel fabrication facilities, almost all operations are carried out by remote handling in glove boxes. Significant portions of the plutonium oxide throughput of these plants can become "held up" in these glove boxes. Since opening in 1988, the small, pilot PFPF MOX plant in Japan accumulated a hold-up of over 70 kilograms of plutonium, and the plant operator was eventually required by the International Atomic Energy Agency to clean out and account for this material, at a cost of over $100 million. 3

NCI has expressed concern about the hold-up issue in a non-proliferation and safeguards context.[4] From a NEPA perspective, it should be noted that plutonium hold-up constitutes a safety and health risk, not only to MOX plant workers but to the general public by increasing the plant's source term in case of an accident. If required later because of excessive hold-up, a full facility clean-out would also pose significant risks of worker exposure to plutonium. The draft EIS does not address the hold-up issue. It is important that the final EIS do so.

4. The "plutonium polishing" option should not be pursued.

DOE has offered respondents to its request for proposals for MOX disposition work the opportunity to propose aqueous processing, so-called "plutonium polishing," to remove gallium and other impurities from plutonium prior to its fabrication into MOX fuel. The detrimental effects of gallium on fuel cladding and reactor safety have not been fully documented and could prove significant. "Plutonium polishing" would significantly increase the environmental impact of the MOX option by creating large amounts of TRU and low-level waste, an increase of 10 to 20 percent over non-polishing options.[5] It would also contravene U.S. non-proliferation policy, in that it would be likely to provide strong support of Russia's plans for aqueous treatment of its own surplus weapons plutonium. Because trace amounts of gallium do not affect the immobilization process or final waste form, the plutonium polishing step could be avoided entirely if the U.S. were to pursue an immobilization-only approach. 4

5. Lengthy storage of fresh MOX fuel at reactor sites poses security risks and should be avoided.

The draft EIS foresees a 10-year operational life for the MOX fabrication plant, but considerable additional time, possibly years, would be required to cycle all this MOX fuel through reactors. NCI objects to long-term storage of fresh MOX fuel at reactor sites on security grounds. Such fresh MOX fuel lacks a radiation barrier, and if stolen, weapons-grade plutonium 5

[4] Steven Dolley, Nuclear Control Institute Comments on the Draft PEIS for Plutonium Disposition, June 7, 1996.

[5] "Appendix N: Plutonium Polishing," draft EIS, pp. N-8 - N-9.

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FD327–3 **Nonproliferation**

DOE is aware of a Japanese plutonium processing incident in which the holdup of a significant amount of MOX powder in the processing lines made it difficult to measure the exact quantity of materials from outside the sealed gloveboxes. The design and operation of the MOX facility would incorporate lessons learned (regarding procedures and equipment) to ensure a low net plutonium loss and would be compatible with NRC and international safeguards. Physical inventories, measurements, and inspections of material both in process and in storage would be used to verify records and ensure that there was no significant holdup of plutonium in the gloveboxes.

FD327–4 **Plutonium Polishing and Aqueous Processing**

DOE acknowledges the commentor's opposition to the MOX approach and plutonium polishing. On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. While it is true that plutonium polishing would add to the amount of LLW and TRU waste generated, this amount should be a small fraction of the total amount of these waste types generated at the candidate sites. For example, at SRS, which is the preferred site for the MOX facility, the addition of the plutonium-polishing process would be expected to increase the site's projected generation of LLW and TRU waste by less than 1 percent and 2 percent, respectively. Section 4.32.4 discusses the cumulative impacts of the proposed action at SRS; Sections 4.32.1, 4.32.2, and 4.32.3, the cumulative impacts of the proposed action at Hanford, INEEL, and Pantex, respectively.

FD327–5 **MOX Approach**

DOE acknowledges the commentor's concern about the storage of fresh MOX fuel at reactor sites. The proposed action does not involve lengthy storage of fresh fuel at reactor sites. Moreover, as discussed in Section 2.4.3.2, the MOX fuel would be managed in essentially the same way as fresh LEU fuel (with tighter security because of the plutonium), which is usually received at the reactor site shortly before it would be inserted into the reactor. The MOX facility includes space for storage of up to 2 years' worth of fresh fuel

could be separated from this MOX by straightforward chemical means. EDF, the French nuclear utility, does not permit fresh MOX fuel to be stored at its reactor sites for more than two weeks, and does not allow any dry storage of such fresh fuel.[6] The same strict security requirement should be imposed on MOX fuel storage, and the additional costs of meeting this storage standard, and of additional security at reactor sites, should be included in the EIS. 5

6. The "216 process" is an inappropriate approach to safety analysis of MOX candidate reactors.

DOE proposes to analyze environmental impacts of specific commercial reactors offered by consortia for MOX fuel irradiation by means of the process specified in 10 CFR 1021.216 (the "216 process"). This regulatory language is part of DOE's NEPA Implementing Regulations, and provides for an "environmental critique," to be prepared by DOE, which "may contain proprietary information which will, therefore, not be made available to the public." [p. S-12] A synopsis will be published in the final EIS, but the full environmental critique would never be made public.

The proposed implementation of the 216 process is entirely unacceptable. First, DOE has indicated that consortia bidders will have complete discretion to determine which information they submit to DOE should be considered "proprietary" and withheld from the public. Thus, any information bearing on the safety of reactors fueled with MOX that the industry does not want subjected to public scrutiny could be withheld. Second, the public synopsis would not be made available until the *final* EIS is released, i.e., after the public input process under NEPA is completed. Public comments on the final EIS are unlikely to have any significant impact on DOE's record of decision. 6

An example of the abuse that can arise from excessive discretion to withhold release of "proprietary" data in regulatory proceedings is the recent revelation in Great Britain that "a supposedly independent report by the accountancy firm Touche Ross - used to provide the economic justification for the Thorp reprocessing plant - had never been drawn up....Environmentalists, independent scientists and the Labour Party in opposition all called for the report to be published, but BNFL which runs Sellafield, refused to do so on the grounds that it was commercially confidential. Recently the Environment Minister, Michael Meacher, asked to see the report but was told, to his amazement, that it did not exist."[7]

DOE has discretion to apply the standards of law in order to determine whether data that the consortia want to be withheld in fact meets these standards. DOE should review this material, with a presumption in favor of public release. The provisions of DOE NEPA regulations which require withholding of "commercially confidential" information should be narrowly interpreted

[6] D. L. Williams Jr., "Licensing Issues Associated with the Use of Mixed-Oxide Fuel in U.S. Commercial Nuclear Reactors," Oak Ridge National Laboratory Report, ORNL/TM-13421, April 1997, p. 9.

[7] Geoffrey Lean, "Report that Justified Thorp Nuclear Plant Never Existed," Independent on Sunday, September 13, 1998.

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assemblies, which was included in the cost estimates for the MOX facility. Any actual restrictions or requirements related to the storage of fresh MOX fuel at the proposed reactor sites would be imposed by NRC as part of the operating license amendment process.

FD327–6 **MOX RFP**

DOE has withheld no information regarding reactor-specific safety analyses conducted for this SPD EIS. Those analyses are discussed in Section 4.28.2.5.

The remainder of this comment is addressed in response FD327–2.

and applied, in order to assure that the maximum amount of data is made available to the public consistent with the requirements of law. The Department should err on the side of disclosing, rather than withholding, and this policy governing the 216 process should be stated clearly in the final EIS. 6

7. Issues related to burnup levels of irradiated MOX fuel should be addressed.

The draft EIS merely refers to the 1996 PEIS's generic safety analysis of MOX fuel irradiation in LWRs. It does not incorporate new information on safety issues related to the burnup level of MOX fuel. In light of recent findings that "MOX fuel shows a higher failure potential than UO_2 at comparable burn up," as revealed by a recent MOX fuel experiment at the Cabri test reactor in France,[8] significant consideration should be given to limiting average burnup of MOX fuel to the regulatory ceiling of 36,000 MW-D/MTHM now imposed in France.[9] This is the only way to avoid with assurance the risks associated with the propensity of high-burnup MOX fuel to catastrophically rupture in the event of reactivity transients or loss-of-coolant accidents (LOCAs). 7

This problem may be more severe for weapons-grade MOX because the phenomenon believed to be responsible for the inferior behavior of MOX fuel (locally high burnups and fission gas release because of the inhomogenous distribution of plutonium in MOX fuel) would be exacerbated by the higher fission rates that occur in weapons-grade plutonium.

8. Additional NEPA analyses might be required.

A number of significant federal actions are mentioned in the draft EIS as potential options that might be pursued in the disposition program. These actions include the "plutonium polishing" option, irradiation of U.S. and Russian MOX in CANDU reactors in Canada, and fueling the Fast Flux Test Reactor (FFTF) with weapons-plutonium MOX to produce tritium for the U.S. nuclear arsenal. We note and concur with DOE's position in the draft EIS that, in each case, additional NEPA analysis beyond the SPD EIS would be required if any of these actions were to be pursued. 8

Sincerely,

Steven Dolley
Research Director

[8] F. Schmitz, Institute de Protection et de Surete Nucleaire (IPSN), "The Status of the Cabri REP-Na Test Programme: Present Understanding and Still Pending Questions," presentation to the NRC/Industry Meeting on High-Burnup Fuel Issues, Rockville, Maryland, November 18-20, 1997.

[9] Jean-Luc Provost, Electricite de France, "Plutonium Recycling and Use of MOX Fuel in PWR: EDF Operating Experience," Industry Presentation to NRC on the Use of MOX Fuel, Rockville, Maryland, February 21, 1997.

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FD327–7 **MOX Approach**

Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents. The referenced failure of the Cabri fuel in the French experiment was not related to the fact that the failure involved MOX fuel. Even if the test failure were actually related to MOX fuel, the significance would be questionable, for tests were conducted on a contrived set of conditions to explore regions of performance well outside the operating regime for commercial reactors. The tests were designed to test enthalpies of high burnup fuels, both LEU and MOX, under severe transient conditions. Although other factors would also invalidate the application of the Cabri test data to the U.S. MOX fuel case, the most important characteristic of the test fuel—high burnup—would not apply because the MOX fuel is planned for irradiation for only two cycles, resulting in a maximum burnup of only 45,000 MW-day/MTHM. The acceptability of burnups at this level has been aptly demonstrated in Belgian, French, and German reactors.

FD327–8 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views that additional NEPA analysis beyond this SPD EIS would be required for the use of CANDU reactors and the restart of FFTF. In the SPD Draft EIS, DOE retained the option to use some of the surplus plutonium as MOX fuel in CANDU reactors, which would have only been undertaken in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the Draft was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is no longer actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. A separate environmental review, the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999), analyzes the fabrication and proposed shipment of MOX fuel rods for research and development activities involving the use of limited amounts of U.S. MOX fuel in a Canadian test reactor. A FONSI was signed on August 13, 1999.

Both of these documents can be viewed on the MD Web site at http://www.doe-md.com. If a decision is made to dispose of Russian surplus plutonium in Canadian CANDU reactors in order to augment Russian's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. DOE has included plutonium polishing as a component of the MOX facility. Section 2.18.3 and the hybrid alternatives analyses in Chapter 4 of Volume I were revised to include the impacts associated with plutonium polishing.

NUCLEAR ENERGY INSTITUTE

Felix M. Killar
DIRECTOR
MATERIAL LICENSEES
& NUCLEAR INSURANCE

September 21, 1998

Mr. G. Bert Stevenson
NEPA Compliance Officer
Office of Fissile Materials Disposition
U.S. Department of Energy
SPD EIS
P.O. Box 23786
Washington, DC 20026-3786

Subject: Request for Comments on "*Surplus Plutonium Disposition Draft Environmental Impact Statement*" (SPD EIS) (DOE/EIS-0283-D)

Dear Mr. Stevenson:

The Nuclear Energy Institute (NEI)[1] is pleased to provide comments on "*Surplus Plutonium Disposition Draft Environmental Impact Statement*". The U.S. nuclear industry supports the disposition of weapons grade plutonium, in the United States and Russia as a very important national security and nonproliferation initiatives. We believe that consistent with the recommendation of the National Academy of Science, both mixed oxide fuel and the immobilization options must meet the spent fuel standard. As indicated in our attached comments we are concerned that the EIS and therefore the program may not be bringing the immobilization option to this standard. 1

We look forward to your consideration of our comments and to effectively and expeditiously implement this critical non-proliferation initiative. The industry has a great deal of interest in the MOX program and you will certainly receive comments from individual companies as well as those

[1] NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

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MD283–1 **DOE Policy**

DOE acknowledges the commentor's concern regarding the ability of the immobilization approach to meet the Spent Fuel Standard. In the *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), DOE identified two potential liabilities of the immobilization alternatives relative to the Spent Fuel Standard. These liabilities involve ensuring sufficient radiation levels and providing removal-resistant can-in-canister designs. Since that time, DOE has modified the can support structure inside the canisters and has focused its research on the ceramic form of immobilization. As part of the form evaluation process, an independent panel of experts determined (*Letter Report of the Immobilization Technology Peer Review Panel*, from Matthew Bunn to Stephen Cochran, LLNL, August 21, 1997) that the can-in-canister design would meet the Spent Fuel Standard. In terms of plutonium 240 content, it is not necessarily required that isotopic dilution be used to make the material as inaccessible and unattractive for weapons use as the plutonium that exists in highly radioactive spent nuclear fuel from commercial reactors. In addition, NAS is currently conducting studies to confirm the ability of the ceramic can-in-canister immobilization approach to meet the Spent Fuel Standard. DOE is confident that immobilization remains a viable alternative for meeting the nonproliferation goals of the surplus plutonium disposition program.

Mr. G. Bert Stevenson
U.S. Department of Energy
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submitted herein. If you have any questions concerning the information contained in this letter, please do not hesitate to contact me.

Sincerely,

Felix M. Killar

Attachment

MD283

Comments on the Department of Energy's (DOE's)
Surplus Plutonium Disposition Draft Environmental Impact Statement

Location	Comment	
Executive Summary p. S-8	Specification of "can-in-canister" immobilization as a preferred alternative. DOE is proposing "can-in-canister" immobilization as its preferred alternative for immobilization. However, the DOE's own reports[2,3] indicate that "can-in-canister" immobilization does not currently meet the Spent Fuel Standard for long-term nonproliferation resistance. The United States must deploy an effective, accepted plutonium disposition technology or technologies if it wants to encourage international support for plutonium disposition. NEI expects that concurrent action on the part of Russia to dispose of its surplus plutonium will be predicated on the disposition of United States material in a manner that provides high confidence in its resistance to theft, diversion, or re-use. *Recommendations:* DOE should consider only those alternatives that meet the Spent Fuel Standard [i.e., mixed oxide (MOX) fuel and homogeneous immobilization] as preferred alternatives. If the DOE pursues deployment of "can-in-canister" immobilization, the DOE should explain how it will demonstrate, in an open, objective, and peer-reviewed process, that the "can-in-canister" plutonium disposition approach will meet this fundamental program requirement - the Spent Fuel Standard. DOE should also explain why immobilized/"can-in-canister" does not have to meet the denatured aspect of the spent fuel standard i.e. the Plutonium 240 content will not be greater than 20%.	1
Location	Comment	
Executive Summary p. S-14.	Quantities of plutonium considered in the EIS for disposal using the two approaches. The draft EIS states, "Since the ROD was issued, however, DOE has determined that an additional 9 tonnes of low plutonium content materials would require additional processing and would, therefore, be unsuitable for MOX fuel fabrication." DOE alternatives include disposing of a maximum of 33 tonnes of plutonium as MOX fuel, while the alternatives include immobilizing 50 tonnes of surplus plutonium. DOE has never provided justification that any surplus plutonium is not suitable for MOX use. The DOE has not explained what form this "unsuitable" plutonium is in. The technology descriptions in the draft EIS make it clear that various kinds of processing will be used in the Conversion and Immobilization Facility. It would appear to be possible that some of this processing would render material that is suitable for fabrication into MOX fuel. Finally, the DOE has specified no requirements that the plutonium destined for either MOX fuel or immobilization must satisfy. Therefore, it seems very unlikely that there is any technical basis for any decision about quantities of plutonium that are suitable or unsuitable for either option.	2

[2] Sandia National Laboratories, SAND97-8203 - Proliferation Vulnerability Red Team Report, October 1996.

[3] U. S. Department of Energy, DOE/NN-0007 - Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives, January 1997.

MD283

MD283–2 **Feedstock**

DOE reviewed the chemical and isotopic composition of the surplus plutonium and determined in the *Storage and Disposition PEIS* ROD that about 8 t (9 tons) of surplus plutonium were not suitable for use in making MOX fuel. Furthermore, DOE has identified an additional 9 t (10 tons) for a total of 17 t (19 tons) that have such a variety of chemical and isotopic compositions that it is more reasonable to immobilize these materials and avert the processing complexity that would be added if these materials were made into MOX fuel. The criteria used in this identification included the level of impurities, processing requirements, and the ability to meet the MOX fuel specifications. Section 2.2 includes a description of the forms of plutonium that would be used for MOX feed and immobilization feed. None of the material planned for immobilization is in the form of spent fuel, and all of it is considered weapons usable. A further description of the types and amounts of plutonium currently planned for disposition can be found in *Feed Materials Planning Basis for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0013, April 1997).

NUCLEAR ENERGY INSTITUTE
FELIX M. KILLAR
PAGE 4 OF 4

Recommendation:
Given the lack of justification for any decision about quantities of material for the two options, DOE should include the evaluation of a 100% (50 tonne) MOX fuel alternative in the SPD EIS. This is the only way to preserve all appropriate options until the time that the DOE can make a technically defensible evaluation and decision on the allocation of material to the two plutonium disposition approaches. We have recently learn that the Russians do not believe the material that is planned for immobilization is truly weapons grade plutonium. If it is already in the form of spent fuel or contains contaminants such that it can't be used for weapons then it should not be considered as part of this program and additional pits should be identified. 2

Location	Comment	
Appendix D, p. D-2	The appendix states "If it were determined that MOX fuel (rather than uranium-only fuel) were needed for the FFTF operations, the MOX fuel fabrication alternatives may be eliminated, depending on the amount of surplus plutonium that would be required for tritium production." However, it is our understanding that the capability to fabricate significant quantities of MOX fuel for the FFTF does not currently exist within the DOE complex. *Recommendation:* DOE should acknowledge that use of the FFTF with plutonium fuel in this manner would require the design and construction of a MOX fuel fabrication facility for the FFTF fuel or consider off shore production of MOX fuel. It is the light water reactor irradiation of MOX fuel that might be eliminated by such a course of action.	3

Location	Comment	
Sections 2.17 and 2.18.	Hot cell examinations of irradiated lead assembly fuel. The environmental impacts in the draft EIS do not appear to include those impacts associated with hot cell examinations. In particular, there is no acknowledgment that the hot cell facilities would be responsible for the disposal of the spent nuclear fuel that results from destructive hot cell examinations. *Recommendation:* DOE should revise the EIS to include these impacts, or note that such impacts are already included in other environmental evaluations.	4

MD283

MD283–3 **DOE Policy**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source.

MD283–4 **Lead Assemblies**

Section 2.18 was revised to include a description of the impacts of postirradiation examination of lead assemblies.

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Nuclear Information and Resource Service
1424 16th St. NW, Suite 404, Washington, DC 20036; 202-328-0002; fax:202-462-2183, e-mail:nirsnet@igc.apc.org web:www.nirs.org

September 15, 1998

Laura Holgate, Director
Office of Fissile Materials Disposition
US Department of Energy
PO Box 23786
Washington, DC 20026-3786

Ms Holgate:

Thank you for this opportunity to comment on the Surplus Plutonium Draft Environmental Impact Statement (EIS) of the U.S. Department of Energy. These comments are supplemental to comments already submitted by me on behalf of Nuclear Information and Resource Service in North Augusta, SC in August (provided again below to insure their inclusion in the record).

We remain unalterably opposed to the use of plutonium fuel in reactors, here in the US, in Russia, Canada, anywhere. 1

I take this opportunity to formally protest the fact that a major federal action is being undertaken without providing side by side parallel levels of information on the various options. Plutonium disposition via immobilization only should be compared to a specific analysis of the dual track putting MOX in an existing light water reactor (LWR) and immobilization. It seems the Department of Energy (DOE) is already completely committed to following the dual track MOX option prior to the issuance of the Record of Decision (ROD) on this EIS (which is ostensibly to inform that decision) and prior to any substantive analysis of the impacts that the MOX option would have on specific existing reactors. 2

The evidence for this is DOE's issuance of a Request for Proposal from MOX fabricators and irradiators (reactors) and the intention to forge a contract on MOX work, possibly before the ROD is out.

It would seem that communities around the DOE sites under consideration for plutonium processing and MOX fuel fabrication can look for protection under the National Environmental Policy Act, but those who will be directly affected by the introduction of experimental, never-been-tried-before fuel in the local nuclear power reactor. This is not acceptable. (European MOX does not have gallium added, not is it pure Pu-239.) 3

It is also not acceptable the on three separate occasions members of your Office staff have offered to me the advice that reactor communities can impact the federal decision-

FD328

FD328–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach. Currently, there is no domestic or international consensus on a single approach to be employed to dispose of surplus plutonium. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

FD328–2 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for proposed surplus plutonium disposition facilities. DOE has not precluded any alternative, including immobilizing all the surplus plutonium or taking no action. A side-by-side comparison of the various alternatives are shown in Table 2–4, which summarizes the environmental impacts for all of the alternatives on an individual basis by DOE candidate site.

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE

source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD. As stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are made and announced in the ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before the ROD is issued, and options that would allow construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach.

FD328–3 General SPD EIS and NEPA Process

Irradiation of MOX fuel in reactors is a well–established technology with commercial application in several countries. Because MOX fuel derived from weapons–usable plutonium has not been produced on a commercial scale, DOE has conducted experiments in a test reactor to obtain detailed engineering performance information. It will also conduct a lead assembly project to ensure the availability of all information (including safety parameters) necessary to obtain a license modification for the irradiation of this specific type of MOX fuel.

As discussed in response FD328–2, the public was provided an opportunity to comment on reactor- specific information. In addition, an opportunity for public comment will likely be provided by NRC during DCS's application for

making process by intervention in the Nuclear Regulatory Commission's (NRC) license amendment process for any reactor that may use MOX fuel.

This is completely inappropriate. It is almost like saying – the automobile manufacturer doesn't have to bother with any safety analysis or tests of a completely new design of an automobile – just go ahead and build it and sell it and then we will see what happens with the local license inspection. Your office, the Secretary of Energy and the President and Vice President have the responsibility to make a decision based on information about all of the impacts that a MOX program may have. The current document is completely lacking in any consideration of the reactor impacts. 3

In a recent conversation with members of your staff, I was referred to the Programmatic Environmental Impact Statement (PEIS) on Plutonium Disposition when I raised issues associated with the use of aging power reactors for this challenging mission. A return to this document yields the comments I offer below. By the way, they left the existing civilian reactor so-called "low-level" waste out of the PEIS, no matter what the NEPA officer says! 4

I do however, want to assure you that the reactor communities across the country are well aware of their right to intervene on the license amendment process. I also want to point out that even in areas where the community is not what might be called "anti-nuclear," there is already official and documented willingness to oppose use of weapons plutonium in existing reactors. We recommend that you add this information to the uncertainty factor on any cost estimates you make for this program. 3

I would also commend to you the fact that novel procedures such as using environmental reports previously filed with the NRC that may be decades old or the invocation of "proprietary information" under a vendor procurement deal which may require that a local community has to "take DOE's word for it" will not build DOE credibility. In fact, such an approach by your office may also provide procedural loopholes that could result in administrative or legal delays. 5

We sincerely hope that your office retains and pursues its stated high level of commitment to the non-MOX options for plutonium disposition, since there is wide consensus that this disposition should proceed. 1

FOR CONSIDERATION UNDER A TRUE NEPA PROCESS:

Utilization of the environment reports filed at the time of reactor licensing may be decades out of date. What are the plans to upgrade and update this information? 6

Given the aging of nuclear reactors—including embrittlement of major components that has caused multiple reactor shut downs (permanent) well in advance of license expiration (Trojan, Yankee Rowe, Big Rock, Oyster Creek (soon), Maine Yankee to name a few in the last 5 years), combined with the environment of utility restructuring and competition 7

2

FD328

FD328–4 **Waste Management**

Section 3.7 was added and Section 4.28 was revised to include information specific to operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

FD328–5 **General SPD EIS and NEPA Process**

In analyzing the reactors proposed to use MOX fuel, DOE has not relied on information from the original environmental reports filed with NRC. Furthermore, DOE has withheld no information regarding reactor-specific safety analyses conducted for this SPD EIS. Those analyses are discussed in Section 4.28.2.5.

FD328–6 **MOX Approach**

The data used in the SPD EIS analyses of the reactors that would use the MOX fuel were provided by DCS and independently reviewed and verified by DOE. In addition, some information was supplemented by DOE, as discussed in Section 4.28.

The remainder of this comment is addressed in response FD328–5.

FD328–7 **MOX Approach**

The MOX approach is not intended to affect the viability of nuclear power generation at any particular reactor. The reactor owner(s) does (do) not have to continue to use MOX fuel if it determines that it is uneconomical to operate the reactor operating license amendments required for each individual reactor before it can use MOX fuel pursuant to 10 CFR 50.91 should the MOX approach be selected.

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among electrical service providers, it is plausible (even likely) that tax-dollars for the service of plutonium irradiation will keep reactors on-line that would other-wise close.

THEREFORE, a true NEPA analysis of the existing reactor MOX option MUST include the shut-down scenario. It is not only a comparison between LEU (scenario: reactor continues to operate on LEU but all surplus plutonium is immobilized) and MOX (scenario: plutonium fuel is loaded in x many specified existing-LWRs and they get costs plus some financial benefits). It must go one step further: LEU vs MOX vs no reactor (scenario: all plutonium is immobilized and the reactor closes due to market forces). 7

In any economic analysis running parallel to the NEPA analysis, there must be a consideration of the impact of federal tax-dollar protectionism of these reactors on the utility markets that they are part of. What are the long-term environmental consequences of privileging nuclear over bio-mass, wind, solar, small hydro and energy efficiency? 8

If we assume that there will be full-core MOX, which is widely assumed by the industry, and we assume a fast thru-put rate, which will be required if predictions hold on the relatively small number of reactors that will remain viable through the entire program, then the MOX program will have extensive impact on the on-site storage of irradiated fuel. The requirement of ten years wet storage for irradiated MOX will certainly force accelerated movement of LEU fuel into dry storage. Once MOX fuel is being put in dry storage, the requirement of relatively few assemblies per container will expand the overall total number of dry casks required. 9

This NEPA analysis should consider how to factor any local or state requirements and restrictions applied to on-reactor-site interim storage. For instance, the Minnesota Supreme Court ruled that cask storage is different than pool storage and is subject to State Legislature approval. Nevada has outlawed storage and Vermont and California also have restrictions in place, to name a few. There has yet to be the constitutional test over the ability of the federal programs to override state law on behalf of nuclear enterprises. This should not be forgotten.

Does DOE intend to start inserting "National Security" type arguments over civilian facilities and the communities and States that host them? If so, we had best know that now, and Governors should be advised as well. Again, it is completely unsupportable that these decisions are being made with a systematic exclusion of the reactor impacts analysis at any level where it can inform this decision, and without the active inclusion of the reactor communities. 3

USE OF A GENERIC REACTOR AS PROXY FOR SITE SPECIFIC ANALYSIS

There is no such thing as a generic nuclear power reactor. Each was built in a unique place, as a unique fabrication, and many on effectively unique designs. Over the years they have become MORE unique, as can be demonstrated by the very high percentage that are now out of compliance with their own Final Safety Analysis Report and Design 10

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the reactor. If a reactor withdraws from the team, DCS must accommodate the loss of capacity. The actions to accommodate might include changing MOX fuel loadings in the remaining reactors and finding a replacement reactor. This ensures that DOE is not driving the continuation of reactor operations solely for the surplus plutonium disposition program. Furthermore, DCS would only be reimbursed for costs that are solely and exclusively related to MOX fuel irradiation. This would ensure that the taxpayers were not underwriting otherwise uneconomical electricity-generating assets.

The purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. If DOE were to choose the immobilization-only approach, these reactors are expected to continue to operate using LEU fuel for at least as long as it would otherwise take to complete the irradiation of the MOX fuel. So, while this SPD EIS does consider the immobilization-only approach (Alternatives 11 and 12) advocated by the commentor, it does not analyze the environmental impacts associated with shutting down the specific reactors proposed to use MOX fuel before the end of their useful life because DOE did not choose to use MOX fuel in those reactors.

FD328–8 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life–Cycle Costs and Cost–Related Comment Resolution Document* (DOE/MD–0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this

Bases documents. It is not at all credible to suggest that the generic analysis provided (such as it is) in the PEIS can stand for a reactor impacts analysis.
Some reactor items which are NOT generic:

Reactor design
Reactor modifications, historic and needed for MOX use
Reactor vessel chemistry
Reactor vessel and internal component aging
Irradiated Fuel storage—wet and dry status, physical, social, political
Fuel storage siting issues and authorities
So-called "Low-Level" waste disposal factors, handling, on-site issues
Transport factors
Population
Emergency planning
History of management/regulatory issues including safety factors and performance
History of emissions
Degree of extant contamination and radiological impact on humans/environment

This is not the complete list. 10

The PEIS references Appendix E for information about the waste associated with the existing-LWR MOX option. Nowhere in Appendix E is the existing-LWR option listed. There is a very cursory discussion of so-called low-level (civilian LLRW includes plutonium even in class A waste, and reactor "low-level waste" may also include sludges from primary coolant and components such as steam generators and the reactor vessel as well as reactor internals that will deliver a lethal dose if unshielded) waste, associated with the Evolutionary LWR scenario There is no section on the existing-LWR option in Appendix E. 11

References to reactor-site burial of such waste certainly require a site-specific analysis, not a generic dismissal. Disposal off site is simply given as the other option; end of analysis. There is no documentation of the array of radionuclides in so-called low-level radioactive waste (LLRW) that would result from irradiation of MOX fuel vs LEU fuel. There is no consideration of the environmental impacts of shipment to or emplacement of this MOX LLRW in any of the existing "low-level" unlined trench dump sites: Barnwell in South Carolina near SRS, Envirocare in Utah or Richland in Washington State next to Hanford. 12

Needless to say, there is no analysis of the potential impacts of this plutonium fuel generated waste in any of the proposed new "low-level" dumps – of greatest interest being Ward Valley in California and Sierra Blanca in Texas because of the ongoing debates about whether these facilities may jeopardize major water supplied in the Colorado and Rio Grande rivers.

Another area of nuclear infrastructure completely ignored by the PEIS are all the nuclear services that reactor operators require. These include: nuclear laundries, incineration and 13

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proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The comparison of the environmental impacts of nuclear power with those of alternative energy sources is beyond the scope of this EIS.

FD328–9 **MOX Approach**

As discussed in Section 4.28, a partial, not full, MOX core is proposed. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a potential geologic repository built in accordance with the NWPA, as amended. As described in response FD328–4, additional spent fuel would be produced, but in amounts that are not expected to dramatically change the reactors' spent fuel storage plans (e.g., no new cooling ponds would be required at the proposed reactor sites). State requirements applicable to the reactors' spent fuel storage plans would be considered during the NRC operating license amendment process pursuant to 10 CFR 50.90.

FD328–10 **MOX Approach**

Reactor-specific analyses are presented in the revised Section 4.28 and replaced the generic reactor analysis presented in the SPD Draft EIS.

FD328–11 **Waste Management**

The estimated waste generation associated with the proposed reactors is discussed in Sections 3.7 and 4.28 of this SPD EIS.

FD328–12 **Waste Management**

None of the proposed reactors plan to bury LLW on the site. LLW would continue to be disposed of at offsite commercial facilities licensed by NRC. There are differences in fission product inventories and activation products between an LEU and MOX core during a fuel cycle. The only time significant quantities of fission products could be released to the environment would be in the event of a large–scale fuel leak. In regard to normal operations, FRAGEMA's (a subsidiary of COGEMA; one of the companies chosen to operate the proposed MOX facility) experience with fabricating MOX fuel indicates a leakage rate of less than one-tenth of 1 percent. FRAGEMA alone has provided 1,253 MOX fuel assemblies, with more than 300,000 fuel rods

for commercial reactor use. There have been no failures and leaks have occurred in only 3 assemblies (a total of 4 rods). All leaks occurred as a result of debris in the reactor coolant system and occurred in 1997 or earlier. The French requirements for debris removal were changed in 1997 to alleviate these concerns. Since that time, there have been no leaks in MOX fuel rods. In the event of a leaker, fission products are released into the primary containment and are ultimately either passed through a series of resins (for liquid releases) or through a HEPA filtration system (for releases to the atmosphere) that would capture approximately 99.99 percent of the radionuclides.

The use of MOX fuel would not be expected to result in any additional LLW from refuelings because the reactors would continue to operate on the same schedule as if they were using only LEU fuel.

FD328–13 **Human Health Risk**

As indicated in the revised Section 4.28 of this SPD EIS, the use of MOX fuel would not significantly change the reactor effluents or the amounts of spent nuclear fuel and wastes generated. Therefore, wastes and emissions from reactor nuclear services would not appreciably change. As such, any changes in worker and public health risk and other environmental impacts associated with these nuclear services would likely be minor.

compaction facilities for so-called "low-level" waste, decontamination services for components that are not yet considered waste and off-site storage warehouses for all of the above. The question is very real, and as yet unanswered: what does the use of MOX fuel do to the workers, the air and water emissions, and waste streams from each of these nuclear services? How does this impact the environment and public health and safety? 13

Don't the communities that affected by these nuclear service facilities have a right to this information? This information should be factored when considering immobilization only as a pilot track. The possibility of reactor closures should also be factored in such an analysis: what the affect on the environment would after plant closures or these facilities? 3

It is ridiculous that the "criteria pollutants" for air emissions under the PEIS generic reactor analysis does not include radionuclides. No numbers are given for MOX radionuclide emissions vs LEU air emissions. It is well documented the there has been a history of fuel failure in US reactors with LEU fuel. There is evidence that European MOX fuel is more prone to cladding failure, and that Weapons Pu MOX may be even more prone to cladding failure than European MOX. The interaction of gallium and zircaloy and other factors, such as the chemistry of the core are factored into this projected incident rate. A credible analysis of the existing-LWR MOX option will need to quantify this in a reasonable and defensible manner, and include it in the projected air emissions. 14

It should be noted that the generic reactor portrayed by the PEIS is based on data that is already today 6 to 10 years old. This is not going to reflect the aging issues that are coming to the forefront of reactor hazard concerns. The difference in neutron activity associated with MOX fuel also needs to be assessed for the possible contribution to further acceleration of the aging of these components, and the consequent reduction in the margin of safety at the site. 15

Additionally, there needs to be some assessment of the institutional issues. Weapons Pu-239 fuel will be a first-time experiment. What are the human factors that are affected by changing basic features of an aging system? 16

The generic reactor analysis further does not give an assessment of the source term associated with the reactor core, the fuel pool or a dry storage unit. Again, the LEU vs MOX comparison must be made, and should be compared to the shut-down reactor possibility. 7

There is ample evidence to suggest that the use of weapons plutonium MOX in existing aging light water reactors subject to utility deregulation may not only increase the probability of a major reactor accident, but would also increase the effects of such an accident, were it to happen. No where in the NEPA process to date are these issues addressed by DOE. What is the justification for taking a major federal action with such potentially grave consequences, without the least consideration of these factors? 17

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FD328–14 **Air Quality and Noise**

Section 4.28.2.4 indicates the doses from atmospheric and liquid releases that would be expected from the continued operations of the proposed reactors with MOX fuel. A plutonium-polishing process was added as a component of the MOX facility to address concerns about the presence of gallium and other impurities in the MOX fuel. Therefore, it is not expected that the MOX fuel would be more prone to cladding failure than LEU fuel.

FD328–15 **MOX Approach**

Section 4.28 of this SPD EIS was revised to provide current reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents. The higher flux associated with MOX fuel can accelerate reactor component aging. However, this would be taken into account when developing fuel management strategy, including fuel assembly placement in the reactor core. Safety issues would also be addressed during the NRC license amendment process.

FD328–16 **MOX Approach**

Some procedural modifications relating to fresh fuel handling, reactivity control, and spent fuel management may be required for the reactors using MOX fuel. None of these modifications would be expected to result in increased environmental impacts from the continued normal operation of these reactors. These changes would likely be covered in an ongoing training program for operators and would be discussed during the NRC license amendment process.

FD328–17 **Facility Accidents**

As discussed in Section 4.28.2.5, studies by NAS have led it to the following conclusion: "no important overall adverse impact of MOX use on the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities will involve factors not related to fuel composition and hence unaffected by the use of MOX rather than LEU fuel." Section 4.28 was revised to include an analysis of the potential accidents and risks associated with using MOX fuel in the proposed reactors.

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Finally, there is no justification whatsoever for taking the recommendation for a linear no-threshold model for radiation dose response from the BIER-V report and then applying an arbitrary risk reduction factor to it. Indeed, real-world health studies done by credible scientists are showing a supra-linear dose-response curve, where per-unit of dose there are more health consequences in the low-dose range. 18

All taken together, we recommend that the current EIS be suspended and a design phase for this NEPA process be initiated so that there is no decision on the MOX option until these, and other concerns that may be raised by concerned citizens are addressed. 2

Thank you for your consideration.

Mary Olson
NIX MOX Campaign Coordinator
Nuclear Information & Resource Service

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The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

FD328–18 **Human Health Risk**

As indicated by the commentor, the estimates of adverse health effects from radiation doses for this SPD EIS are based on the linear, no-threshold theory of radiation carcinogenesis, including the application of a dose-rate effectiveness factor (risk reduction factor). The no-threshold model postulates that all radiation doses, even those close to zero, are harmful. The approach used in this EIS, including the application of a dose-rate effectiveness factor of 2 is consistent with the recommendations made by the Committee on Interagency Radiation Research and Policy Coordination (*Use of BEIR V and UNSCEAR 1988 in Radiation Risk Assessment, Science Panel Report, No. 9*, ORAU 92/f-64, December 1992). However, it is generally acknowledged that the model results in conservative predictions of adverse health effects.

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Thank you for this opportunity to comment on the Surplus Plutonium Draft Environmental Impact Statement of the U.S. Department of Energy, North Augusta, SC, August 13, 1998

Mary Olson
NIX MOX Campaign Coordinator
Nuclear Information & Resource Service

On behalf of the nationwide membership of Nuclear Information and Resource Service, I am here to respectfully tell you to put zero plutonium into MOX (mixed plutonium and uranium oxide) fuel. Our organization was founded by communities that are affected by commercial nuclear power reactors. Over time our members have grown to include those who are affected by current and proposed nuclear waste sites and transport routes. We are offended that the Department of Energy has persisted in ignoring these communities that will be directly affected if MOX fuel is produced and introduced into the fuel stream and so inevitably the waste stream of the nation's reactors. Your process has selectively targeted comments from the communities that would be affected by MOX fuel fabrication, but not it's use. 1 2

We oppose the use of plutonium fuel, therefore we oppose the fabrication of plutonium fuel. We encourage DOE to fully explore the non-reactor alternatives for plutonium disposition. 3

I am here to tell you will hear from the reactor communities. You have done little to reach these communities, but when the news arrives that plutonium is on the way, you will hear the cry loud and clear: NIX MOX. Communities simply will not settle for a plan that both increases the possibility of a major reactor accident occurring AND also guarantees that if there is a major release of radiation that the consequences of that accident will be greater than if there were LEU uranium as the reactors were designed for. Communities with aging reactors are taking the safety issues into their own hands and 9 reactors in as many years have closed due to a combination of safety and economic concern. MOX will simply become one more opportunity for those concerned about nuclear hazards at reactors to make their case. 4 5

Nationally this program will not stand the scrutiny of the electric utility deregulation process. Direct taxpayer subsidy unfairly advantages nuclear power 6

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SCD28–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

SCD28–2 **General SPD EIS and NEPA Process**

At the time the SPD Draft EIS was issued for comment, no domestic, commercial reactors had been identified for the possible irradiation of MOX fuel.

The SPD Final EIS was not issued until the proposed reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

SCD28–3 **MOX Approach**

DOE acknowledges the commentor's support for the immobilization-only approach. DOE considers the use of a nonreactor alternative in Alternatives 11 and 12, immobilization of all the surplus plutonium.

SCD28–4 **MOX Approach**

This comment is addressed in response SCD28–2.

SCD28–5 **Facility Accidents**

Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

SCD28–6 **MOX Approach**

Use of MOX fuel in commercial reactors is not proposed in order to subsidize the commercial nuclear power industry in the event of deregulation. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

reactors over other forms of electricity. Ultimately, when the consumer decides, DOE may have to pay a lot to keep MOX reactors on line. 6

When it comes to transportation, MOX will necessarily involve more transportation steps than any other alternative. Our experience is that communities are extremely unhappy to hear about nuclear shipments on their roads and rails. The Department's own research has shown that this opposition runs very deep. More than 20 % of those queried (in a social science survey done by the University of New Mexico for DOE) said that they thought that civil disobedience (breaking laws) was justified to stop nuclear shipments through heir town, and 80% said that they would vote against any elected official who supported such a plan, as well as give money to groups that would help fight it. People feel very strongly about this, perhaps Vice President Gore should listen! 7

One of the most disturbing aspects of the DEIS that we are here to comment on, aside from the obvious commitment to taking the MOX option, is the plan to ship plutonium in the powder or oxide form. We would oppose this idea if it were just a few miles, but the current consideration of shipping it across 6 states is ridiculous. Not only is it a enormous security risk, if there were some form of catastrophic disruption of such a shipment, the containment of the plutonium oxide would present a much greater challenge than other forms of the material. The potential dispersal by air (wind or fire plume) or run-off would place countless human generations at greater risk of cancer, birth defects and other health problems, as well as affecting other species adversely. We firmly believe that the U.S. DOE has no right whatsoever to take risks, the consequences of which could result in nuclear devastation, particularly in the name of reducing nuclear dangers. 8

We are further alarmed to realize that recent changes in Nuclear Regulatory Commission requirements for plutonium shipping containers no longer require a double walled vessel. DOE should not ship plutonium oxide in bulk at all and any other type of plutonium shipment, the Department should voluntarily use a double (or more) walled container. What is the excuse for increasing risk? This is an inherently hazardous activity, which long term consequences. 9

There would be many advantages to the plutonium disposition mission if the MOX program were canceled. Here is a brief overview along with our recommendations for how to proceed with a successful disposition for this plutonium which we all agree is far better removed from the weapons inventory.

Plutonium "polishing" would be minimal for most immobilization methods. An aqueous "pre-processing" step, much like the reprocessing step that separated the plutonium in the first place could be avoided. Reprocessing is known to produce some of the most dangerous and difficult to contain wastes in the history of the nuclear age. There is no reason for the DOE to compound this disaster as 10

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SCD28–7 **Transportation**

DOE acknowledges the commentor's concern about public reaction to the transportation of nuclear material. The hybrid alternatives in this SPD EIS would require more transportation than the immobilization-only alternatives as shown in Section 2.18 and Appendix L.

SCD28–8 **Transportation**

Table L-6 summarizes the analysis of risks attributed to alternatives that involve transportation of nuclear materials. The Type B packages that would be used to transport radioactive material are designed to withstand test conditions described in Appendix L.3.1.6, which represent extremely severe accidents (estimated to be more severe than over 99 percent of all accidents that could occur). Type B packages have been used for years to ship radioactive materials in the United States and around the world. To date, no Type B package has ever been punctured or has had its contents released, even in actual highway accidents. As described in Appendix L.3.1.6, the Type B package is extremely robust and provides a high degree of confidence that even in extremely severe accidents, the integrity of the package would be maintained with essentially no loss of the radioactive contents or serious impairment of the shielding capability. As discussed in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. DOE's decision will be based on analysis in this SPD EIS and will include consideration of public comments.

SCD28–9 **Transportation**

Appendix L contains information on the shipping containers that would be used to transport plutonium. Transportation of the plutonium material would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. Under NRC regulations (10 CFR 71), plutonium in excess of 20 Ci per package must be packaged in a separate inner container placed within an outer container (i.e., double-walled system). This requirement would apply to DOE shipments of surplus plutonium.

SCD28–10 **Alternatives**

DOE is not considering reprocessing any surplus plutonium from spent nuclear fuel; plutonium polishing is not reprocessing and would be a relatively small component of the MOX facility. As described in the Waste Management sections in Chapter 4 of Volume I, the wastes generated would not have a major impact on waste management resources at any of the candidate sites. If Pantex were chosen as the site for any of the proposed surplus plutonium disposition facilities, additional LLW and TRU waste capabilities may be required, as discussed in the appropriate sections in Chapter 4 and Appendix H.3. DOE also appreciates the commentor's concern regarding environmental consequences of surplus plutonium disposition activities. As described in Chapter 4 and summarized in Section 2.18, potential impacts to the public from any of the proposed activities during routine operations at any of the candidate sites would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed in compliance with today's environmental, safety, and health requirements.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons–Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site–specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life–Cycle Costs and Cost–Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life–cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe–md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington D.C.

Commercial reactors currently have armed security forces, primarily to protect against perimeter intrusion. There would be increased security for the receipt and storage of fresh MOX fuel, as compared with that for fresh LEU fuel, for additional vigilance inside the perimeter. However, the increased security surveillance would be a small increment to the plant's existing security plan.

The remainder of this comment is addressed in responses SCD28–7, SCD28–8, and SCD28–9.

is already evident in the environmental devastation of nuclear pollution here at and around Savannah River Site and the Hanford Reservation.

Fewer facilities would have to be built, reducing the coat as well as the inevitable difficulty associated with approvals, licenses and such.

Plutonium would travel less. Nuclear Information and Resource Service is not taking a position on where the immobilization program should be pursued, or even if it should be done in one place. Nonetheless, it is pretty obvious that weapons-usable material would be transported less and spend more time within the boundaries of the DOE complex than in the MOX option. Before it is fissioned in the reactor core MOX fuel is still weapon's usable, requiring only reprocessing technology, not enrichment. Thus it would require national security level security in transport. 10

Further, there would have to be the same level of security instituted at reactor sites. We object to DOE endowing private security services in our communities with a shoot-to-kill authority.

Obtaining reactor license amendments for this new fuel type will offer the opportunity to review the reactor safety systems and also t he aging issues inherent in the long-term exposure to he heat and radiation of LEU uranium fuel. The increased capacity of plutonium fuel to age components, particularly in the full-MOX cores that the Department seems to be assuming in the DEIS, will provide a wonderful opportunity to target reactors for early closure. 11

On the waste front, immobilization also offers the Department some relief, since the storage of an immobilization end-product can be designed from the ground-up to be appropriate for this new waste type. In contrast, irradiated MOX fuel in the hands of nuclear utilities that are already facing challenges of waste storage is a very different picture. Over-filled fuel pools, many already strained far beyond their original design capacity will not be easier to manage with the greater thermal and criticality factors, as well as cladding stress issues that MOX will introduce. If dry storage is in use at the time that MOX waste would be moving out of the fuel pools, attempted use of current cask designs may also result in problems that will be the Department's to deal with at some point. What is going to become of all that damaged fuel if we ever do have a repository? 12

All this spells more expense, more regulatory and administrative combat with local communities and ultimately if great care is not take and more money is not spent, far greater environmental impact than a system that is designed specifically for the unique aspects of plutonium wastes.

The list of all the reasons MOX is a bad idea goes on, and we will supplement these oral comments with further written comments. The bottom line is that MOX will cost a tremendous amount of money to do at all, and then it will cost even

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SCD28

SCD28–11 **NRC Licensing**

The higher flux associated with MOX fuel can accelerate reactor component aging. However, this is taken into account when developing fuel management strategy, including fuel assembly placement in the reactor core. The proposed action anticipates partial, not full, MOX cores in the selected reactors. This issue, along with other issues important to safety, would be addressed during the NRC license amendment process.

SCD28–12 **Waste Management**

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. MOX fuel would be handled the same as other fuels with regard to pools and dry casks. MOX fuel assemblies would be the same size and shape as the LEU fuel for the specific reactor. The only difference would be the additional decay heat from the higher actinides, especially americium, in the MOX fuel. Dry casks are designed and certified for a maximum heat load, so the additional decay heat would contribute to the total heat load and not require any redesign. The additional heat load may result in less spent fuel stored per cask. A more likely option is that the MOX fuel would be selectively packaged with cooler LEU fuel to obviate any overall heat output restriction. As a result, DOE does not expect any changes in the cask design. An amendment to the Certificate of Compliance for the cask, and the reactor operating license, would be needed to include storage of MOX fuel assemblies.

The remainder of this comment about cost is addressed in response SCD28–10.

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MARY OLSON
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more to deal with the legal and administrative aspects of trying to oppose the people you serve, and then it will cost even more than that, since the probability of a real problem at some point are not our imagination, but rather based on 50 years of experience with the Department and three decades of suffering reactor operation. 12

Recommendations for responsible immobilization of surplus weapons plutonium.

The Department must insure a zero release policy for every site where plutonium is handled. There is no acceptable amount of this material in the environment, in our bodies, in our food, in our air in our water.

This means that there has to be a plan for ALL the waste at every step to insure that it is tracked into 100% containment, and that there is no idea that it is OK to vent.

The Department should insure that state of the art monitoring will instituted -- with redundancy to insure that this policy is in-force at all times. One of the monitoring systems should be administered completely in the control of the local community. 13

This means that there is a commitment to zero dose to the public in this process.

The Department should institute a low as achievable dose policy for workers. This is NOT ALARA -- remove the word "reasonably" before achievable. Cancel MOX and spend the money you would save on meeting these goals, and there will be far greater acceptance of plutonium disposition mission in whatever community you approach to host this vital contribution to the welfare of our planet.

Equally Important to protecting the people and the environment from DOE's plutonium handling is the security of this vulnerable material. We recognize that steps must be taken to insure that this material is not diverted. At the same time this must not be at the expense of an open and accessible information base to insure that environment and safety commitments are being met. 14

Thank you.

OLSON-4

SCD28

SCD28–13 **DOE Policy**

The health and safety of workers and the public is a priority of the surplus plutonium disposition program, regardless of which approach is chosen. Operation of the proposed surplus plutonium disposition facilities would comply with applicable Federal, State, and local laws and regulations governing radiological and hazardous chemical releases. Within these limits, DOE believes that the level of contamination should be kept as low as is reasonably achievable, so that the benefit of reducing the already low level of contamination would warrant the additional cost of that reduction. Chapter 5 summarizes the applicable environmental statutes, regulations, and permits that cover emissions, waste, and ALARA standards.

SCD28–14 **DOE Policy**

DOE acknowledges the commentor's concern about the security of plutonium materials. The proposed DOE surplus plutonium disposition facilities are all at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Security for the proposed facilities would be implemented commensurate with the usability of the material in a nuclear weapon or improvised nuclear device. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed inside are adequately protected. Closed-circuit television, intrusion detection, motion detection, and other automated materials monitoring methods would be employed. Furthermore, the physical protection, safeguards, and security for the MOX facility and domestic, commercial reactors would be in compliance with NRC regulations. International inspections of the proposed facilities would be conducted strictly by procedure so as not to compromise security. None of the policies, programs, or procedures implemented for safeguarding this material would inhibit compliance with safety or environmental regulations.

Sept 10, 1998

U.S DOE, Office of Fissile Materials Disposition:
Comment on SPD EIS (DOE/EIS-0283-D)

1952 Palisades Dr.
Appleton, WI
54915

I am pleased to see this effort with Russia to reduce the threat of nuclear proliferation. I certainly hope an agreement on this is being made. We need to set an international example in this "gift of time" we now have. 1

I strongly advocate immobilizing all of the surplus plutonium and not using any of it as MOX in commercial reactors. I think your SPD EIS does not deal with what is "really happening" with spent fuel at commercial reactors and paints a rosy picture of mox fuel being tested by lead assemblies, and NRC approved, and everything going fine. If you look at what has happened with spent fuel at commercial reactors in relation to the VSC-24 and Nuhoms dry cask storage in the past 10 years, it is very clear that commercial vendors and commercial utilities (as licensees) have been very lax in the way things were handled — and the NRC had its share of mistakes too. There were so many nonconformances and violations and fines given out, that in the end Vectra and Sierra Nuclear both were on the verge of bankruptcy and not allowed to fabricate casks — which means reactors were stuck with full fuel pools and no casks to load spent fuel into. The explosion of a VSC-24 at our St. Lucie Beach reactor was a real black eye to the whole system — vendors, utilities, and the NRC. Now you ask us to put MOX fuel in their hands? I think not. We have enough problems already. 2

Commercial reactors are aging; steam generators are corroding, brittleness is a problem, pools are aging, more and more safety factors are coming to light. How

MD178

MD178–1 **Nonproliferation**

The United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain surplus plutonium disposition activities in order to encourage the Russians and set an international example.

MD178–2 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach and support of the immobilization approach. In choosing reactors to use the MOX fuel, DOE looked at the criteria of reactor age. DOE chose only reactors whose planned operating life extended through the full life cycle of the surplus plutonium disposition program. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel. The spent fuel generated from the use of the MOX fuel in the commercial reactors would be stored at the reactors in accordance with all applicable NRC regulations and shipped to and disposed of at a potential geologic repository as would other commercial reactor spent fuel. Transportation of commercial spent fuel to a potential geologic repository is analyzed in the *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999). As far as reactor modifications and liability, the commercial reactor licensee is responsible to maintain and modify the reactor as needed.

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is no time to put more stress on the public system by promoting the use of military waste in commercial reactors. The military and public were always to be separate on this. If you mix this now it will only lead to future troubles. I see it as a cheap bailout for the nuclear industry which is facing huge problems and costs with dry cask storage and decommissioning woes. They'd love to get some cheap MOX fuel and have DOE (the public as tax payers) liable for any problems. Once this MOX is spent fuel, then what??? Will DOE pay for dry casks for it and be responsible? If reactors need changes, or fuel handling at reactor pools require changes, or casks need design changes, is DOE responsible for costs and liabilities or what? You have to look at the details here. The public could get saddled with a huge bill. Let the commercial reactors pay for their own fuel, and be responsible for their own problems. Don't get the military and DOE interwoven in utility spent fuel problems. It will be a mess! 2

Questions:

1. If Yucca Mt does not open, will DOE be responsible for MOX in dry cask storage at reactors? Who pays for problems? 3
2. If Yucca Mt. does open, will MOX spent fuel take priority ahead of other commercial spent fuel to go in first? How will other commercial reactors feel about this? 4
3. The capacity of Yucca is too small for total waste now, where will other repositories be sited? How many will we need, if MOX fuel promotes relicensing of aging plants so that they run longer on this cheap subsidy? We should be closing these plants now, not 5

MD178

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

MD178–3 **Repositories**

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. The characteristics of the MOX spent fuel would be similar to those of normal spent LEU fuel. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. Following irradiation, the MOX fuel would be removed from the reactor and managed at the reactor site as spent fuel in accordance with the site's normal spent-fuel-handling procedures. Reactors would require NRC operating license amendments and, as part of that process, safety and operational arrangements (e.g., spent fuel management plans) would be evaluated. In any event, it would be the licensee's responsibility to ensure that spent fuels, MOX or LEU, were safely managed.

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pouring more money down the commercial nuclear drain. This country is ready for renewables and not longer run nuclear plants creating waste that has no place to go. 5

4. Will MOX spent fuel fit into already generically certified dry cask designs, or will there be big problems with changes necessary? Will amendments to certificates by rulemaking be needed? 6

5. Can cask vendors supply casks for all the spent fuel needs in the next years? There are only a few vendors and they have huge problems. Who is going to supply casks for all this MOX spent fuel? How does it fit in the system? Will commercial reactors that use MOX go to the head of the list for their waste to go to Yucca? 7

6. If Canada uses MOX in their reactors, who is liable for problems? Where does the spent fuel go? When? How do they fit into priority repository scheduling? 8

7. How will you decide which reactors will use MOX? Are you evaluating which are best suited and their past safety record? You should. What is their history? 9

8. NRC should definitely do a post-irradiation examination inspection of lead MOX assemblies. These tests need to be done before any licensing. We got into a lot of problems because dry casks weren't pretested correctly and casks were built by exemption before certification. Testing needs to be done before use at reactors. Require NRC to do this please. 10

9. DOE should have evaluated FFTF for tritium production before putting this SPD EIS out. If they use the MOX there, you say MOX in commercial reactors would not be "a reasonable cost-effective approach" to 11

MD178

MD178–4 **Repositories**

The order of acceptance of the spent fuel for final disposition in the potential geologic repository would be in accordance with agreements made between DOE and the licensee and in compliance with NEPA.

MD178–5 **Repositories**

This comment is addressed in responses MD178–2 and MD178–3.

MD178–6 **Waste Management**

MOX fuel would be handled the same as other fuels with regard to pools and dry casks. MOX fuel assemblies would be the same size and shape as the LEU fuel for the specific reactor. The only difference would be the additional decay heat from the higher actinides, especially americium, in the MOX fuel. Dry casks are designed and certified for a maximum heat load, so the additional decay heat would contribute to the total heat load and not require any redesign. The additional heat load may result in less spent fuel stored per cask. A more likely option is that the MOX fuel would be selectively packaged with cooler LEU fuel to obviate any overall heat output restriction. As a result, DOE does not expect any changes in the cask design. An amendment to the Certificate of Compliance for the cask, and the reactor operating license, would be needed to include storage of MOX fuel assemblies.

MD178–7 **Waste Management**

DOE acknowledges the commentor's concern that dry cask storage at the reactor sites may be limited by the availability of casks. Little or no additional wet pool or dry cask storage space would be needed for the MOX spent fuel generated at the selected commercial reactor sites. DOE does not expect that MOX spent fuel would get preferential treatment over other reactor spent fuel for disposal in a potential geologic repository.

MD178–8 **Parallex EA**

In the SPD Draft EIS, DOE retained the option to use some of the surplus plutonium as MOX fuel in CANDU reactors, which would have only been undertaken in the event that a multilateral agreement were negotiated among

Russia, Canada, and the United States. Since the Draft was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is no longer actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. A separate environmental review, the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999), analyzes the fabrication and proposed shipment of MOX fuel rods for research and development activities involving the use of limited amounts of U.S. MOX fuel in a Canadian test reactor. A FONSI was signed on August 13, 1999. Both of these documents can be viewed on the MD Web site at http://www.doe-md.com. If a decision is made to dispose of Russian surplus plutonium in Canadian CANDU reactors in order to augment Russian's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

MD178–9 **NRC Licensing**

As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively).

As discussed in Section 4.28.2.5, studies by NAS have led it to the following conclusion: "no important overall adverse impact of MOX use on the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities will involve factors not related to fuel composition and hence unaffected by the use of MOX rather than

LEU fuel." Further, as discussed in the revised Section 4.28, the most recent systematic assessment of licensee performance conducted in 1997 on the reactors selected to irradiate MOX fuel resulted in ratings ranging from good to superior with respect to operations, maintenance, engineering, and plant support.

An NRC reactor operating license amendment will be required for each individual reactor before it can irradiate the MOX fuel. The regulatory process will be the same as for any 10 CFR 50 operating license amendment request in accordance with 10 CFR 50.90. The reactor licensee will initiate the process by submitting an amendment request. Safety and environmental analyses commensurate with the level of potential impact are submitted in support of, and as part of, the amendment to NRC. NRC reviews the submitted information and denies or approves the request.

MD178–10 **Lead Assemblies**

In consultation with DCS, the team selected to fabricate and irradiate the MOX fuel, DOE believes that limited lead assembly fabrication and postirradiation examination would be required. This SPD EIS analyzes the potential environmental impacts of the fabrication of lead assemblies and their postirradiation examination. Domestic, commercial reactors operate under NRC license; therefore, the use of MOX fuel lead assemblies would be subject to review and regulation by NRC prior to it being used in any of the proposed reactors.

MD178–11 **DOE Policy**

DOE acknowledges the commentor's concern regarding the use of MOX fuel in FFTF to produce tritium. As discussed in Appendix D of the SPD Draft EIS, DOE did consider FFTF in the *Storage and Disposition PEIS*, but it was eliminated from further study because it was in a standby status and it could not satisfy the criterion of completing the disposition mission within 25 years using the historic FFTF plutonium enrichment specifications. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium. As discussed in Section 1.7.4, Appendix D was deleted from this SPD EIS because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source.

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disposition of remainder of surplus". This needs a clear explanation. Isn't there really enough to defend making changes at commercial reactors to use MOX or what? If the amount is that small — the potential problems at commercial sites it could cause is really not worth the effort I would think. 11

10. There should be a clear alternative plan as to what to do with MOX spent fuel from commercial reactors use. Can it be put above ground at DOE sites? (instead of repository plans which may not work) 12

11. Summary p S-19 you say "MOX fuel would be removed from the reactor and "managed" at the reactor site as spent fuel" — How?? You don't address this at all. 13

12. Can you really get all the gallium and other impurities out? Check carefully as to how all this will affect commercial reactor spent fuel pool water. Reactor pools have different temperatures, and different criteria. 14

13. p S-27 of summary — you say "MOX assemblies would be removed from the reactor as soon as the fuel had been irradiated enough to meet the Spent Fuel Standard, rather than being left in the reactor for the maximum length of time". How? Pools are near full and full core unloads are a problem scheduled with dry cask loading — wouldn't taking MOX assemblies out early even cause more core unloading at reactors and problems? 15
You also say on this page that "there would be sufficient space at the reactor site in either spent fuel pools or dry storage to store the additional spent fuel until it could be sent to a geologic

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MD178–12 **Repositories**

This comment is addressed in response MD178–3.

MD178–13 **Repositories**

This comment is addressed in response MD178–3.

MD178–14 **Plutonium Polishing and Aqueous Process**

At the time DOE issued the SPD Draft EIS, it believed the gallium content in the plutonium dioxide feed specifications for MOX fuel could be reached using the dry, thermal gallium removal method included in the pit conversion process. However, in response to public interest on this topic and to ensure adequate NEPA review in the event that the gallium specification could not be met with the thermal process, an evaluation of the potential environmental impacts of including a small-scale aqueous process (referred to as plutonium polishing) as part of either the pit conversion or MOX facilities was presented in Appendix N of the SPD Draft EIS. On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing. Therefore, it is not expected that there would be gallium or other impurities present in sufficient quantity to adversely affect the reactor pools. However, information would likely be needed by NRC during the reactor license amendment process on the proposed plan for storing MOX spent fuel at the selected reactor sites.

MD178–15 **Waste Management**

DOE acknowledges the commentor's concern about core unloading and cask storage. The statement quoted by the commentor that MOX assemblies would be removed from the reactor as soon as the fuel had been irradiated was originally stated in the *Storage and Disposition PEIS* to demonstrate that there would be sufficient spent fuel storage capacity under the MOX approach. Actual planned operations, however, include refueling on the

5

repository". I wonder about the feasibility of this at all. Check the details of what is happening at commercial reactors now. They are all in need of more storage and dry casks. I've been following the fiasco of the VSC-24 cask all the years since it was in a proposed rule. Why WEPCO in WI was backed against the wall with the NRC hold on cask fabrication because of (seal weld cracks in the design) so that our Public Service Commission allowed WEPCO to purchase 3 VM-32 casks (even before the VM-32 was NRC certified) because they were the only casks that WEPCO could get fabricated in time, if they could it load their VSC-24s. What a mess! 15

14. Can MOX spent fuel be put in a pool next to other spent fuel? any concerns? Check this now. 16

15. Can MOX spent fuel be put in a cask with other spent fuel from a reactor? any concerns? Check this now.

16. I think ratepayers and tax payers should not have to end up being liable for costs of problems of MOX fuel at a commercial reactor. Our electricity should it have to rely on using military waste and the potential problems that could occur. We had possible blackouts all last summer because of cask problems and safety concerns at our Pt. Beach nuclear plant. 17

17. Are you considering the safety record of commercial plants? 18

18. Are you considering their priorities of making money for their stockholders? Ratepayers in Wis. got stuck with paying costs for Pt. Beach so stockholders would get their funds. It was a cause of great concern here. DOE has no business mixing with ratepayer costs. 19

MD178

same schedule that is currently used for LEU fuel with no modification to permit the early withdrawal of MOX fuel.

MD178–16 **Waste Management**

This comment is addressed in response MD178–6.

MD178–17 **MOX RFP**

DOE agrees that it should not be involved in the business of generating electricity or delivering electricity to customers. DOE's *RFP for MOX Fuel Fabrication and Reactor Irradiation Services* (May 1998) ensures that these businesses reside solely in the domain of the utilities without any DOE involvement.

MD178–18 **MOX RFP**

The operating records of the selected reactors was considered by DOE prior to awarding the contract for MOX fuel fabrication and irradiation services.

The remainder of this comment is addressed in response MD178–9.

MD178–19 **MOX RFP**

DOE agrees that it should not be involved in ratepayers costs; the RFP was written to ensure that the generation and delivery of electricity to customers be performed solely by the utility with no DOE involvement. The intention is for the use of MOX fuel to be revenue neutral for utilities. Commercial reactors in the United States are capable of safely burning MOX fuel. DOE believes that the cost to make existing reactors suitable for using MOX fuel would be relatively low and would be limited to some analyses and operating license amendments.

6

19. There has been a huge problem with responsibility and liability for CHANGES in cask designs — this includes handling equipment such as transfer casks in the pool, transporters to the pad, pad evaluations, heavy load equipment - cranes etc. in pools — if a vendor, subcontractor, contractor, licensee (utility) (and now DOE too!) changes any part of this design and this change causes a problem, and this problem has costs - then you'd better decide now who pays. If DOE says to fabricate the casks "this way", then do utilities say DOE pays when it causes a handling problem or doesn't relate to their existing cask pad, transporter, transfer cask, monitoring system or whatever else? You are dealing with whole systems here, not just a garbage can at the back door. People fail to realize this ahead and it causes problems. How does MOX really fit into all this? 20

20. Each commercial reactor needs its own site specific changes. Some have already committed to a certain dry storage system. Are they reliable? What is their vendor, contractor, subcontractor Q A history? Right now, I see none out there with great qualifications or long term safe history. And no dry cask has ever been unloaded. The unloading procedure for MOX fuel in any cask design had better be very carefully scrutinized by NRC now, not after casks have been loaded like with the VSC-24 design cask which had an inadequate unloading procedure. Steam shock 21

MD178

MD178–20 **Waste Management**

This comment is addressed in response MD178–6.

MD178–21 **Waste Management**

DOE acknowledges the commentor's concerns regarding dry storage reliability, vendors, and quality assurance. NRC will review these issues as part of the reactor operating license amendment process. These are utility operational responsibilities that would have to be addressed regardless of fuel type.

The remainder of this comment is addressed in response MD178–6.

in cooling fuel and venting etc — time limits for boiling
etc. need to be set now, not later. Will MOX fuel
in a cask need changes in unloading procedures? 21
(And expect an emergency unloading necessary early —
and be ready for it.) this spent fuel is not going to
any repository for a long time I wonder if suppose.
21. Will MOX fuel in pools or dry casks need any
special monitoring? Decide this now. How will this be done? 22
22. Will MOX fuel in canisters affect transfer cask,
transporter movement, or cask pad design
requirements (soil tests etc?) Decide this before a 23
reactor gets MOX. What will doses be at a cask pad?
23. Can a cask vendor or a utility sue the DOE? 24

I really just think this is a huge mistake to use MOX
at commercial reactors. We have always kept the military waste
separate and you can expect problems by changing this. On its
face it sounds "win win" — DOE gets rid of waste and reactors
get cheap fuel — but in reality, when you look at what really
is the situation, it is very "lose-lose". DOE gets mixed up
in commercial reactors and utilities problems in dry cask
storage and decommissioning and aging reactor problems. DOE
is asking for trouble. Don't do this. Just immobilize all 25
the surplus plutonium and take care of it your way,
yourselves, so you are responsible for what you do. Your
whole priority list for the repository will be a mess otherwise
and, in essence, you are promoting longer commercial reactor
use and licensing, and more waste you have no place to put.
Let's face it, most of this will be at reactor sites in
dry casks for many many years. Will DOE be on watch here?

MD178

MD178–22 **Waste Management**

MOX fuel would be handled the same as other fuels with regard to pools and dry casks, and there is no need for special monitoring.

MD178–23 **Waste Management**

Dry casks are designed and certified for a maximum heat load; therefore, doses at the cask pad would be expected to be same for MOX fuel as for other fuels.

MD178–24 **Waste Management**

DOE cannot be sued by a cask vendor or a utility in the event a cask fails due to the inclusion of MOX fuel. The reactor licensee would be responsible for safely storing MOX spent fuel and must make all the calculations to show that this can be done properly before the fuel is put into the cask. Cask operations would be subject to the NRC operating license amendment process.

MD178–25 **DOE Policy**

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The remainder of this comment is addressed in responses MD178–2 and MD178–3.

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8.

24. The gallium problem is a big concern. If it chemically attacks zirconium and some is left in the spent fuel, then what happens in a cask stored 20 – 100 years? We need to be sure of what might happen here. Take time to do the necessary tests — not just computer models on paper. 26

25. How much will gallium removal cost? Is it worth it?

26. What is the morphology of hydride-derived powder? 27

27. The rest of the world does not have an NRC. How do we know their casks are safe or their MOX fuel has no gallium etc.? Why are we setting the example of proposing to use MOX fuel in reactors? Surely Russia and other countries will want to too. Won't this be more of a risk? They aren't regulated as we are. The more plutonium you allow in the public sector, the more they will want to also. Don't do it and don't allow them to either. Canada either! We don't regulate Canada. 28

28. Just read where even the manufacture of mixed-oxide fuels creates serious risks of deversion because plutonium tends to stick to the surface of remotely-operated processing equipment. If this is so, here is another problem. 29

29. Seems to me other countries will use the pretext of military plutonium disposal to build and operate nuclear plants to depend on the plutonium for fuel. This would be a concern. 30

30. We need to take the lead in straightforward plutonium immobilization or it will have to be transported long distances, with much handling, and stored at civilian reactors. This is asking for trouble worldwide. 31

31. There would be a greater heat load at reactors and then in any repository too, wouldn't there? 32

32. Will MOX fuel be "free" to reactors? If so, why??? 33

MD178

MD178–26 Plutonium Polishing and Aqueous Processing

As discussed in response MD178–14, DOE has included plutonium polishing as a component of the MOX facility so it's not expected that there would be gallium and other impurities present in sufficient quantity to adversely affect the reactor spent fuel plans. However, these plans would be subject to NRC review and approval prior to using the MOX fuel in the selected reactors.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999) covers recent life-cycle cost analyses associated with the preferred alternative, including the cost of plutonium polishing. This document is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

MD178–27 Pit Disassembly and Conversion

Plutonium metal parts separated from pits and other nonpit plutonium metals and alloys undergo a hydride-oxidation process as described in Section 2.4.1.2, to produce clean plutonium dioxide powder that is suitable as feed material for MOX fuel fabrication. This powder is free of moisture and impurities, such as tritium and halide. It is stored in stainless steel cans that are welded shut to ensure purity and accountability.

MD178–28 Nonproliferation

As discussed in Section 2.4, there are provisions for international inspections of each of the proposed surplus plutonium disposition facilities. International monitoring and inspection of the unclassified plutonium would also allow the United States to demonstrate to the world, including Russia, Iran, Iraq, Pakistan, India, and North Korea, that disposition is being carried out under stringent nonproliferation controls, and that the excess plutonium is not being diverted for reuse in weapons. The United States is working closely with Russia to develop a bilateral inspection agreement which would allow the United States to monitor Russian plutonium disposition efforts and vice versa.

In the SPD Draft EIS, DOE retained the option to use some of the surplus plutonium as MOX fuel in CANDU reactors, which would have only been undertaken in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the Draft was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is no longer actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. A separate environmental review, the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999), analyzes the fabrication and proposed shipment of MOX fuel rods for research and development activities involving the use of limited amounts of U.S. MOX fuel in a Canadian test reactor. A FONSI was signed on August 13, 1999. Both of these documents can be viewed on the MD Web site at http://www.doe-md.com.

MD178–29 **Nonproliferation**

DOE is aware of an incident involving a Japanese plutonium processing plant in which a significant amount of MOX powder was held up in the processing lines so that it was difficult to measure the exact quantity of materials from outside the sealed gloveboxes. This problem was solved by implementing a model schedule of selective clean-outs so that the powder could be collected and accurately accounted for. The design and operation of the MOX facility would incorporate lessons learned (regarding procedures and equipment) to ensure low net plutonium loss and would be compatible with NRC and IAEA safeguards. Physical inventories, measurements, and inspections of material both in process and in storage would be used to verify inventory records.

MD178–30 **Nonproliferation**

DOE acknowledges the commentor's concern regarding the use of nuclear reactors to disposition weapons-usable plutonium. The United States will not support any plans to build a plutonium economy.

The remainder of this comment is addressed in response MD178–2.

MD178–31 **Alternatives**

As indicated in Appendix L, several of the hybrid alternatives would require less transportation of special nuclear materials than some of the 50-t (55-ton) immobilization alternatives. However, the risks from transportation for all of the alternatives would likely be minor.

MD178–32 **Repositories**

After the first 5 years or so, there would be more decay heat produced by the MOX spent fuel than traditional LEU fuel, hence a greater heat load at both the fuel storage locations and the potential geologic repository. However, the additional heat load is about 10 percent per assembly and would be considered in the total heat load calculations for any storage facilities and the repository.

MD178–33 **MOX Approach**

The MOX fuel would not be free to the reactors selected to use it. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

9.

33. How much will it really cost to convert reactors to use and handle and store MOX? Do you really know? 34

34. Using MOX fuel hinders the development of other safe clean renewable energy option all over the world. This is wrong. Think about it. 35

35. What plans have you for reactor security against sabotage? Cost? 36

36. Isn't it possible really that other countries will make spent fuel out of weapons plutonium only to extract more plutonium out of reactor spent fuel perpetuating a cycle of possible threat and diversion? This is dangerous. 37

37. In essence MOX really is a subsidy to keep operating aging uneconomic reactors all over. The public is against this clearly. More complicated waste will be created from this dangerous cycle also. 38

38. Utilities are not licensed to use plutonium in their reactors. Getting licensed could be a long battle with hearings and public opposition. Why open up this can of worms? 39

39. Won't using MOX just encourage pork-barrel interests in plutonium in Russia? Are you really seeing what might happen there? Aren't we really setting an example of a military-industrial complex? 40

40. Will utilities using MOX get to waive contribution to the nuclear waste fund? If so this is asking for economic disaster for disposal. Retrofitting or repairing at reactors for MOX could far out weigh this. DOE will cost more by using MOX than if they would immobilize *all* plutonium surplus. (you can't *predict* all the problems and costs of MOX) 41

41. Are utilities actually offering to allow the US government to use their facilities for a fee? If so, this is just 38

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MD178–34 **Cost**

This comment is addressed in response MD178–26.

MD178–35 **DOE Policy**

By fabricating MOX fuel from surplus plutonium, the United States is not encouraging domestic or foreign commercial use of plutonium as an energy source. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this.

The development of alternative or renewable energy sources is beyond the scope of this EIS.

MD178–36 **MOX Approach**

Reactor sites in the United States have significant security requirements to prevent sabotage. Sabotage scenarios are considered conjecture and not reasonably foreseeable. Although they were excluded from this SPD EIS, the results of such sabotage would be bounded by the accidents presented in Appendixes K and L. The possibility of sabotage would be controlled through the safeguards and security provisions including security requirements associated with facility workers. The reactors selected to use MOX fuel would continue to be operated in accordance with applicable NRC requirements. Additional information on specific security issues is discussed in *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997).

MD178–37 **Nonproliferation**

Approximately 726 t (800 tons) of plutonium exists in spent fuel in the world today. The spent fuel assemblies are so large and radioactive that any attempted theft of the material would require a dedicated team willing to suffer large doses of radiation, along with substantial equipment for accessing

and removing the spent fuel from the storage facility and carrying it away. A terrorist group must also have a shielded reprocessing facility to recover the plutonium from the highly radioactive spent fuel.

MD178–38 **DOE Policy**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

The remainder of this comment is addressed in response MD178–2.

MD178–39 **NRC Licensing**

DOE acknowledges the commentor's concern about licensing reactors to use MOX fuel. Although no U.S. commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily accommodate a partial MOX core. DOE understands that DCS would have to apply for a reactor operating license amendment for each individual

reactor before it can use MOX fuel and what that process entails, including the public involvement opportunities provided by NRC per 10 CFR 50.91. DOE is conducting regular meetings with NRC on the MOX approach, including fuel design and qualification. In addition, DCS would work closely with NRC to ensure that the license amendment process can be accomplished in a timely manner.

On June 15, 1999, DOE held a hearing on the Supplement to the SPD Draft EIS which focused on the use of MOX fuel at the selected reactors. As a result, DOE does not anticipate the licensing requirements would present a significant impediment to implementing its decisions on surplus plutonium disposition. Efforts have been made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. Approximately 1,300 copies of the Supplement were mailed, and an NOA postcard was mailed to an additional 5,800 members of the public.

The remainder of this comment is addressed in response MD178–25.

MD178–40 **Nonproliferation**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Close cooperation between the United States and Russia is required to ensure that nuclear arms reductions cannot be easily reversed. Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

MD178–41 **MOX Approach**

Utility contributions to the nuclear waste fund would not be waived for those reactors selected to use MOX fuel. The cost-related aspects of this comment are addressed in response MD178–26.

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plain wrong. You want to give them free fuel, cancel their waste fuel debt, then pay them ?? This makes no sense at all in the public interest. Tax payers and ratepayers will end up footing the bill for problems. 38

42. Standardization and integration in the total storage, transport, and disposal of radioactive waste used to be a main DOE goal. Seems to me MOX adds one more type of waste to deal with in all this. 42

43. Seems to me the federal government is unlikely to allow a power producer to fail if that producer has become a critical part of a plutonium disposition program involving MOX burning. This is very possible and just a situation you do not want to get into. 38

44. How can we regulate MOX fuel use in Canadian reactors? 43

45. Wouldn't a reactor accident involving MOX fuel be even more dangerous? 44

46. Nuclear reactors that are not economical should not be propped up courtesy of tax payers. Use of MOX would set up a reprocessing infrastructure which is uneconomical, unsafe, and prone to nuclear proliferation. And tritium production should not be at commercial reactors either. The public does not want this. 38

47. This business of (p2-8-Volume 1-Part A) of awarding a contract in November seems all wrong. The "offeror" has a perfect set-up to make "deals" with commercial reactors it proposes for irradiation of the fuel. All this so called "paper work" design does not cover dry cask storage, or unloading, or loading, casks with 45

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MD178–42 **Waste Management**

Standardization and integration of the treatment, storage, transport, and disposal of waste is a DOE priority as evidenced by the preparation of the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE/EIS-0200-F, May 1997) and *Accelerating Cleanup: Paths to Closure* (DOE/EM-0362, June 1998). In addition, decisions in the *Storage and Disposition PEIS* ROD included reducing the number of storage locations where plutonium is stored by consolidating the storage of pits at Pantex and nonpit materials at SRS. This action reduces the number of DOE sites generating wastes related to plutonium storage activities. As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies.

MD178–43 **Parallex EA**

This comment is addressed in response MD178–8.

MD178–44 **Facility Accidents**

Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents.

MD178–45 **MOX RFP**

The schedule for award of the MOX fuel fabrication and irradiation contract was in accordance with DOE's procurement and NEPA policy. DOE's NEPA implementing regulations in 10 CFR 1021.216 requires DOE to phase contract work in a way that will allow the NEPA review process to be completed in advance of a go/no-go decision. In the case of this SPD EIS, the go/no-go decision will be determined by which alternative is selected by the decisionmaker. Further, the provisions of 10 CFR 1021.216 call for DOE to prepare a publicly available synopsis of the environmental information to provide to the source selection official in order to document the consideration

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MOX, or handling MOX by transfer casks in the pool, or transporters to the concrete pads etc. We had an explosion at our Pt. Beach plant here in Wisconsin loading a VSC-24 cask with regular spent fuel because the cask coating created flammable hydrogen. Do you know how MOX will react with cask coatings, etc? 45
Dry cask storage of MOX is a major concern.
Any proposal by an "offeror" needs to address this issue in detail. (Make sure a pad for mox fuel casks is soil tested for the pad area not based on the reactor site as it was at Palisades — The pad was on sand dunes but the reactor was on bedrock — yet
48. that was what was used for initial evaluation!)
Reactor specific information provided by the offeror of the MOX plan will be verified by whom? Will you check the safety history of these specific reactors in the NRC public documents? You need to. If the have a history of nonconformance + violations and fines; if they have embrittlement or steam generator problems; if they have fuel pool or dry cask concerns —
certainly tax payers don't want to do business with them. This "package deal" of a MOX manufacturer, and its irradiating reactors, sounds like too 18
"sweet" a situation to me. Here in Wisconsin, our utility was all involved in the initial creation of the VSC-24 cask design and almost had to use it then as I see it — even though it was a mess and had problem after problem. They ended up using their own QA with their own contractors when Sierra Nuclear

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given to environmental factors and to record that the relevant environmental consequences of reasonable alternatives have been evaluated in the selection process.

DOE prepared an Environmental Synopsis on the basis of the environmental information reviewed by DOE in the selection process. This was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

Any requirements related to the storage of MOX fuel would be imposed by NRC as part of the reactor operating license amendment. For this amendment, the licensee would have to demonstrate that all safety, testing, and environmental impacts have been addressed as well as complete the public hearing process. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and the commercial reactors selected to use MOX fuel to ensure adequate margins of safety.

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made so many mistakes. Are we going to get into the same sort of situation with a MOX vendor? 18

49. This needs to be looked into now as NRC is in process of rulemaking on this sort of thing for cask vendors. Can a supplier of MOX fuel be fined for violations in any way? It should be and its contractors and subcontractors should be held to NRC regulations. Vendors of casks could not be fined for violations before. Now NRC has a proposed rule to give them this clout to get cask vendors in shape. Should it this be the same for a MOX fuel vendor too? What to keep them doing quality work and following regulations? 46

50. There has been great concern on the part of the public that SAR's have not met reality or enforced — (for plants and for dry cask storage) in some cases. — final safety analysis reports need to be kept amended so that documents always meet reality and SAR's should be enforceable. This needs to be looked into now, not later. It was a big problem and still is. I have a proposed rule in with NRC to require documents kept current. This needs to be done or utilities and vendors and DOE and NRC won't be working with documents dealing with what is "really" there. MOX use needs to have documents in order and current. 47

51. Volume 1 - Part A p 2-27 It appears your fuel fabrication area plans to accomodate the potential for 48

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MD178–46 **NRC Licensing**

The MOX fuel fabricator would be an NRC licensee under 10 CFR 70, *Domestic Licensing of Special Nuclear Materials*, and as such, would be subject to fines and penalties for violations of NRC regulations, up to and including license revocation.

MD178–47 **NRC Licensing**

The reactors selected to irradiate MOX fuel are operating domestic, commercial reactors and are licensed by NRC. DCS would be required to submit an application for a reactor operating license amendment under 10 CFR 50.90 for each individual reactor before it can use MOX fuel. Reactor licensees are responsible for maintaining reactor SARs current in accordance with NRC regulations. NRC regulations in 10 CFR 50.59 allow changes that meet certain requirements to be made without prior NRC approval. Proper review and documentation of the review must be retained at the reactor site for NRC inspection. Changes other than these must be approved by NRC prior to implementation, and all changes must be included in biennial SAR updates. Reactor SARs would be updated to reflect the use of MOX fuel once the operating license amendment was issued.

MD178–48 **Parallex EA**

This comment is addressed in response MD178–8.

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fabricating a different type of fuel for CANDU reactors (if an agreement is made with Russia and Canada). There is no clear explanation for this. Does Russia have CANDU reactors? Why would we want to generate spent fuel that does not fit in our certified dry cask storage designs? Canadian fuel and casks are different than ours. Won't this cause just one more waste type to complicate our at reactor storage problems and repository criteria for containers? We already have "radioactive soup" of so many waste types that it's very difficult to plan for repository containers now — all these different strips and heat loads, etc. just complicate the matter more. And NRC does not regulate Canada. Will we take Canadian spent fuel back? Liabilities? 48

52. p2-30 you say, individual MOX assemblies could be stored for as long as 18 months prior to shipment to a reactor. What if one of those reactors shuts down or has major problems and can't use the fuel? What then? How will you store the fuel safely? How far ahead can you make it safely? 49

53. — this "polishing step" to remove gallium seems to be a real concern. Seems to me you are adding a real possible problem to the whole waste system here that really isn't necessary — for isn't "waste" the really only reason for using MOX? You want to get as much plutonium into an unusable form as fast as you can? Haste makes waste!! (an old saying but true — you may be creating more problems.) 50

54. Volume II, appendix N — Plutonium Polishing — this should "not be only a contingency". It should be a detailed planned requirement. When used, you have a new waste form of gallium americium, aluminum, and flourides, you have all this liquid and solid waste from MOX fabrication to deal with. Plus

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MD178–49 **MOX Approach**

Fresh fuel would remain safe and stable indefinitely. It would be stored at the MOX facility in a storage vault meeting security requirements for special nuclear materials. The MOX facility would be built at an existing DOE site that has the levels of protection and control (including access control) required by applicable DOE safeguards and security directives. In addition to DOE sitewide security services, the facility would have its own security features and procedures. The general security requirements for the proposed surplus plutonium disposition facilities are described in Section 2.4.

The SPD Draft EIS's specification of assembly storage for up to 18 months is a bounding assumption for planning and analysis purposes. This SPD EIS reflects an extension of the possible storage time of individual assemblies to up to 2 years, a storage period that is neither expected nor desirable from a business standpoint. As stated in Section 2.4.3.2, production would closely follow product need. Reactor licensees typically order LEU fuel to coincide with their refueling outages, and fuel shipment is usually scheduled so that fuel does not have to be stored very long at the reactor site. Licensees work closely with each of the vendors involved in the fuel fabrication process, as well as the fuel fabricators, to ensure that the fuel is ready when needed. The only likely difference in this process for MOX fuel would be a closer relationship between the licensee and the fabricator; the two would work as a team. Reactor shutdowns and other operational issues that could affect the need for fuel would be accommodated in the fuel fabrication schedules, and adjustments would be made as required. Fuel fabricated and later not needed would constitute no long-term storage problem, for the components could be recycled and reused—a routine commercial practice for off-specification materials and completed assemblies that is accounted for in this EIS. The fuel rods would be disassembled and the pellets either reused directly or returned to the processing facility for reformulation. The metal components of the fuel rods would also be reused or recycled.

MD178–50 **Plutonium Polishing and Aqueous Processing**

Section 2.18.3 was revised to include the impacts associated with plutonium polishing. As indicated by the analyses, additional waste generation or

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the volume of waste (hazardous and non hazardous) increases 20%. Wastewater generation increases 8 to 20%. (How do you plan to remove this in PORTABLE TOILETS ?? Seems strange!) Electrical consumption increases by 5,500 MWh/yr and more "foot print" space is needed and would be contaminated. You say (on p N-8) that "Waste could be a fairly large percentage of the total waste generated by the disposition facilities". (TRU waste requiring storage increases). 50

** To make more waste by trying to eliminate surplus plutonium in MOX fuel makes no sense considering our critical waste problems already in this country.

55. Volume 1 Part A — p 2-65 and 2-68 on post irradiation examination site alternatives — I notice you say these tests would provide information on how MOX would respond being inside an operating reactor. But is this * representative of the commercial reactors that in reality would use MOX? And can you test as to how MOX spent fuel would react inside dry cask storage? That is the thing you need to look at. You say that at any rate the HFEF is presently being modified to accept "commercial size" fuel assemblies and to handle commercial size casks and fuel rods for examination. So this all all sounds new. So much in past documents I've read, the tests have been on part of a rod or assembly which is not enough of representation as I see it, also prototypes such as the VSC-17 were tested instead of a full-size VSC-24 cask, and there were major differences between these. You need to examine full MOX assemblies. I never can understand visual effects, or 51

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resource consumption associated with the plutonium-polishing process is not expected to materially affect the ability of any of the candidate sites to handle MOX fuel fabrication.

The remainder of this comment is addressed in response MD178–14.

MD178–51 **MOX Approach**

The lead assemblies would be irradiated in domestic, commercial reactors and then subjected to postirradiation examination. Thus, the tests conducted as part of the postirradiation examination would provide information on how MOX fuel would respond inside a commercial reactor. The MOX fuel assemblies would be placed in accordance with specific reactor fuel management plans, which exist at all reactors regardless of fuel type.

The remainder of this comment is addressed in responses MD178–3, MD178–6, MD178–7, and MD178–10.

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even UT, gamma spectroscopy, neutron radiography of an assembly? Do you take it apart in any way to evaluate the different effects in the reactor from outer rods to center rods in the assembly? This should be done.

and — where in the reactor will these MOX assemblies be irradiated? This is crucial information, as certainly the placement in the reactor dictates the effect on the assembly. Can you really foretell reactions over time in a real reactor from these tests? I fear all the "what ifs" can't be covered. The last thing we need is to build this MOX fabrication facility — put these assemblies in commercial reactors, and find we have an unexpected problem in the public arena. Why take this risk when it just is not necessary. Get rid of all the surplus plutonium in immobilizing it in the same for all of it without risking MOX problems.

Can you really predict how MOX spent fuel will react when put in the pool with regular spent fuel? Overtime? How will it react in dry cask loading in the pool? How will it react in dry cask unloading in the pool? Can you expect to have dry transfer from a cask on the pad in the future to a transport cask without necessitating it go back to the pool and get wet again for transport to a repository? All this future handling, are you looking at the details? Consider this: MOX fuel in the reactor (dry), in the pool (wet), in casks at the plant (dry), unloaded in the pool (wet again), transported to a repository or interim storage site (dry again), put in a repository (maybe transferred to a disposal cask lot (wet or dry handling?) then dry in

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the repository (hopefully if dry shields work and humidity and evaporation predictions are correct) — and in the end, after many years we hope, — wet in the repository. Look at this total waste future for MOX fuel. What problems do you foresee? When it finally gets wet in the repository next to other waste forms, what can happen? And if MOX fuel goes to a repository (?), what happens? And what storage, and disposal, and transport containers do you need for irradiated MOX spent fuel? Can they be certified, and tested in time? NRC has a full load on its hands now just trying to keep up with the certification of dry cask designs for regular spent fuel — and fabrication changes cause a problem in QA and scheduling. Time is crucial and reactors pools are loaded. And then too, will local public opposition and Public Service Commission procedures or transportation concerns etc cause hold-ups in schedules? The longer you wait to get MOX really tested and everything in place, the more the reactors are aging and their pools filling. MOX fuel will add to the overload in the whole spent fuel waste problem. Don't do it. 51

56. We don't know how well WIPP will work yet. We don't know if Yucca will ever open? We don't even dare to think of siting a necessary 2nd or 3rd repository yet. However, everybody acts like a hole in the ground will take all the military and commercial waste and take care of it. I don't believe this. I predict it will mostly be kept above ground, recasked periodically like Russian dolls inside each other, and monitored and safeguarded 52

MD178

MD178–52 **Repositories**

The management of TRU wastes generated by the proposed surplus plutonium disposition facilities is evaluated in this SPD EIS. DOE alternatives for TRU waste management are evaluated in the WM PEIS (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). WIPP began receiving shipments of TRU waste for permanent disposal on March 26, 1999. As described in Appendix F.8.1, and the Waste Management sections in Chapter 4 of Volume I, it is conservatively assumed that TRU waste would be stored at the candidate sites until 2016, at which time it would be shipped to WIPP in accordance with DOE's plans. This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel.

The remainder of this comment is addressed in response MD178–3.

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forever. The public and even native american tribes cannot be bribed to accept this waste in their backyard anyplace — as history has proven over time. Yet the nuclear industry and DOE just keep acting as if repositories are the answer. TIME is a concern here. The longer you keep reactors going, the more spent fuel is created and that in itself is the crux of the problem with MOX fuel. You are creating more and more spent fuel nobody knows what to do with or where to store or dispose. Commercial reactors hope DOE will take it from their sites — out of their hands as far as liability and responsibility — they hope to put it in cheap casks, which may allow spent fuel degradation, then drop it in the government lap and walk away from nuclear power in the end. No new nuclear plants have been built — the public doesn't want the plants or more spent fuel — MOX just adds to the problem — all over the world. What do you think Russia will do with their spent fuel? Put it in the most expensive, safest canister? I doubt it. Costs will be cut wherever possible and that means problems. You know that. 52

53. I just find section 4.28 "Summary of Storage and Disposition PEIS Generic Reactor Analysis" very lacking. Just 2 pages here to cover the public. Specific reactors are not generic. Each is very different. We found that out when NRC tried to certify a "generic" cask. It ended up needing many site specific changes in design and handling procedures for each plant. Pool water is 53

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MD178–53 **MOX RFP**

Generic reactors were presented in the SPD Draft EIS because the specific reactors had not yet been identified. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba Nuclear Station Units 1 and 2 in South Carolina, McGuire Nuclear Station Units 1 and 2 in North Carolina, and North Anna Power Station Units 1 and 2 in Virginia, the reactors selected to use the MOX fuel.

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different, equipment is different, some handling equipment didn't fit in existing areas or didn't relate to existing equipment or heavy load criteria. Each reactor has many site specific needs, There is no generic reactor. You say a small "addition" may be needed to the fuel receiving and storage building. Just getting a cask + transporter in the small door of our auxillary building at the Wis. Pt. Beach reactor was a problem. The transporter had to be developed especially + lifting lugs had to be added on top of the cask design to get it to fit in. Then weight in the cask loading area may be limiting and weight in casks. Arkansas fuel was larger and weighed more, thus changes were needed in the cask design there too. 53

You say "radionuclide distribution in the waste will be somewhat different" — so how does this react with a cask coating for example? Or next to regular spent fuel in a pool or cask?

You admit more spent fuel would be generated and that you want to remove the assemblies of MOX from the reactor as SOON as it meet the spent fuel standard. Are you considering scheduling for this at a commercial reactor? Refueling is a big thing — a reactor needs to be shut down — we do use this reactor for our electricity, remember. and we have a power crunch at peak times of the year in many areas. Would a reactor shut down for repairs, use rods to remove fuel for casks and then shut down again just to remove 54

MD178

MD178–54 **MOX Approach**

This comment is addressed in responses MD178–3, MD178–9, MD178–15, MD178–18, and MD178–36.

SHILLINGLAW, MRS. JOHN
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some MOX fuel? Are you looking at the reality as to how fuel removal from a commercial reactor would affect its operation? MOX adds to worker overload already.

Plus you say there is an increase in worker dose, public dose (even if just from more dry cask handling + storage) and increase in accident and certainly sabotage possibilities. I am certainly not comforted that you expect no more problems "if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure." Well it should, but will it? This is an experiment in the public arena really. You don't really know all the possible ramifications of using MOX fuel at commercial reactors. 54

A truck bomb at a dry cask storage pad holding MOX fuel really is a possibility, tho a truck bomb still not considered at a cask pad at a reactor? You reference a Final Generic EIS from the 1970's for using MOX. I find this really unacceptable. Get some current information. A lot has changed since 1970. I find these "tired" EISs really faulty. (They certainly were for dry cask storage.) 55

The NRC had an awful time with generic licensing for dry cask storage at reactors. It took many years before all the problems were addressed and, in the meantime, vendors were repeatedly shut down and reactors not able to load casks. Will the same happen in licensing for MOX fuel in reactors and in casks? This is all new — there will be problems. As one NRC person said — "I expect 15

MD178

MD178–55 **Facility Accidents**

The possibility of a truck bomb was considered to be beyond the scope of this SPD EIS analysis based on DOE NEPA guidance. This guidance states that impacts should be analyzed if they are reasonably foreseeable, requiring that the analysis is supported by credible scientific evidence and is not based on pure conjecture. The terrorist scenario is considered conjecture and although it was excluded from this EIS, the results of such terrorism would be bounded by the accidents presented in Appendixes K and L.

20

every thing to go wrong that can go wrong" —
and it did — this is not a perfect world and
the human element for mistakes enters in. 15

Well, I'm tired of all this — your 3 volume report
is huge and very repititious. I agree that you need
to get surplus plutonium all over the world in
a safe unusable form. I hope the agreement with 56
Russia gets going before its too late. BUT
using MOX fuel at commercial reactors is a mistake.
I've watched closely for many years now how spent
fuel and dry cask storage has been licensed and
certified and I foresee the same situation and problems
with generic evaluation of MOX fuel at commercial
reactors. You have to view it in the whole waste system
in the future. See the total picture and plan the details.
The world is getting less and less safe. Why put MOX
fuel into the hands of the public? It isn't necessary
and should not be done. Please.

I am the mother of two fine sons, with a grandchild
coming this Christmas. I don't want these kids to face
a world full of nuclear waste problems and MOX fuel
at our local reactors. We need to phase out spent fuel
creation and work toward a safe clean renewable
energy system for this world for our kids. A Native
American Saying states "We have not inherited
the earth from our fathers, we are borrowing it
from our children." Think about that carefully.

Thank you,
Mrs. John Shillinglaw

(whomever reads this — you — yourself — try to do the right thing — please)

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MD178–56 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for proposed surplus plutonium disposition facilities.

Why did the initial EIS [*refers to the scoping process*] not explore or identify all possible alternatives for using the Fuels and Materials Examination Facility (FMEF)? Alternatives were added later, why not from the beginning? 1

DOE should take advantage of the existing complex infrastructure by considering the following combination as an alternative option/ alternative: locate pit disassembly and conversion at Pantex; locate MOX fuel fabrication mission at FMEF; locate plutonium conversion and immobilization at the Savannah River Site (SRS). 2

Why does the preferred alternative consider infrastructure and the workforce if the MOX facility is being privatized? Optics are that the EIS is biased toward SRS. 3

RICHLD–1 **General SPD EIS and NEPA Process**

The SPD Draft EIS evaluated all alternatives for FMEF at Hanford considered reasonable by DOE. FMEF was identified as a candidate location in the NOI for the SPD EIS, which starts the scoping process. The possible mix of activities that might be located in FMEF was refined during the scoping process. In fact, the number of alternatives considering FMEF was increased during scoping, even though collocation of all three proposed surplus plutonium disposition facilities in FMEF was eliminated because DOE concluded that the available space in FMEF would not be sufficient to accommodate the efficient operation and maintenance of all three facilities. Analyses do not begin until completion of the scoping process, so these alternatives were evaluated from the earliest possible time, along with all the other SPD EIS alternatives.

RICHLD–2 **Alternatives**

DOE acknowledges the commentor's suggestion to locate the proposed surplus plutonium disposition facilities at three different sites. As discussed in Section 2.3.1 of the SPD Draft EIS, the range of reasonable alternatives analyzed was developed using equally weighted screening criteria. Over 64 options were evaluated, yielding a range of 23 reasonable alternatives that met all the criteria. Options that involved siting the proposed surplus plutonium disposition facilities at three different sites were eliminated because the goals of minimizing worker and public exposure to radiation, minimizing proliferation concerns associated with transportation, and reducing infrastructure costs would not be met. Alternatives considered reasonable were further reduced to 15 that are analyzed in the SPD Final EIS because the 8 alternatives that included using portions of Building 221–F at SRS for immobilization were eliminated based on the increased size requirements.

RICHLD–3 **Alternatives**

DOE's proposed action for surplus plutonium disposition is not a privatization effort, although the acquisition of MOX fuel fabrication and irradiation services has some similarities to DOE's privatization initiative. While the necessary infrastructure may be available in a number of places, only certain DOE sites and other facilities have the security infrastructure and radiological

Environmental cleanup and plutonium conversion missions are not exclusive of each other; one can work effectively with the other [*at Hanford*]. 4

What are the increased costs associated with three separate sites? 5

monitoring services and systems in place to protect special nuclear materials. Although SRS has been identified as the preferred site for the MOX facility, this is only DOE's preference; it is not a decision. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

RICHLD–4 **Alternatives**

DOE acknowledges the commentor's view that environmental cleanup and plutonium conversion missions can work effectively together. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–5 **Cost**

Section 2.3.1 explains the development of the facility siting alternatives that were analyzed in this SPD EIS. The equally weighted criteria used were worker and public exposure to radiation, proliferation concerns due to transportation of materials, and infrastructure cost. These criteria would not be met if DOE were to build one facility at each of three candidate sites.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at

Unions are concerned that DOE has not adequately considered costs and the potential impacts presented by overextending limited funds. 6

DOE is not including the total cost as a consideration in selecting its preferred alternative. The U.S. Nuclear Regulatory Commission (NRC) said cost benefits should be prepared. This is not in keeping with the spirit of the law in applying NEPA. I believe the EIS is incomplete. 7

http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

RICHLD–6 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

RICHLD–7 **Cost**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively), which do not require that a cost benefit analysis be performed. The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium*

Benton County supports the plutonium disposition process and MOX mission, but feels the EIS has not adequately addressed the cost issue; cost savings are more attractive when viewing the overall DOE funding picture. 8

The national security threat needs further discussion [*this refers to the presentation*]. Focusing on reducing the national security threat posed by surplus plutonium alone is too restrictive to be the program's primary goal. 9

Disposition (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

RICHLD–8 **Cost**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

RICHLD–9 **DOE Policy**

DOE acknowledges the commentor's concerns regarding national security. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely

All communities will be working to ensure DOE that they are the best location for performing the MOX and immobilization mission. Hanford's ability to manufacture and produce MOX fuel and to meet nonproliferation concerns is not reflected in the current SPD EIS. 10

DOE has not adequately considered the budget and technical realities of Hanford's existing facilities in favor of building new facilities down south. 11

The Hanford workforce is already at a critical low; we can't perform work now when two people are on vacation. Further workforce reductions place the site's ability to perform necessary work in jeopardy. Hanford's workforce is well trained and well versed in the type of work required by the MOX mission. Hanford's workforce is the most efficient workforce in the DOE system and is capable and ready to work on the MOX fuel program. A *Scientific American* study shows a 16 percent productivity level above baseline by using union workers. Nonunion is 11 percent below. Moving to SRS will reflect that level of reduction in efficiency. 12

manner. By working in parallel with Russia to reduce stockpiles of excess plutonium, the United States can reduce the chance that weapons-usable nuclear material could fall into the hands of terrorists or rogue states and help ensure that nuclear arms reductions will never be reversed.

RICHLD–10 **Alternatives**

DOE acknowledges the commentor's support for siting the immobilization and MOX facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–11 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

RICHLD–12 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

Hanford's workforce is recognized by industry leaders for their specialized abilities and skills. Hanford workers can establish relationships with any employers who come there. 13

FMEF can handle multiple functions/missions effectively. 14

Have there been other analyses conducted that consider pit disassembly and conversion at Pantex with a cost analysis for transporting materials to either SRS or Hanford? The transportation argument falls short. SRS biases are very apparent in the technical documents. Analyses highlighting benefits at other sites were not conducted at Hanford. 15

RICHLD–13 **Alternatives**

DOE acknowledges the commentor's support of the Hanford workforce. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–14 **Alternatives**

DOE acknowledges the commentor's support for using FMEF at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

RICHLD–15 **General SPD EIS and NEPA Process**

For a better understanding of cost and transportation issues, consult the following reports: *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), and *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998). These documents are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities.

I am involved with four different organizations monitoring the program's progress and have made several trips to Washington, D.C., to discuss the issue with various government officials. The barriers and inefficient communication channels that exist at DOE Headquarters block effective cross-fertilization. The communication process has failed, and the message is not getting through. 16

The decision is not about money, it's about political expediency. I wish the decision was based more on the health and safety of the American people. 17

There is a concern that the Portland meeting, attended primarily by Hanford opponents, will disrupt and distort DOE's perception of Hanford's willingness and ability to do the job. The Portland meeting stacks the deck against Hanford. There are no other places where meetings are being held 200 miles from the site. 18

RICHLD–16 **DOE Policy**

DOE acknowledges the commentor's concern regarding effective communication channels at DOE Headquarters. Since its creation, MD has supported a vigorous public participation policy. This policy is facilitated by the availability of a substantial amount of information and the implementation of numerous communication mechanisms (e.g., hearings, workshops, toll-free telephone and fax line, Web site).

DOE gave equal consideration to all comments received during the comment period on the SPD Draft EIS and incorporated changes, as appropriate, in this SPD EIS. Each environmental document is prepared and reviewed by qualified professionals and is subjected to independent review within DOE to ensure that all actions are properly coordinated.

RICHLD–17 **DOE Policy**

DOE acknowledges the commentor's concern regarding the criteria used in the decisionmaking process. The health and safety of both workers and the public is a priority of the surplus plutonium disposition program. DOE would comply with all pertinent Federal, State, and local laws and regulations and would meet all required standards. Chapter 5 summarizes the pertinent environmental regulations and permits required by the disposition program. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

RICHLD–18 **Alternatives**

DOE acknowledges local support for new missions at Hanford and the commentor's concern that other areas in Washington and the State of Oregon do not support new missions. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

DOE needs to consider the technical knowledge of the people when going to Portland. 19

I dislike DOE responding to each comment or remark. I am familiar with the opinions from the officials, and it takes time away from the public comments. 20

Are comments being received as part of a public meeting or a public hearing? Will the testimony be recorded? DOE needs to clearly state at the beginning of the meeting what type of format is in effect. 21

I have been a citizen of Richland for 40 years and am a retired member of the American Nuclear Society. I agree with other statements that there is a bias in the decision process, as well as other comments offered by previous speakers. I want to see an advance agenda prior to the meetings taking place. 22

Dividing up the EIS into environmental impact topics is faulty. 23

RICHLD–19 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concern about the hearing in Portland.

RICHLD–20 **General SPD EIS and NEPA Process**

In the opening remarks, the facilitator announced that DOE was using an interactive meeting format so that members of the public could obtain immediate answers to their questions and provide DOE with comments that truly represented their concerns. Written comments were also accepted at these hearings from those members of the public who preferred not to speak. The hearings continued until all participants desiring to speak had the opportunity.

RICHLD–21 **General SPD EIS and NEPA Process**

The format of SPD EIS hearings was described in a fact sheet presented to participants at the start of each hearing and was announced by the facilitator who conducted the hearing. In opening remarks, the facilitator explained that all comments were to be recorded by trained notetakers and that an electronic recording was to be made of the hearing as a backup.

RICHLD–22 **General SPD EIS and NEPA Process**

DOE does not have a bias against placing the proposed plutonium disposition facilities at Hanford. The preferred alternative was chosen based on the best information and analyses available to allow for a fair comparison among the candidate sites for the proposed surplus plutonium disposition facilities. In the case of Hanford, DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–23 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). It is

From my review of records from past meetings, I feel that DOE is proceeding on a predetermined path. If you don't listen to us, do not come here and waste our time and yours. 24

The SPD EIS should be withdrawn, revised, and reissued from a balanced perspective. 25

intended as a source of environmental information for the DOE decisionmakers and the public. The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. As with any EIS, technical information is included to the extent that it is required to understand those actions and impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities.

RICHLD–24 General SPD EIS and NEPA Process

The preferred alternative was chosen based on the best information and analyses available to allow for a fair comparison among the candidate sites for the proposed surplus plutonium disposition facilities. In the case of Hanford, DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

Since its creation, MD has supported a vigorous public participation policy. This policy is facilitated by the availability of a substantial amount of information and the implementation of numerous communication mechanisms (e.g., hearings, workshops, toll-free telephone and fax line, Web site).

DOE gave equal consideration to all comments received during the comment period regardless of how they were submitted. Further, the hearings continued until all participants desiring to speak had the opportunity to do so.

RICHLD–25 General SPD EIS and NEPA Process

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). DOE has analyzed each environmental resource area in a consistent manner across

Why was privatization not discussed during the presentation? Has privatization been excluded from further consideration?	26
I am skeptical about relying on the consortium contract; doesn't the handling of special nuclear material fall under NRC regulation?	27
The cleanup function [*resulting from plutonium disposition*] is left out of the EIS.	28
There is a total of 12 DOE sites. How much plutonium is at SRS? The EIS should look at where the plutonium is.	29

all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities.

RICHLD–26 **DOE Policy**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. Section 4.28 was revised to discuss the procurement process as well as the potential environmental impacts of the reactors that would use the MOX fuel. Regarding pit disassembly and conversion and immobilization, neither process is sufficiently defined or understood to enable the Government to privatize these activities. Plutonium pits of various designs would be disassembled and converted to oxide. The multiplicity of designs may present uncharacterized scopes of work. There are also uncertainties associated with the nature and forms of materials to be immobilized.

RICHLD–27 **NRC Licensing**

NRC is responsible for regulating special nuclear material in the private sector; DOE, for the safe handling and regulation of its own special nuclear material. Under the MOX contract, the possession and use of plutonium by both the MOX facility and the commercial reactors selected to use the MOX fuel would be regulated by NRC.

RICHLD–28 **General SPD EIS and NEPA Process**

Deactivation and stabilization of the surplus plutonium disposition facilities on completion of their mission are discussed in Section 4.31. Options for D&D would be assessed at the end of the useful life of the facilities. The assessments would include engineering evaluations, environmental studies, and NEPA review of various courses of action.

RICHLD–29 **Transportation**

The amount of surplus plutonium at each DOE site is shown in Chapter 1 of Volume I. These amounts and locations are the starting points for determining

Does constructing a new MOX fuel fabrication facility at SRS adjacent to the Actinide Packaging and Storage Facility (APSF) mean that most of the material will be immobilized in a ceramic versus a glass form and not be used for fuel? 30

Is APSF a major factor in determining the preferred alternative? 31

the potential transportation impacts for each of the alternatives analyzed in this SPD EIS. Should DOE decide to implement one of these alternatives, all of the surplus plutonium at each of these sites would eventually be sent to a potential geologic repository. None of the alternatives involve moving Hanford materials to Pantex.

RICHLD–30 **MOX Approach**

A MOX facility would only be constructed to convert the surplus plutonium into MOX fuel. Under the preferred alternative, the immobilization and MOX facilities would be sited next to APSF, if built, at SRS, and a hybrid approach to surplus plutonium disposition would be implemented. MOX fuel would be made from all but the approximately 17 t (19 tons) of surplus plutonium that is unsuitable for such use because of the complexity, timing, and cost that would be involved in purifying the material. All the plutonium unsuitable for use as MOX fuel would be immobilized, preferably in the ceramic rather than the glass form.

RICHLD–31 **Alternatives**

APSF was a factor, but not a major consideration, in selection of the preferred alternative. As discussed in the revised Section 1.6, SRS is preferred for the proposed surplus plutonium disposition facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Section 2.4 of the SPD Draft EIS discusses the alternatives that considered locating pit conversion or immobilization facilities at SRS and using APSF as the site of a receiving facility for SST/SGT shipments, nondestructive assay facilities, and storage vaults for plutonium dioxide and metal. However, DOE has recently decided to delay the construction of APSF, so this SPD EIS was revised to exclude any benefit of APSF.

The location of DWPF was the major factor in the preference for SRS as the site of the immobilization facility. DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for

Could the Fast Flux Test Facility (FFTF) be used? The draft document evaluated FFTF as the sole venue for surplus plutonium disposition. If FFTF is used to produce tritium, plutonium could not be disposed of in the indicated timeframe. Previous reports said that FFTF could dispose of plutonium in 19 years. 32

The SRS decision for MOX fuel fabrication is based on administrative issues. Is it logical to site MOX at SRS considering the site has no previous MOX experience? 33

There are no other alternatives that also ship oxides to Hanford and the Idaho National Engineering and Environmental Laboratory (INEEL). Alternatives also did not consider a MOX-only function at FMEF. All alternatives consider the cost of creating a MOX facility with one new stand-alone facility. 34

processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can–in–canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared.

RICHLD–32 **MOX Approach**

As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium.

RICHLD–33 **Alternatives**

The selection of SRS as the site of the MOX facility was not an administrative issue. As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise. While SRS does not possess previous MOX experience, it possesses, like Hanford, a wealth of plutonium processing experience. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

RICHLD–34 **Alternatives**

Section 2.3.1 explains the development of the facility siting alternatives that were analyzed in this SPD EIS. A range of 15 reasonable alternatives remained after evaluating over 64 options against the three screening criteria, which are analyzed in the SPD Final EIS. The equally weighted criteria used were worker and public exposure to radiation, proliferation concerns due to transportation of materials, and infrastructure cost. The resulting reasonable facility and building combinations did not include those options involving shipments of oxides to Hanford and INEEL, or a MOX-only function in FMEF at Hanford because those options do not meet all the screening criteria.

Converting pits and other plutonium sources into MOX fuel is a wise use of resources; why not use all, or as much as possible, in fuel? Why immobilize any plutonium?	35
Who will operate the MOX facilities?	36
Wasn't MOX eliminated as a commercial product a number of years ago?	37

RICHLD–35 **Alternatives**

All of the surplus plutonium would not be made into MOX fuel because some of it is not suitable for fabrication due to the complexity, timing, and cost that would be involved in purifying those plutonium materials to make them suitable for use in MOX fuel. As described in this SPD EIS, DOE has identified 17 t (19 tons) of impure plutonium. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not considered a reasonable alternative at this time. In order to simplify the manufacture of MOX fuel and help produce a consistent product, DOE considers it advantageous to use a feed stream consisting of only plutonium from clean metal, pits, and clean oxide. Sending the remaining materials to the immobilization facility avoids extensive characterization and purification of materials. While it is possible to use impure plutonium, the incremental burden to do so is unnecessary and complicates the MOX approach.

RICHLD–36 **MOX Approach**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. As discussed in the revised Section 4.28, it would be the selected team, DCS' responsibility to design, request a license, construct, operate, and deactivate the MOX facility, and to irradiate the MOX fuel in a domestic, commercial reactor. The MOX facility would be subject to DOE and NRC safety requirements.

RICHLD–37 **MOX Approach**

R&D efforts involving MOX fuel were halted in the 1970s when fuel reprocessing and breeder reactor programs were eliminated. However, these were political decisions based on proliferation concerns, and did not reflect the viability of the technologies. The use of MOX fuel as an approach to surplus plutonium disposition does not run counter to this position. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

Page 27 of the SPD Draft EIS Summary indicates that DOE plans to irradiate MOX fuel only until it reaches the Spent Fuel Standard. Some commercial companies may resist running partial rather than full fuel cycles. 38

Most utilities will argue that receiving plutonium for free alone is insufficient compensation for conducting the MOX program; utilities will want additional compensation (e.g., domestic reactors requiring highly enriched uranium that the utility had to buy). 39

Is this material [*MOX fuel*] going to go to foreign reactors? 40

RICHLD–38 **MOX Approach**

As discussed in Chapter 2 of Volume I, MOX fuel would be left in the reactor for a full cycle. Under the current reactor options, there are no plans to leave it there only long enough to meet the Spent Fuel Standard. The statement in the Draft Summary refers to an analysis from the *Storage and Disposition PEIS* that assumed MOX fuel would be removed from the reactor as soon as it had been irradiated sufficiently to meet the Spent Fuel Standard. The point being made in that PEIS was that even if this were the plan, there would still be enough space at the reactor sites to store the spent fuel until it could be sent to a potential geologic repository.

RICHLD–39 **MOX Approach**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. Furthermore, to ensure that taxpayers would not underwrite what might be uneconomical electricity-generating costs, DOE specifically excluded from the contract reimbursement of any costs for continuing operation of any plant unless those costs are solely and exclusively related to MOX fuel irradiation.

RICHLD–40 **MOX Approach**

This SPD EIS addresses the use of MOX fuel only in domestic, commercial reactors. In the SPD Draft EIS, DOE retained the option to use some of the surplus plutonium as MOX fuel in CANDU reactors, which would have only been undertaken in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the Draft was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is no longer actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. A separate environmental review, the *Environmental Assessment for the Parallex Project*

Have any commercial reactors been identified by DOE? MOX fuel can be irradiated in a commercial domestic reactor (Gore/Korenko meeting).	41
Will the provider conduct the analysis for the core reactor?	42
Has DOE considered the use of existing commercial facilities such as the Siemens plant for manufacturing MOX fuel?	43

Fuel Manufacture and Shipment (DOE/EA-1216, January 1999), analyzes the fabrication and proposed shipment of MOX fuel rods for research and development activities involving the use of limited amounts of U.S. MOX fuel in a Canadian test reactor. A FONSI was signed on August 13, 1999. Both of these documents can be viewed on the MD Web site at http://www.doe-md.com. If a decision is made to dispose of Russian surplus plutonium in Canadian CANDU reactors in order to augment Russia's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

RICHLD–41 **MOX RFP**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. As a result of its procurement process, DOE identified the reactors proposed to irradiate MOX fuel, Catawba, McGuire, and North Anna, as part of the proposed action in this SPD EIS. Section 4.28 was revised to discuss the potential environmental impacts of operating those reactors.

RICHLD–42 **MOX RFP**

One of the inherent responsibilities of the reactor licensee is assurance that the fuel inserted into its reactors meets all licensing requirements. This responsibility is not isolable from the reactor license. Many utilities choose to subcontract core analysis to fuel vendors, but some perform their own analyses; the decision, whether LEU or MOX fuel is involved, is the utility's alone to make.

RICHLD–43 **MOX RFP**

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For

Time is critical for reducing weapons materials; using existing facilities [*rather than taking time to build new ones*] will reduce the timeframe for dispositioning this material. 44

Has DOE considered doing a pilot scale of plutonium conversion? Should DOE test 1-1/2 to 2 tons as a trial run? Existing Hanford facilities could be used as a pilot plant to test the process. 45

Cost was left out of the EIS. 46

reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing. Therefore, the use of the Siemens Plant approach is beyond the scope of the alternatives evaluated for this SPD EIS.

RICHLD–44 **Purpose and Need**

Although use of existing facilities might save some time in the disposition process, such facilities would still require considerable modification. Timeliness, however, is only one of many factors in decisionmaking with respect to surplus plutonium disposition. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

RICHLD–45 **Pit Disassembly and Conversion**

DOE is currently in the process of testing the plutonium conversion process as an integrated system at LANL. Up to 250 pits will be disassembled and converted to plutonium dioxide using the same techniques proposed in this SPD EIS. Details of this test may be found in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), which is available on the MD Web site at http://www.doe-md.com. The resulting experience from this demonstration would be used to supplement information developed to support the design of the full-scale pit conversion facility should DOE decide to construct that facility. There is no need to duplicate this effort at any other DOE site.

RICHLD–46 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013,

Where are the funds for MOX coming from? | 47

DOE needs to compare the cost of using existing facilities against the costs of building a new facility. I can't believe that the preferred site is cheaper than Hanford. FMEF cost $200 million to build 20 years ago. The National Academy of Sciences estimates that it will cost $500 million to $1 billion to build a new MOX facility. It would cost only $150 million to $175 million to modify the existing FMEF. Funds generated from FMEF could run FFTF to produce medical isotopes. | 48

The current cost analysis is in conflict with an independent cost analysis, and this will have future ramifications. | 49

November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

RICHLD–47 **Cost**

Funding for MOX fuel fabrication and the rest of the surplus plutonium disposition program comes from DOE's budget, which is authorized and appropriated by the U.S. Congress. The MOX facility would produce nuclear fuel to displace the LEU fuel that utilities otherwise would have purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

RICHLD–48 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

RICHLD–49 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

Are the United States and Russia close to a bilateral agreement on the disposition of plutonium?	50
Is the United States getting close on the Spent Fuel Standard (15 percent/240)?	51
I understand that Russia prefers to burn, not immobilize. The General Accounting Office (GAO) said the Russian mission will not fly without funding. Will the United States wait on disposition until Russia is ready to begin?	52

RICHLD–50 **Nonproliferation**

In September 1998, the United States and Russia, in a joint statement, affirmed the intention of each country to remove, by stages, approximately 50 t (55 tons) of plutonium from its stockpile and to convert this material so that it can never be used in nuclear weapons. The two countries also agreed to seek to develop appropriate international verification measures and stringent standards of physical protection, control, and accounting for the management of plutonium.

RICHLD–51 **DOE Policy**

The Spent Fuel Standard does not require a specific plutonium 240 isotopic content of 15 percent. Although isotopic dilution of the surplus plutonium resulting in a higher plutonium 240 content would support nonproliferation objectives, it is not necessarily required to make the material as inaccessible and unattractive for weapons use as the plutonium that exists in highly radioactive spent nuclear fuel from commercial reactors. Other factors considered in attaining the Spent Fuel Standard include the incorporation of physical (size and weight) and radioactive barriers to reduce the possibility of proliferation.

RICHLD–52 **Nonproliferation**

To date, Russia has not made a final decision on which disposition option it will use. DOE is working diligently to ensure that Russia continues to pursue plutonium disposition with the same vigor as the United States. Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain surplus plutonium disposition activities in order to encourage the Russians and set an international example.

Who is funding the Russian component of the plutonium disposition process? The DOE or the G-7? 53

The largest store of weapons-grade plutonium is here at Hanford. The location of plutonium should be looked at. This was not included in the EIS. 54

Hanford was not treated fairly in the SPD EIS. Of eleven alternatives, only one considered Hanford for all three facilities, and in this one alternative (2), the MOX facility at Hanford would be a new facility, while ignoring FMEF capabilities. I feel that this is a clear example of the inherent bias reflected in the SPD EIS. Alternatives 4A and 4B calls for a new facility for MOX and immobilization, respectively. There is no case presented that allows Hanford to do more than two of three tasks, and Hanford is always required to build a new facility. 55

RICHLD–53 **Nonproliferation**

DOE is working diligently to ensure that Russia continues to pursue plutonium disposition with the same vigor as the United States. The U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

RICHLD–54 **Transportation**

Pantex has the largest volume of surplus plutonium, in the form of pits and metal; Hanford, most of the nonpit surplus plutonium. Appendix L was revised to show the number of shipments for each alternative. Alternatives 2, 4, 6, 8, and 10 in this SPD EIS involve siting one or more of the proposed surplus plutonium disposition facilities at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–55 **Alternatives**

DOE acknowledges the commentor's concern regarding the development and evaluation of the surplus plutonium disposition alternatives. Section 2.3.1 explains the development of the facility siting alternatives that were analyzed in this SPD EIS. A range of 15 reasonable alternatives remained after evaluating over 64 options against the three screening criteria, which are analyzed in the SPD Final EIS. The equally weighted criteria used were worker and public exposure to radiation, proliferation concerns due to transportation of materials, and infrastructure cost. Every alternative that considered Hanford used, to

The MOX mission should be located at Hanford because Hanford has an experienced workforce with the technical skills and knowledge to perform the MOX mission.	56
The plutonium disposition mission will help to maintain a highly skilled workforce [*at Hanford*].	57
Hanford's dry climate is better suited for conducting the MOX mission.	58
Cheap power should be considered when looking to site mission; power is much more expensive in the south.	59

the maximum extent possible, FMEF. In the case of Alternative 2, it was determined that the available space in FMEF would not be sufficient to accommodate the efficient operation and maintenance of all three proposed facilities. Therefore, the MOX facility was proposed to be located in a new building in part because, unlike the other facilities, it would be licensed by NRC.

RICHLD–56 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–57 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–58 **Alternatives**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–59 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis*

FMEF is an ideal facility for performing the MOX mission. It is the best choice for achieving an optimal timeframe for startup. FMEF is built to NRC standards, is ready to license, is clean, and can be easily modified to meet the demands of a MOX mission. Infrastructure considerations are offered by existing facilities, FMEF, over new facilities. It makes sense to use the facility rather than walking away from it in order to build a similar facility elsewhere. The National Academy of Sciences has pointed this out. 60

DOE should apply Hanford's assets to emerging national and international needs. I would like to reemphasize the importance of plutonium disposition: it's critical to withdraw surplus plutonium from the weapons supply. The SPD EIS is an extremely important document, and it needs to be technically sound. 61

FFTF, if dedicated to the plutonium disposition mission, could dispose of the plutonium within 25 years as required while at the same time producing medical isotopes. 62

in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

RICHLD–60 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility in FMEF at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

RICHLD–61 **Alternatives**

DOE agrees with the commentor's views on the importance of plutonium disposition. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–62 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program using FFTF at Hanford. As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source.

DOE should give further consideration that FFTF could handle burning 33 tons. I think that all excess plutonium could be burned and FMEF could produce MOX fuel. The taxpayers would save a lot. 63

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

RICHLD–63 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program using FFTF and FMEF at Hanford. As discussed in Section 1.7.4, Appendix D was deleted because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source.

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

I am concerned that with cleanup as the only mission at Hanford, it is a signal that no new missions will be given to Hanford. The plutonium disposition mission is consistent with the cleanup mission, contrary to EIS findings. Hanford can handle more than one mission at a time. 64

SRS also has an extensive cleanup mission to consider; why is DOE only penalizing Hanford and INEEL? 65

The SPD EIS misrepresents Hanford by claiming additional facility requirements while ignoring dual-mission capability, which incurs additional costs. 66

RICHLD–64 **Alternatives**

DOE acknowledges the commentor's view that the surplus plutonium disposition program is consistent with the cleanup mission. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–65 **Alternatives**

Cleanup is, and will remain, a priority at SRS and will be unaffected by other DOE initiatives. As indicated in the revised Section 1.6, SRS is preferred for the proposed surplus plutonium disposition facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

RICHLD–66 **Alternatives**

DOE acknowledges the commentor's concern regarding DOE's assessment of Hanford's capabilities relative to the other candidate sites for the surplus plutonium disposition program. The preferred alternative was chosen based on the best information and analyses available to allow for a fair comparison among the candidate sites for the proposed surplus plutonium disposition facilities.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

What were the discriminating factors for selecting SRS? If there were no major differences in the environmental impacts at the sites, then the mission should be given to Hanford. Hanford is the most contaminated site; therefore, it should have a priority in receiving new missions. 67

DOE would be shipping out more plutonium from Hanford than it would take in if the plutonium mission were to be sited at SRS. We would be shipping more plutonium to SRS than they would be shipping here. That was left out of the EIS. 68

Locating a MOX facility at SRS requires an extra step in moving materials from Hanford to Pantex. 69

I would like to address the political side of the decision. The Northwest community sent a message to DOE during the scoping process that they expected an objective, unbiased assessment of all options and opportunities, and that the previous PEIS should not drive the current SPD EIS. The SPD EIS is not balanced and objective. Hanford deserves fair and unbiased consideration. 70

RICHLD–67 **Alternatives**

The preferred alternative was chosen based on the best information and analyses available to allow for a fair comparison among the candidate sites for the proposed surplus plutonium disposition facilities. In the case of Hanford, DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

RICHLD–68 **Transportation**

The amount of surplus plutonium at each DOE site is shown in Chapter 1 of Volume I. These amounts and locations are the starting points for determining the potential transportation impacts for each of the alternatives analyzed in this SPD EIS. Should DOE decide to implement one of these alternatives, all of the surplus plutonium at each of these sites would eventually be sent to a potential geologic repository.

RICHLD–69 **Transportation**

None of the alternatives involve moving Hanford materials to Pantex.

RICHLD–70 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementing regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

I am disappointed in DOE's process for developing this EIS; I feel that it is a predetermined process. It could be litigated. 71

I hope DOE recognizes that there is more than one voice speaking for the Northwest. Not everyone agreed or supported the recent lawsuit, so don't hold that lawsuit against Hanford. 72

Will public comments on the cost analysis be accepted? 73

Can domestic facilities be licensed to produce MOX fuel? Will MOX be licensed by the NRC? 74

The SPD EIS added additional spent fuel difficulties (americium, high-heat levels, etc.). DOE has a questionable record when it comes to storing spent fuel. How will DOE help the sites store spent fuel? 75

RICHLD–71 **General SPD EIS and NEPA Process**

DOE prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementing regulations (40 CFR 1500 through 1508 and 10 CFR 21, respectively). Decisions on the surplus plutonium disposition program are not predetermined; they will be based on the environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

RICHLD–72 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concern for equal representation. DOE provided opportunities and means for public comment on the surplus plutonium disposition program and gave equal consideration to all comments.

RICHLD–73 **Cost Report**

Public comments on the cost analysis are addressed in the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

RICHLD–74 **NRC Licensing**

Domestic facilities can be licensed to produce MOX fuel. Both the MOX facility and the domestic, commercial reactors selected to use the MOX fuel would be licensed and monitored by NRC.

RICHLD–75 **MOX Approach**

MOX fuel assemblies would be the same size and shape as the LEU fuel for the specific reactor. The only difference would be the additional decay heat from the higher actinides, especially americium, in the MOX fuel. Dry casks are designed and certified for a maximum heat load, so the additional decay heat would contribute to the total heat load and not require any redesign. The additional heat load may result in less spent fuel stored per cask. A more likely option is that the MOX fuel would be selectively packaged with cooler LEU fuel to obviate any overall heat output restriction.

If there are to be no new missions at the DOE Hanford facility, is DOE prepared to give up their space in the Federal Building [*in Richland*]? I suggest transitioning the Federal Building from DOE use to the City of Richland use. 76

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

RICHLD–76 **Other**

The use of the DOE space in the Federal Building is beyond the scope of this SPD EIS.

Is aqueous processing a contingency in the SPD EIS? The Weapons Monitor has criticized DOE for not considering aqueous processing. 1

The metals-only option was not evaluated. It was described by Los Alamos National Laboratory (LANL) as the most effective. 2

A significant number of pits are contaminated with tritium. Tritium-contaminated pits were not tested at Lawrence Livermore National Laboratory because of the tritium concern. Tritium issues were not addressed in the SPD EIS. 3

The SPD EIS does not cover a lot of the issues associated with pit disassembly and conversion. 4

PANTEX–1 Plutonium Polishing and Aqueous Processing

There are two basic technologies available for the conversion of pit plutonium into plutonium dioxide: wet (aqueous) and dry processing. DOE determined that aqueous processing, a proven technology, is not a reasonable alternative for pit conversion because current aqueous processes using existing facilities would produce significant amounts of waste, and aqueous processing would complicate international safeguard regimes. Therefore, the remaining technology, dry processing, was analyzed in the *Storage and Disposition PEIS* and this SPD EIS. DOE is currently demonstrating the dry plutonium conversion process as an integrated system at LANL. This activity is described in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), which is available on the MD Web site at http://www.doe-md.com.

PANTEX–2 Alternatives

The metals-only option would convert the plutonium from pits into metal for long-term storage. This option was not evaluated in this SPD EIS because it does not render the plutonium proliferation-resistant. Immobilizing the plutonium or converting it to MOX fuel and then irradiating the fuel would meet the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

PANTEX–3 Alternatives

Section 2.4.1.2 was revised to include a discussion of tritium-contaminated pits.

PANTEX–4 Pit Disassembly and Conversion

DOE acknowledges the commentor's concern that not all issues associated with the pit disassembly and conversion process are addressed in this SPD EIS. This EIS reflects a thorough analysis of impacts, including air quality, human health risk, waste management, and socioeconomics, that would be associated with the siting of a pit conversion facility at either Hanford, INEEL, Pantex, or SRS. Also evaluated were impacts on other resources (i.e., geology and

I want a more in-depth discussion of risks associated with the plutonium and tritium mission. | 5

soils, water resources, ecological resources, cultural and paleontological resources, land use and visual resources, and infrastructure), but only in terms of the alternative that would have the greatest impact on the resource. The alternative analyzed was generally that which would involve locating the largest number of facilities at a given site. Impact analyses are summarized in Chapter 4 of Volume I. More detailed information on the pit disassembly and conversion process is included in the data reports for each candidate site referenced in this EIS. These references can be obtained from local DOE reading rooms.

DOE's *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998) analyzes the environmental impacts of a demonstration to test an integrated pit disassembly and conversion process on a relatively small sample of plutonium pits and metals at LANL. The information gathered in that demonstration will be used to supplement information developed to support the construction of a full-scale pit conversion facility, if DOE decides to build such a facility. The demonstration focuses on equipment design and process development. Since it could continue for up to 4 years, information transfer conducive to fine-tuning the operational parameters of a pit conversion facility could be provided continually throughout the facility design phase. The EA is available on the MD Web site at http://www.doe-md.com.

PANTEX–5 **Human Health Risk**

This SPD EIS identifies and analyzes potential human health impacts that might result from construction and normal operation of the proposed surplus plutonium disposition facilities. The Human Health Risk and Facility Accidents sections in Chapter 4 of Volume I discuss the effects on the public of potential radiological releases. DOE policy places public safety above other program goals, and requirements have been established to protect the safety and health of the public. DOE considers the protection of the public against accidents in the design, location, construction, and operation of its facilities.

The tritium mission is beyond the scope of this EIS. The *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE/EIS-0161, October 1995) evaluates alternatives for new tritium production and for the recycling of tritium recovered from weapons retired from service.

The No Action Alternative is not a viable alternative because the half-life of plutonium is 20,000 years. The No Action Alternative leaves the material in a form that invites terrorism and environmental problems; we should not leave these issues for future generations. 6

Pit disassembly and conversion should be kept separate from MOX and immobilization to be able to have accountability for Russian plutonium disposal. 7

DOE should dismantle weapons materials as soon as possible by moving forward with the pit disassembly and conversion mission. 8

PANTEX–6 **Alternatives**

DOE acknowledges the commentor's opposition to implementing the No Action Alternative. Analysis of the No Action Alternative is required under NEPA. Section 2.5 indicates that the No Action Alternative would not satisfy the purpose and need for the proposed action because DOE's disposition decisions in the *Storage and Disposition PEIS* ROD would not be implemented. As indicated in Section 1.6, DOE has identified as its preferred alternative the hybrid approach (i.e. immobilization and MOX) to disposition surplus plutonium.

PANTEX–7 **Nonproliferation**

The United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. Because each country is responsible for separately disposing of its own stockpiles of surplus plutonium, this agreement contains provisions for developing verification methods and technology. These include appropriate international verification measures and stringent standards of physical protection, control, and accounting for the management of plutonium. IAEA is charged with verifying compliance with international nonproliferation policies. As discussed in Section 2.4, there are provisions for international inspections of each of the proposed surplus plutonium disposition facilities.

PANTEX–8 **Pit Disassembly and Conversion**

DOE acknowledges the commentor's support for pit disassembly and conversion. DOE plans to move ahead with the surplus plutonium disposition program as expeditiously as possible. However, the proposed surplus plutonium disposition facilities would not be constructed until significant progress was made by the Russian government on its plutonium disposition program. Schedules for construction and operation of the proposed facilities are provided in Appendix E.

There is political controversy surrounding the MOX option. I believe the MOX option will fade as more is analyzed and understood about the materials. 9

The pit disassembly and conversion mission should go to an established site. 10

Technology for converting pits into an oxide form has not been demonstrated; DOE is getting ahead of itself. 11

The nuclear community indicated at a meeting in Atlanta, Georgia, that it does not trust the ARIES process for oxide. DOE, however, amended the RFP to allow the ARIES process. 12

PANTEX–9 **MOX Approach**

DOE acknowledges the commentor's opinion regarding the MOX approach.

PANTEX–10 **Alternatives**

DOE acknowledges the commentor's opinion that the pit conversion facility should be located at an established site. As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–11 **Pit Disassembly and Conversion**

The process that will be used to convert the plutonium in pits to an oxide is not new; each step has been successfully demonstrated. For the proposed action, however, those steps would be linked for the first time as a full-scale, integrated process. DOE's *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998) analyzes the environmental impacts of a demonstration to test an integrated pit disassembly and conversion process on a relatively small sample of plutonium pits and metals at LANL. The information gathered in that demonstration will be used to supplement information developed to support the construction of a full-scale pit conversion facility, if DOE decides to build such a facility. The demonstration focuses on equipment design and process development. Since it could continue for up to 4 years, information transfer conducive to fine-tuning the operational parameters of a pit conversion facility could be provided continually throughout the facility design phase. The EA is available on the MD Web site at http://www.doe-md.com.

PANTEX–12 **Alternatives**

The ARIES process is one of the pit conversion process steps, in which the pits are disassembled and the plutonium is separated from other pit components and converted into plutonium dioxide. The scope of work reflected in the *RFP for MOX Fuel Fabrication and Reactor Irradiation*

Both the ARIES and MOX processes were evaluated in the Independent Risk Study. Based on my background, the data presented is current, relevant, and accurate. 13

Can DOE say with certainty that it is cheaper to build and operate facilities at SRS than at Pantex? 14

The American Federation of Labor-Congress of Industrial Organizations (AFL-CIO) has a strong working relationship with DOE and has met with past Secretaries to develop programs to reduce costs that resulted in a savings of $50 million for taxpayers. The AFL-CIO is actively working to seek out ways for improving cost efficiency in workforce practices. 15

Services (May 1998) would begin after the production of plutonium dioxide. Because there was some discussion that the resulting plutonium might contain too much gallium to meet the MOX fuel specifications, the RFP was amended to allow the offerors to propose an additional polishing step for gallium removal.

PANTEX–13 **Alternatives**

DOE acknowledges the commentor's conclusion that the data in the Independent Risk Study is current, relevant, and accurate.

PANTEX–14 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PANTEX–15 **Cost**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Pantex. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and

Clarification of the cost report is needed. Some of the pit disassembly and conversion facility needs for SRS are being rolled into the design changes for the APSF and are not being reflected in the cost estimates. The need for a source calibration facility is also not covered. The indirect cost factors are not covered. 16

I am pleased that Laura Holgate is stepping in to head up the plutonium disposition mission, which is an international issue as well as a national concern. As the National Academy of Sciences stated, surplus plutonium represents a clear and present danger. The United States needs to demonstrate leadership and technology for Russia. 17

Engaging Russia has the added benefit of reaching and leading a broader international audience in dispositioning surplus weapons materials. A bilateral agreement is being negotiated with Russia for inspecting nonclassified material. Involving the international community opens up opportunities for transparency. 18

Washington, D.C. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–16 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PANTEX–17 **DOE Policy**

DOE acknowledges the commentor's support for the leadership of the surplus plutonium disposition program. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

PANTEX–18 **DOE Policy**

DOE agrees that close cooperation between the United States and Russia is essential to achieve the objectives of nonproliferation and arms reduction, and to ensure secure management of nuclear weapons materials. To that end, in late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During

The pit disassembly and conversion mission is a huge decision for the nation. Components of the mission must be handled with care. DOE needs to move forward in demilitarizing the pits and moving the material into safe and secure storage ultimately under the purview of International Atomic Energy Agency inspection and control. DOE needs to demonstrate a leadership roleCthis opens up a lot of opportunity for transparency and knowing what is going on in both Russia and the United States. 19

I don't believe we need to tear down so many weapons. I believe we need to keep our big stick; I hope we never have to use it. Slow down the dismantlement of weapons, and use caution in tearing down military resources that may be needed in the future. 20

We urge you not to let political urgency influence the decision made to house and dilute these plutonium pits. We urge you to select Pantex. 21

the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. One of the seven principles that were agreed upon relates to acceptable methods and technology for transparency measures, including appropriate international verification measures and stringent standards of physical protection, control, and accounting for management of the plutonium.

PANTEX–19 **DOE Policy**

DOE agrees that bilateral monitoring with Russia of the classified plutonium material and international inspection of the unclassified material would give assurances to the world of U.S. leadership in plutonium disposition. Once the United States and Russia completed an agreement providing the basis for exchanging classified nuclear information, the procedures to be used for inspection of pits in storage could be adapted to contribute to the bilateral monitoring of pit conversion facilities. As shown in Figure 2–7, accommodation for international inspection of the unclassified material has been incorporated into the design of the pit conversion facility. International monitoring and inspection of the unclassified plutonium would also allow the United States and Russia to demonstrate to each other and to the world that disposition is being carried out under stringent nonproliferation controls, and that the excess plutonium is not being diverted for reuse in weapons.

PANTEX–20 **DOE Policy**

DOE acknowledges the commentor's view regarding national defense. Declaration of surplus weapons is made by the President in response to recommendations from the Nuclear Weapons Council, which consists of representatives from DOE, DoD, and the Joint Chiefs of Staff.

PANTEX–21 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Let Pantex's excellent track record speak for itself; we are the obvious choice.	22
The disposition of pits can be done in the most timely fashion at Pantex. Pantex's current capabilities will allow the United States to achieve some high-level goals, accelerate timeliness, and offers opportunity for inspection and collaboration with Russia.	23
Amarillo supports Pantex for the new pit disassembly and conversion mission. Keep the work at Pantex. Pantex has a highly trained workforce capable of meeting the pit disassembly and conversion mission. Pantex has one of the best safety records in the DOE complex and rarely has off-normal or unusual occurrences. There is a strong health program at Pantex. DOE orders are followed strictly, and Pantex's workforce is healthier and safer than Savannah River's workforce.	24
Pantex is a secure location. Pits are already located at Pantex, which is a strong argument for siting the pit disassembly and conversion facility at Pantex. Performing the pit disassembly and conversion mission at Pantex lessens the risk of nuclear proliferation.	25
Pantex plays an important role in the local community; the community is allowed to participate in environmental safety and health oversight. There is a strong spirit of community cooperation and support for the Pantex site, including the Amarillo business community.	26

PANTEX–22 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–23 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–24 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–25 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–26 **Other**

DOE acknowledges the strong community support for Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on public input, environmental analyses, technical and cost reports, and national policy and nonproliferation considerations.

Texas has a long and healthy relationship in working with DOE and the Federal Government to meet defense needs. The State of Texas support along with the support of the AFL-CIO is a powerful ally for the Department. It makes no sense to do the work any place else. 27

The support for Pantex is localized; the rural community is historically less supportive of Pantex. 28

The Stockpile Stewardship and Management PEIS states that plutonium won't be introduced into sites that don't have the infrastructure. Pantex does not have the capability to handle TRU (transuranic) waste and tritium. Why is it being considered? 29

PANTEX–27 **Other**

DOE acknowledges the support of the State of Texas and the AFL-CIO. Decisions on the surplus plutonium disposition program at Pantex will be based on public input, environmental analyses, technical and cost reports, and national policy and nonproliferation considerations.

PANTEX–28 **Other**

DOE acknowledges the commentor's observation that Pantex support is localized and that the rural community has historically been less supportive.

PANTEX–29 **Alternatives**

The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) (DOE/EIS-0236, September 1996) states that the pit fabrication mission would not be introduced into a site that does not have an existing plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities. The SSM PEIS states further that an important element of the site selection strategy is to maximize the use of existing infrastructure and facilities as the nuclear weapons complex becomes smaller and more efficient in the 21st century; thus, no new facilities were to be built to accommodate stockpile management missions. Accordingly, DOE considered as reasonable only those sites with existing infrastructure capable of supporting a pit fabrication mission. Although Pantex has the infrastructure to carry out its current weapons assembly and disassembly mission and nonintrusive pit reuse program, it was not considered a viable alternative for the pit fabrication mission because it did not possess sufficient capability and infrastructure to meet the SSM PEIS siting assumption stated above. Among the operations that were considered in developing siting alternatives for pit fabrication in the SSM PEIS were plutonium foundry and mechanical processes, including casting, shaping, machining, and bonding; a plutonium-processing capability for extracting and purifying plutonium to a reusable form either from pits or residues; and assembly operations involving seal welding and postassembly processing.

When comparing the site selection strategy for pit disassembly and conversion with that used for the pit fabrication mission, the siting criteria in the SSM PEIS

Tritium in the pits made them too dangerous to handle and test at Los Alamos; why is it any safer to perform pit conversion at Pantex?	30
Siting the pit disassembly and conversion mission at Pantex will be creating a new plutonium-contaminated site.	31

have little or no bearing on siting criteria used in this SPD EIS. Pit disassembly and conversion do not require foundry and mechanical processes discussed in the SSM PEIS and can be accomplished in a stand-alone facility. Also, the SSM PEIS siting assumptions include a requirement to use existing facilities, whereas the pit conversion facility would be a new structure no matter where it is located.

Pantex is a candidate site because it meets the three screening criteria: worker and public exposure to radiation, proliferation concerns due to transportation of materials, and infrastructure cost. In addition, Pantex is a candidate site for the pit conversion facility because most of the pits are stored there. Although TRU waste is not routinely generated and stored at Pantex, dedicated storage space would be provided with the proposed surplus plutonium disposition facilities.

PANTEX–30 **Pit Disassembly and Conversion**

Pits containing tritium are routinely processed in the Special Recovery Line at LANL. Removal of the tritium is a rather straightforward process and can be performed safely. Pits with tritium contamination are bisected to separate the plutonium from the classified metal shapes, and then processed in a vacuum furnace to drive off the tritium, as described in Section 2.4.1. This same process would be applied in the pit conversion facility.

PANTEX–31 **Alternatives**

DOE acknowledges the commentor's opposition to siting the pit conversion facility at Pantex. This SPD EIS identifies and analyzes potential environmental and human health impacts that might result from the construction and normal operation of the proposed surplus plutonium disposition facilities. As described in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of any of the proposed actions during routine operations at any of the candidate sites would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed surplus plutonium disposition facilities in compliance with today's environmental, safety, and health requirements. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Promised site safety upgrades [*at Pantex*] have not happened; the effects are being realized in Zone 4 where pits had to be moved. Last month the pits were moved because of the heat. We shouldn't be playing musical bunkers. We would take a dim view of Russia if they started moving their pits around. 32

Pantex is not a clean site; it has its problems. More study is needed before introducing plutonium processing into the Amarillo area. Amarillo will become no different than any other DOE site if plutonium processing comes to the area. 33

The GAO is investigating pit storage at Pantex. There is no plan for long-term storage at Pantex; we're still waiting on the plan. 34

PANTEX–32 **Storage and Disposition PEIS and ROD**

The ROD for the *Storage and Disposition PEIS* presents the long-term storage plan for plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. Further, DOE has prepared an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com.

PANTEX–33 **Alternatives**

DOE acknowledges the commentor's concerns about siting any proposed surplus plutonium disposition facility at Pantex. This SPD EIS identifies and analyzes potential environmental and human health impacts that might result from the construction and normal operation of the proposed facilities. As described in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of any of the proposed actions during routine operations at any of the candidate sites would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed surplus plutonium disposition facilities in compliance with today's environmental, safety, and health requirements. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–34 **DOE Policy**

The ROD for the *Storage and Disposition PEIS* presents the long-term storage plan for plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review

I want to ask about the differences in occurrence reporting between Pantex and SRS. Pantex has fewer employees than SRS. How many more employees does SRS have? What processing does SRS do? 37

SRS does not have the type of enhanced safety programs in place that Pantex has. 38

SRS has limited experience in handling pits. 39

conversion process that has been proposed for all candidate sites. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–37 **Socioeconomics**

At the time the SPD Draft EIS was prepared in 1997, SRS employed 15,032 persons and Pantex, 2,944.

Currently, SRS processes nuclear materials into forms suitable for continued safe storage, use, or transportation to other DOE sites. Tritium is recycled at SRS in support of stockpile requirements using retired weapons as the tritium supply source. In the past, DOE produced nuclear materials and tritium at SRS.

PANTEX–38 **Alternatives**

All of the candidate sites considered for the surplus plutonium disposition program have safety programs in place that would meet the needs of the proposed activities; site capabilities in this area were not a discriminator in the process of selecting the preferred alternative. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–39 **Alternatives**

As indicated in the revised Section 1.6, SRS is preferred for the pit conversion facility because the site has extensive experience with plutonium processing, and the pit conversion facility complements existing missions and takes advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

The decision for MOX at SRS should be reassessed. 40

Negative impacts (economic) can wipe out any gains in nonrelated areas. If Pantex fails to grow, it will be like taking two steps backward. 41

I am encouraged that there are no discriminating impacts between the sites. 42

The Independent Risk Assessment Study's preliminary findings show that risks from the new mission are comparable to existing missions at Pantex. The Independent Risk Assessment Study stated that risks can be mediated by the type of facility built. A person would receive a higher dose taking an airplane ride than from the 1,100 curies of tritium that would be released each year from the new pit disassembly and conversion mission at Pantex. 43

PANTEX–40 **Alternatives**

As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise. The preferred alternative was chosen based on the best information and analyses available to allow for a fair comparison among the candidate sites for the proposed surplus plutonium disposition facilities. This is DOE's preference; it is not a decision. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–41 **Socioeconomics**

DOE acknowledges the commentor's support for growth at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–42 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's observation that there is no fundamental distinction between the candidate sites in terms of environmental impacts of the surplus plutonium disposition program.

PANTEX–43 **Human Health Risk**

DOE acknowledges the commentor's statement of fact. In particular, the dose of 0.062 mrem/yr to the maximally exposed member of the public from the release of 1,100 Ci of tritium from a new pit conversion facility at Pantex (see Table 4–66) would be 40 times smaller than the dose of 2.5 mrem received by a person during a 5-hr airplane ride across the United States (*Ionizing Radiation Exposure of the Population of the United States* [NCRP Report No. 93, September 1987]).

I am a Risk Study participant. The numbers are stacking up against the SPD EIS. I do not believe that the facilities required for the pit disassembly and conversion mission would impact the site; impacts will occur from added waste streams. 44

I am not hearing anything in the meeting about health, and impacts to the environment are being dismissed. Plutonium disposition is a long-term decision. DOE needs to consider the long-term health effects for the children and the children's children. I am concerned about the plutonium disposition mission's effect on water and land; we need only look to Oak Ridge to see the long-term effects. 45

PANTEX–44 **Waste Management**

DOE acknowledges the commentor's concerns regarding the impacts of waste that would be generated by a pit conversion facility at Pantex. As described in Section 4.6.2.2, the impacts of operation of the pit conversion facility on the waste management infrastructure at Pantex would likely be minor. Even the 180 m^3 (235 yd^3) of TRU waste, a new waste type for Pantex, could be stored within the new pit conversion facility, and therefore would likely have minor impacts on the waste management infrastructure.

PANTEX–45 **Human Health Risk**

Analyses in Chapter 4 of Volume I indicate that impacts of operating the proposed surplus plutonium disposition facilities on human health and the environment at Pantex would likely be minor. Section 4.26.3.2 analyzes impacts to the environment due to construction and normal operation of a pit conversion facility at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water resulting from the proposed surplus plutonium disposition facilities at Pantex, either from minute quantities of air deposition into small water bodies or from any potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways.

As described in Appendix J.3.1.3, ingestion doses at Pantex were assessed for eight different food categories: leafy vegetables, root vegetables, fruits, grains, milk, meat, poultry, and eggs. Public doses incurred from the uptake of these foodstuffs were determined to be well below Federal, State, and local regulatory limits; therefore, potential radiological impacts to local prime farmlands would be essentially nonexistent.

Appendix J.3.2.3.2 includes an analysis of potential contamination of agricultural products and livestock and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. If the proposed facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation.

The SPD EIS does not address all environmental impacts. The SPD EIS fails to adequately address air emissions (beryllium, americium, tritium, etc.). 46

The risk estimators used to convert doses to fatal cancers (see Appendixes F.10.2 and K.1.4.3) project LCF risks over the full lifetime of people exposed to radiation. These risk estimators factor in the presence of children in the general population. Results of the assessments indicate no LCFs among the public and about two among the workforce.

Risk estimators have also been developed to predict severe hereditary effects (e.g., mental retardation) (*1990 Recommendations of the International Commission on Radiological Protection*, [ICRP Publication 60, November 1991]). As these risk estimators are much smaller than those for fatal cancers (i.e., only about 20 to 26 percent of the values), severe hereditary effects would not be expected among the progeny of members of the public or workers exposed to radiation.

Long-term effects on the health of people living in the vicinity of ORR are addressed in Section 3.6.9 of the *Storage and Disposition PEIS*. The health effects studies discussed in that Section yielded no statistically significant evidence of excess cancer risk.

PANTEX–46 **Human Health Risk**

Chapter 4 of Volume I addresses the potential environmental impacts of implementation of the surplus plutonium disposition alternatives. Included are detailed assessments of air quality and noise, waste management, socioeconomics, human health, facility accidents, transportation, and environmental justice.

The radiological and chemical releases associated with each alternative, and the resulting environmental impacts, have been subjected to detailed assessment. Appendixes J.1.1.4, J.2.1.4, J.3.1.4, and J.4.1.4 present the annual rates of radiological releases to the environment for Hanford, INEEL, Pantex, and SRS, respectively. The releases include isotopes of uranium, americium, and plutonium, and for the pit conversion facility, these three plus tritium. There would be no releases of beryllium. Numerous tables in Appendix G present the amounts of chemicals that would be released annually to the air environment.

All four sites could stand a better crop and livestock analysis. Pantex is the only site without a river. Contamination pathways were not evaluated enough except for direct ingestion. 47

I am concerned about aquifer and environmental contamination, and the impacts to rural families and the environment from Pantex operations. 48

Impacts of air emissions are also presented in Chapter 4 of Volume I. For radiological releases, the doses and resulting health effects (i.e., LCFs) are given. For chemical releases, increases in air concentrations are listed for criteria air pollutants, other regulated pollutants, and hazardous and other toxic compounds, and these concentrations are compared with the applicable standards or guidelines.

PANTEX–47 **Human Health Risk**

As described in the Agricultural Data sections of Appendix J, agricultural Census food production data established via DOC were used in the radiological dose assessments for this SPD EIS. Ingestion doses were assessed for eight different food categories for Hanford, INEEL, and Pantex: leafy vegetables, root vegetables, fruits, grains, meat (livestock), poultry, milk, and eggs; for SRS, three additional consumable categories were assessed: fish, shellfish, and drinking water. Analysis of per-county production provided for a high degree of accuracy in the assessment of dose via the ingestion pathway.

The analyses in Appendix J consider the potential contamination of agricultural products and livestock, and consumption of these products by persons living within an 80-km (50-mi) radius of the candidate sites. The analyses of doses consider bioaccumulation of radioactivity in grain crops, forage, and animals (and the resultant effects on ingestion doses to humans), and all potential dose pathways including direct ingestion, inhalation, external ground exposure, and plume immersion. These analyses indicate that the potential impacts of operation of the pit conversion, immobilization, and MOX facilities on agricultural products, livestock, and human health at any of the sites would likely be minor.

Releases of radioactivity from the proposed facilities at each candidate site to the food production chain are discussed in Appendixes J and K. Section 4.26 and Appendix K were revised to discuss potential impacts of radioactive emissions on agriculture and water resources.

PANTEX–48 **Human Health Risk**

Analyses in Chapter 4 of Volume I indicate that impacts of operating the proposed surplus plutonium disposition facilities on human health and the environment at Pantex would likely be minor. Section 4.26.3.2 analyzes impacts

DOE needs to consider the risks to agriculture. Radioactive materials have no place in an agricultural community. Risk and public perception of tainted agricultural products must be considered. 49

to the environment due to construction and normal operation of a pit conversion facility at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water resulting from the proposed surplus plutonium disposition facilities at Pantex, either from minute quantities of air deposition into small water bodies or from any potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways.

As described in Appendix J.3.1.3, ingestion doses at Pantex were assessed for eight different food categories: leafy vegetables, root vegetables, fruits, grains, milk, meat, poultry, and eggs. Public doses incurred from the uptake of these foodstuffs were determined to be well below Federal, State, and local regulatory limits; therefore, potential radiological impacts to local prime farmlands would be essentially nonexistent.

Appendix J.3 includes an analysis of potential contamination of agricultural products and livestock and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. If the proposed facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation.

PANTEX–49 **Human Health Risk**

As described in Appendix J.3.1.3, agricultural Census food production data established via DOC were used in the radiological dose assessments for this SPD EIS. These data were separated into eight individual categories: leafy vegetables, root vegetables, fruits, grains, beef (livestock), poultry, milk, and eggs. Analysis of per-county production provided for a high degree of accuracy in the assessment of dose via the ingestion pathway. According to the Chapter 4 (Volume I) data on radiological dosage, which includes a component from contaminated food, the highest potential dose to the public residing within 80 km (50 mi) of Pantex is 0.59 person-rem/yr. This is 170,000 times lower than the annual population dose from natural background radiation.

I own about 1,000 acres adjacent and west of Pantex. I farm about 2,500 acres south of Pantex. We have proof that the water wells on the farm are contaminated with tritium. 50

The National Farm Bureau and the Grange oppose reprocessing MOX fuel in agricultural areas where it can pollute the air, water, or land. 51

Although public perceptions with regard to human health risk are not discussed directly in this EIS, comparisons with reference standards help put the potential radiological impacts into perspective. For example, comparisons with natural background radiation doses and normal cancer incidence (i.e., 0.2 percent) in the general population are presented in Chapter 3 of Volume I.

PANTEX–50 **Water Resources**

DOE acknowledges the commentor's concerns regarding groundwater contamination at Pantex. The impact of existing contamination at Pantex is beyond the scope of this SPD EIS. This comment was referred to the appropriate site personnel. As discussed in Section 4.26.3.2.2, there would be no discernible impacts on surface water or groundwater quality from operation of the proposed surplus plutonium disposition facilities. Other sections show, moreover, that the operation of these facilities would likely have only minor impacts on human health, agriculture, and livestock: Section 4.17.2.4 addresses the potential radiological and hazardous chemical effects of the maximum-impact alternative on the public and workers at Pantex; Appendix J.3.1.3, the potential contamination of agricultural products and livestock, and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex.

PANTEX–51 **Alternatives**

DOE acknowledges the commentor's opposition to siting the MOX facility at Pantex. Section 4.17 describes the potential effects of the proposed surplus plutonium disposition facilities on air quality at Pantex. Sections 4.26.3.1 and 4.26.3.2 analyze the potential impact on soil and water due to construction and normal operation of the proposed facilities at Pantex. There would be no discernible contamination of aquatic biota (fish) or drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways.

As described in Appendix J.3.1.3, ingestion doses at Pantex were assessed for eight different food categories: leafy vegetables, root vegetables, fruits, grains, milk, meat, poultry, and eggs. Public doses incurred from the uptake

Data in the Pantex Site-Wide EIS is faulty and flawed. The former Site-Wide EIS overestimates the probability of an air crash. Air crashes raise the risks at Pantex. Crash data should be reassessed and reanalyzed for more realistic crash data. Do not use crash data as an excuse not to site the pit disassembly and conversion mission at Pantex. 52

All but Pantex have elevated risks from transportation crash scenarios. What data was used to calculate the transportation data? 53

of these foodstuffs were determined to be well below Federal, State, and local regulatory limits; therefore, potential radiological impacts to local prime farmlands would be essentially nonexistent.

Appendix J.3 includes an analysis of potential contamination of agricultural products and livestock and consumption of these products by persons living within an 80-km (50-mi) radius of Pantex. If the proposed facilities were located at Pantex, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products (i.e., food ingestion pathway). This dose (about 0.56 person-rem/yr) would be 0.0006 percent of the dose that would be incurred annually from natural background radiation.

PANTEX–52 **Facility Accidents**

This aircraft crash evaluation involved the use of the operations data from the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996) because they are the best available data at this time. The data were used in accordance with *Accident Analysis for Aircraft Crash Into Hazardous Facilities* (DOE-STD-3014-96, October 1996). Estimated frequencies, consequences, and risks related to aircraft crashes depend on a number of factors, such as building size and shape; building robustness; and the quantity, material form, and containment characteristics of the hazardous material. As a result, the overall aircraft crash frequencies reported in this SPD EIS are lower than those reported in the Pantex EIS. The decision as to where to site the pit conversion facility will not be based on exclusively on aircraft crash frequency. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–53 **Transportation**

Accident data from *Longitudinal Review of State-Level Accident Statistics for Carriers of Intrastate Freight* (ANL/ESD/TM-68, March 1994), was used to estimate accident frequencies. This document is based on DOT accident data. Several DOE sources, shown in the Appendix L reference list, were

There are less risks associated in transporting pits than in transporting the entire weapon.	54
Transportation of the pits is not trivial and will slow down the demilitarization process of the pits.	55
I only see money and politics in the room. Many of the people at the meeting are paid to attend–DOE should listen to those not being paid.	56
I know that plutonium disposition decisions will be political, and I believe that these decisions have already been made.	57

used to estimate SST/SGT accident frequencies. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

PANTEX–54 **Transportation**

DOE acknowledges the commentor's concerns about transportation risks. However, the transportation of nuclear weapons is beyond the scope of this SPD EIS.

PANTEX–55 **Transportation**

DOE has a very safe record in transporting plutonium pits, and has transported pits around the DOE complex throughout the Cold War. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposure or vehicle emissions are expected. DOE's experience and current planning analyses indicate that the transportation of pits can be carried out for each of the alternatives in this SPD EIS in the time required.

PANTEX–56 **General SPD EIS and NEPA Process**

The comment period for the SPD Draft EIS extended from July 17 through September 16, 1998. During that time, DOE convened five public hearings to obtain oral and written comments from the public. These hearings were open to all individuals and organizations, and their format was intended to encourage public discussion and interaction, regardless of the motivation for attending the hearing.

PANTEX–57 **General SPD EIS and NEPA Process**

DOE has not made any decision on the siting of the proposed surplus plutonium disposition facilities. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for the proposed facilities. In accordance with CEQ implementing regulations (40 CFR 1502.14(e)), DOE identified its preferred alternative in the SPD Draft EIS. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

I see DOE's logic in the SPD Draft EIS Summary, and I appreciate the extent of work put into the SPD EIS. 58

The Pantex Citizens Advisory Board is a consensus board; no consensus has been reached on plutonium. 59

The MOX option decision is being commercially driven, and the affected communities are not being heard. DOE is not following NEPA process in selecting reactors. It is allowing vendors to submit bids without holding hearings at reactor sites. 60

PANTEX–58 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on the preparation and logic of this SPD EIS.

PANTEX–59 **Other**

DOE acknowledges the commentor's observation that the Pantex Citizens Advisory Board has not reached a consensus on plutonium.

PANTEX–60 **MOX RFP**

The SPD Final EIS was not issued until specific reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999.

A hearing was held in Washington, D.C. on specific reactor information. After careful consideration of its public involvement opportunities, including information availability and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement*. DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of a South Carolina State Senator, DOE attended and participated in a public meeting held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representiatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

The SPD EIS falls short, and should be reevaluated. The SPD EIS is not a legally valid document and is a total corruption of the spirit and legal letter of the law. It needs to be legally defensible. 61

Land was taken from the family for the Pantex Plant. It is disheartening to see that only 80 percent of Amarillo supports Pantex. Everyone should support weapons dismantlement. 62

A meeting on the SPD EIS is not a pep rally for Pantex and against SRS; the meeting is about the document. 63

Some comments here today are embarrassing. Much of the research is based on hysteria. I support the risks characterized in the document. My goal is to have more people better informed. 64

The Union cannot continue going to the Hill with DOE to request funding when DOE isn't making smart decisions. Labor backs friends and could hurt enemies. Right now DOE is a friend, don't become an enemy. 65

The Pantex Site-Wide EIS was completed before the DOE Standard [*aircraft crash analysis*]. This leaves little opportunity for input to the standard. 66

I see a certain synergism between different levels of the plutonium disposition mission. To what extent has the synergism of the mission been considered related to repackaging the pits? 67

PANTEX–61 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on the legality of this SPD EIS. DOE has prepared the EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementing regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively).

PANTEX–62 **Alternatives**

DOE acknowledges the commentor's support for Pantex and the weapons dismantlement missions. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–63 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views.

PANTEX–64 **Other**

DOE acknowledges the commentor's goal to have more people better informed.

PANTEX–65 **DOE Policy**

Separate cost and schedule analyses have been performed and documented, and testing to demonstrate technical feasibility of the various alternatives is under way. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–66 **DOE Policy**

DOE acknowledges the commentor's concern regarding public input on DOE's standard involving aircraft crash analyses. Since this issue is beyond the scope of this SPD EIS, the comment has been referred to the DOE Amarillo Area Office.

PANTEX–67 **DOE Policy**

Repackaging the pits would allow for safe long-term storage, handling, and shipment of the pits for disposition. Therefore, repackaging would facilitate

Pit location should not be factored into the final disposition decision. Pit assembly skills are not the same as those required for pit disassembly and conversion. The distinction is being blurred.	68
Has there been a decision on form or output of pit conversion? What is the product from pit disassembly and conversion?	69
I worked at Los Alamos in the MOX fuel and ARIES programs. Both the ARIES and MOX processes were evaluated in the Independent Risk Study. Based on my background, the data is current, relevant, and accurate.	70
How long does it take to turn a single pit into MOX fuel? How long will it take to have the facility up and running?	71

safe transport of the pits to the pit conversion facility, and would reduce the risk of unnecessary exposure to workers associated with facility operation.

PANTEX–68 **Alternatives**

DOE acknowledges the commentor's concern regarding the distinction between skills required for pit assembly and those required for pit disassembly and conversion. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–69 **Pit Disassembly and Conversion**

Plutonium metal extracted from disassembled pits would be converted to an oxide powder. The powder from various pits would be blended to ensure the final powder is unclassified and homogeneous. This process would produce plutonium dioxide that is suitable for immobilization or fabrication into MOX fuel. This blended powder would be seal-welded into stainless steel cans. A description of the pit conversion process is given in Section 2.4.1.2.

PANTEX–70 **Alternatives**

DOE acknowledges the commentor's claim that the ARIES and MOX processes were evaluated in the Independent Risk Study.

PANTEX–71 **MOX Approach**

Given processing directly from start to finish, a pit could be converted into MOX fuel in 1 day. However, the process occurs in steps; a single pit would not likely go through the system directly from start to finish. Several runs of plutonium dioxide product from the pit conversion facility would likely be mixed to ensure consistency of feed to the MOX facility. Moreover, time would be required for international inspection, and for transfer to the MOX facility. Production schedules would also dictate the length of time that either a given pit, its plutonium, or the oxide could remain at the pit conversion facility between process steps.

Section 2.4.1.2 describes the pit disassembly and conversion process, and Section 2.4.3.2, the MOX fuel fabrication process. Appendix E provides schedules for construction and operation of the surplus plutonium disposition facilities. According to estimates, approximately 6 years would be required,

MOX and ARIES processes are not magic; they can be easily understood. 72

Were the canyon facilities at SRS considered to conduct the polishing process if needed? 73

If the plutonium disposition decision were based solely on cost, then the decision would be full immobilization. It would save on conversion, MOX fuel burn, and final storage factors. 74

start to finish, for activation of a MOX facility. Specific activities during that period would include selection of the MOX team, contract negotiations, facility design, licensing, construction, and startup.

PANTEX–72 **Alternatives**

DOE acknowledges the commentor's claim that the ARIES and MOX processes can be easily understood.

PANTEX–73 **Alternatives**

Use of the canyons for plutonium dioxide polishing to remove gallium was not considered for the following reasons: DOE has committed to closing the canyons prior to the completion of the surplus plutonium disposition program; the canyons are currently planned for other missions (e.g., processing of RFETS plutonium residues and scrub alloy) and could not be readily retrofitted for the plutonium polishing process until after that mission was complete; the cost of maintaining the canyons would increase due to the new mission and necessary safety upgrades; and use of the canyons would increase worker exposures.

PANTEX–74 **Cost**

As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach, which includes both immobilization and MOX fuel, would be more expensive than the immobilization-only approach. However, pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs

The 1997 S&D PEIS selected Pantex for long-term storage; this was also mentioned in the Pantex Site-Wide EIS. Seventy million dollars were added to the budget for repackaging. The government is double billing $70 million for repackaging to move pits off the site. Can you explain this? 75

Collateral effects–would additional needs be addressed? Will additional costs be considered for moving pits offsite? Was ALARA (as low as is reasonably achievable) factored into the cost estimate? 76

associated with the various alternatives. The cost report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–75 **DOE Policy**

The ROD for the *Storage and Disposition PEIS* identified Pantex as the storage site for plutonium pits pending disposition. Pits are currently stored in containers that are not suitable for long-term storage or transportation. Therefore, repackaging is necessary to ensure safe storage for up to 50 years. Should the decision be made to transport the pits offsite, the pits would have to be repackaged in a suitable shipping container. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

PANTEX–76 **Cost**

Because cost issues are beyond the scope of this EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

I would like to understand the cost of containers and transportation. 77

Explain how the value of residual/ongoing cleanup at SRS is factored into costs. Overhead rates are dependent on overall activity at sites, not just on one project. 78

Explain how SRS is more cost effective than Pantex if the cost estimate is statistically identical. 79

PANTEX–77 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. For a better understanding of cost and transportation issues, consult the following reports: *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD–0009, July 1998), *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), and *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98–8244, June 1998). These documents are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PANTEX–78 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PANTEX–79 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

Sites are not identical. One site appears to have the advantage. Look at existing facilities at the sites and what is available. There are labor uncertainties in the cost. The difference in cost at SRS is not a significant discriminator. 80

I am concerned about the moving design of APSF and the moving design of the pit disassembly and conversion facility at SRS. I am concerned that design change costs are not being rolled into the overall costs and how these costs are considered in the cost report. 81

Five years ago, questions were raised to DOE regarding pit storage. The storage decision would presuppose decision on final disposition. DOE needs to honor its 5-year commitment made through the S&D PEIS process. Pit location should not be factored into the final decision process. 82

PANTEX–80 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–81 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PANTEX–82 **DOE Policy**

The ROD for the *Storage and Disposition PEIS* presents the long-term storage plan for plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has prepared an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—*

The timetable for MOX production could be delayed for years over political controversy regarding our national policy toward nuclear energy. 83

AL–R8 Sealed Insert Container (August 1998). This document is on the MD Web site at http://www.doe-md.com. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–83 **DOE Policy**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Toward that end, DOE conducted a procurement process in accordance with DOE NEPA regulations 10 CFR 1021.216. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process.

A limited number of MOX fuel assemblies would be irradiated and tested in accordance with NRC requirements to verify acceptability prior to fabricating the fuel on a larger scale for insertion into the reactors. The recently enacted legislation, National Defense Authorization Act for Fiscal year 1999, provided NRC the authority to license the MOX facility. Therefore, NRC will also license the MOX facility under 10 CFR 70, and be responsible for issuing operating license amendments under 10 CFR 50 for the domestic, commercial reactors that have been selected to irradiate the MOX fuel. There are always uncertainties involved with construction projects and startup of new facilities and processes. DOE understands that DCS would have to apply for a reactor operating license amendment for each individual reactor before it can use MOX fuel and what that process entails, including the public involvement opportunities provided by NRC per 10 CFR 50.91. DOE is conducting regular meetings with NRC on the MOX approach, including fuel design and qualification. Although no substantive design work or construction can be started on the MOX facility until a decision is made in the SPD EIS ROD, DCS would work closely with NRC to ensure that the license amendment process can be accomplished in a timely manner. If the decision is to proceed with MOX fuel fabrication, construction of the MOX facility would begin in 2002.

Concerning the timeliness of this with the Russians, what is the overlay of this with other DOE missions? 84

An accident at the British Nuclear Fuels MOX demonstration plant required 73 people to be evacuated. It's only a 5-year-old facility. The accident demonstrates that other countries are having problems with MOX, and DOE is not listening to them. The decisions made here are international in scope, and we are asking for the people to hear from people in Europe and Russia. 85

If there is an accident, will DOE compensate those landowners with property contaminated by the accident? Fernald, Hanford, and Rocky Flats landowners have never been compensated. Where should landowners go if their land is contaminated by DOE? 86

PANTEX–84 **DOE Policy**

The United States will continue to work with Russia along agreed paths and schedules for plutonium disposition, and DOE's surplus plutonium disposition program will proceed accordingly. The proposed plutonium disposition actions will be coordinated with other ongoing DOE programs. Section 1.8 discusses the relationship of this program with other proposed or ongoing actions and programs.

PANTEX–85 **Facility Accidents**

The MOX facility would be designed in accordance with all applicable requirements and standards to ensure the health and safety of workers and the public and protection of the environment. The design team would review and consider, as appropriate, information that may be available about similar facilities to ensure that the MOX facility met applicable requirements and that the design incorporated the newest technologies and benefits from previous experience. The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

PANTEX–86 **DOE Policy**

Should there be an accident involving nuclear materials, compensation would be determined according to the provisions of the Price-Anderson Act. The purpose of this act is to indemnify contractors responsible for managing and conducting nuclear activities within the DOE complex. An extension, the Price-Anderson Amendments Act of 1988, requires mandatory coverage of all contractors, subcontractors, and suppliers conducting nuclear activities for DOE, and, in compliance with a congressional mandate, enforcement action by DOE against indemnified contractors for violations of nuclear safety requirements.

Sixty-five percent of the scientists and engineers in Amarillo work at Pantex; the community relies on Pantex to provide a science and engineering base for education. When looking at the importance of science and engineering, especially when compared to other sites, it is important to Pantex to keep a science and engineering base in Amarillo. 87

Pit disassembly and conversion should be performed at Pantex. No significant additional training is needed for the committed and skilled workforce at Pantex. Pantex has the best training program to bring its workforce up to speed to meet the new mission. The site operates in full compliance with DOE orders. There is 100 percent literacy among the Pantex workforce. 88

State and local organizations support siting a new plutonium disposition mission at Pantex. 89

Industries contribute to the quality of life in the Panhandle. I see environmental concerns that citizens voluntarily respond to. It is not in the best interest of the United States to ship the pit disassembly and conversion mission offsite. 90

PANTEX–87 **Socioeconomics**

DOE acknowledges the community support of Pantex and the importance of science and engineering education. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–88 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–89 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–90 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Work would be done safely and professionally, and the environment would be protected if the pit disassembly and conversion mission is sited at Pantex.	91
I have worked at Pantex for 7 years. If the site wasn't safe, I wouldn't work there. I feel safer at Pantex than on the street and I believe DOE's culture is changing.	92
I am not concerned about or believe that information is being withheld from workers. Added knowledge leads to improvements. All questions ever asked at Pantex have been answered. I trust Pantex management to be open and honest with the workforce.	93
I am proud of the work performed at Pantex. A quality assurance process is in place to make sure Pantex meets quality standards. As a union steward, it's my job to ensure continuing job performance and excellence.	94
Pantex employs 2,500 Hispanic and other minority employees.	95
With all the research facilities located at Pantex, it should be the site chosen for MOX fuel fabrication.	96

PANTEX–91 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–92 **Other**

DOE acknowledges the commentor's support of Pantex and of the change in DOE culture to put safety first. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–93 **Other**

DOE acknowledges the commentor's support of Pantex and the open lines of communication. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–94 **Other**

DOE acknowledges the commentor's support of Pantex and its quality assurance achievements. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–95 **Other**

DOE acknowledges the commentor's support of diversity in the workplace.

PANTEX–96 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

The International Guards Union supports bringing the pit disassembly and conversion mission to Pantex. A new mission is needed to keep a qualified workforce in the area. The site has a highly trained and skilled security force and an excellent safety record. 97

Storage infrastructure is already in place at Pantex. 98

I understand a great deal about land stewardship. I was formerly a farmer, and am now a hazmat (hazardous materials) worker at Pantex. I believe that general industry is much worse than anything I've seen at Pantex. Agriculture has messed up more as a land steward than DOE. 99

It's of paramount importance to dismantle weapons. The first stage of weapons production (assembly) was performed at Pantex. The second stage of weapons production (disassembly and conversion) should also be performed at Pantex. 100

Pantex has worn out its welcome. Job security is nice, but the plant is coming to the end of its usefulness. Pantex should accept the unacceptable. 101

PANTEX–97 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–98 **Alternatives**

Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–99 **Alternatives**

DOE acknowledges the commentor's support of Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–100 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–101 **Alternatives**

DOE acknowledges the commentor's opposition to new missions at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

I lived in Hereford, Texas, when Texas was considered for the repository project. I believe that DOE sees people as expendable and was more concerned about where to locate the repository than it was about the impacts on people. This community should not trade safety for jobs. 102

The argument being presented is that since the materials are at Pantex, the pit disassembly and conversion mission should reside there as well. The truth is that 12 metric tons of plutonium residing at Rocky Flats will be shipped with this mission. Weren't concerns raised about plutonium from Rocky Flats being shipped before the decision was issued? Plutonium processing is what messed up Rocky Flats. 103

Pantex's ongoing mission will last anywhere from 10 to 12 years. Pantex does its job admirable, but it should never process plutonium. 104

I am a former Washington resident. My husband died because of living near and working at Hanford. I hope that Pantex does not become like Hanford. Pantex is safe, and I hope that it stays that way. 105

PANTEX–102 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–103 **Transportation**

DOE acknowledges the commentor's concerns about the shipment of surplus plutonium from RFETS to Pantex and the processing of that material at Pantex. The decision to ship surplus pits from RFETS to Pantex is stipulated in the ROD for the *Storage and Disposition PEIS*. The shipment of pits from RFETS to Pantex supports the DOE commitment to close RFETS. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–104 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–105 **Human Health Risk**

DOE acknowledges the commentor's concern for the safety of workers and persons living near Pantex. This SPD EIS identifies and analyzes potential environmental and human health impacts that might result from the construction and normal operation of the proposed surplus plutonium

SRS workers are experts at processing plutonium; Pantex workers are experts in pit disassembly and conversion.	106
SRS experience in processing plutonium is long past.	107
If the plutonium mission is so dangerous, why does SRS want it so bad? SRS is no smarter or dumber than Pantex.	108

disposition facilities at the candidate sites. As described in Chapter 4 of Volume I and summarized in Section 2.18, these potential impacts would likely be minor. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–106 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–107 **Alternatives**

DOE acknowledges the commentor's opposition to siting the proposed surplus plutonium disposition facilities at SRS. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–108 **Human Health Risk**

As described in Chapter 4 of Volume I, potential impacts of alternatives for surplus plutonium disposition would likely be minor. In addition, analyses of design-basis accidents showed that no LCFs to the population would be expected from operation of the proposed surplus plutonium disposition facilities at any of the candidate sites. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

The public has an inalienable right to know impacts and hazards of site operations. Workers know hazards, the community should also know hazards. 109

If contamination poses a health risk, how much damage to health occurs due to stress from job loss? 110

It seems that every facility processing plutonium has either been contaminated or had an accident. Has there ever been an instance while processing plutonium where a facility hasn't been contaminated? 111

PANTEX–109 **General SPD EIS and NEPA Process**

DOE acknowledges the need of the public to be informed about the potential impacts and hazards of the ongoing and prospective work at DOE sites. The SPD Draft EIS was merely one step in the public information process. It included information on potential accidents, types and levels of waste to be generated, and a number of other environmental impacts. After its publication, the public was accorded the opportunity to comment on any aspect of DOE's proposed action to disposition up to 50 t (55 tons) of surplus plutonium.

In compliance with existing laws and regulations, DOE provides information on site-specific hazards of ongoing operations other than the surplus plutonium disposition program in various documents, including site-specific NEPA documents, annual site-specific environmental reports, reports of chemical discharges, and reports of chemical use and storage.

PANTEX–110 **Socioeconomics**

DOE acknowledges the commentor's concern about job loss. The socioeconomics analyses do not specifically evaluate the health effects resulting from the stress of losing a job. As part of its Strategic Alignment Initiative and restructuring of the nuclear weapons complex, however, DOE has put in place several programs to assist its employees in finding new jobs. Decisions on the surplus plutonium disposition program will be based on environmental analyses (including analyses of socioeconomics), technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PANTEX–111 **DOE Policy**

It is true that plutonium-processing facilities could experience contamination. The proposed surplus plutonium disposition facilities would be designed, constructed, operated, and deactivated in accordance with applicable Federal, State, and local environmental, safety, and health requirements. Within these limits, DOE believes that contamination levels should be kept as low as is reasonably achievable, taking into account social, technical, economic, practical, and public policy considerations. Worker safety is also a major consideration in construction and operation of the proposed facilities, and safety assessment (including accident analysis) is an integral part of the design process.

Plutonium processing may result in higher radiation releases than the area is accustomed to. Tritium releases are 10,000 times higher in processing than in pit assembly. 112

Exposure rates are much higher in other countries than the United States. We need to put doses into perspective. 113

PANTEX–112 **Human Health Risk**

The bounding alternative for Pantex would be siting the pit conversion and MOX facilities at Pantex. About 0.000104 Ci/yr of plutonium and americium and 1,100 Ci/yr of tritium, total, would be released to the atmosphere from these facilities. In 1996, the airborne releases from Pantex operations were 1.6×10^{-17} Ci of thorium 232, 0.000146 Ci of uranium 238, and 0.103 Ci of tritium (*1996 Environmental Report for Pantex Plant*, [DOE/AL/65030-9704, May 1997]). While the commentor is correct in stating that plutonium processing would result in radiation releases greater than those from current operations, including a tritium release 10,000 times greater, the doses and resulting adverse health effects associated with the increased releases would be very small. The dose to the MEI from these facilities would be increased by 0.068 mrem/yr, and the dose to the population living within 80 km (50 mi) of Pantex in the year 2010 would be increased by 0.59 person-rem/yr. For 10 years of operation, the increased risk of an LCF to the MEI would be 3.4×10^{-7}, and the increased number of LCFs to the 80-km (50-mi) population would be 0.003.

PANTEX–113 **Human Health Risk**

The various U.S. agencies (DOE, EPA, and NRC) involved in promulgating dose limits have established strict limits for workers and the public (see Appendix F.10.2). In addition, operators of nuclear facilities must demonstrate that all operations are conducted in a manner that further reduces doses to ALARA levels. The combination of strict enforcement of dose limits and adherence to the ALARA operational philosophy ensures that exposure rates from nuclear operations in the United States are generally maintained below those in other countries with nuclear programs.

Specific comparisons with exposures in other countries are not given in this SPD EIS. These comparisons would be difficult to make, given the large number of countries involved; they are not really necessary, anyway, because demonstrating compliance with U.S. requirements ensures small risks of adverse health effects. Doses associated with facilities assessed in this EIS are put into perspective through comparison with U.S. requirements and natural background radiation levels.

What are the current emissions in curies of tritium from Pantex? 114

DOE needs to resolve uncertainties before decisions are made. Internal radiation effects from plutonium inhalation are severe. More data is needed on exposure risks. Does the plutonium dose estimate include internal? Studies of health effects are never revealed. 115

PANTEX–114 **Human Health Risk**

Emissions of tritium to the environment from Pantex operations are included in the annual environmental reports. The latest report available is for operations in 1996 (*Environmental Report for Pantex Plant*, [DOE/AL/65030-9704, May 1997]). It is reported in Table 6.1 of that document that 0.103 Ci of tritium was released to the air environment.

PANTEX–115 **Human Health Risk**

The Human Health Risk sections in Chapter 4 of Volume I present the results of detailed assessments of health impacts on the public and onsite workers. Doses to the public from both normal operations and postulated accidents were calculated using models accepted within the scientific community. While uncertainties are typical of such assessments, the use of the GENII computer code for the evaluation of normal operations (see Appendix F) and the MACCS2 code for accidents (see Appendix K), along with best estimates of input parameters (e.g., radiation source terms, meteorological conditions, population distributions, agricultural production), yielded results that are expected to be as accurate as possible. If anything, they would be on the conservative side; that is, the doses would be overestimated. These doses were converted into LCFs using the risk estimators derived from data prepared by the National Research Council's Committee on the Biological Effects of Ionizing Radiation and by the International Commission on Radiological Protection, as discussed in Appendixes F.10.2 and K.1.4.3.

For workers, the doses from normal operations were taken from data reports prepared for each facility assessed in this SPD EIS. The reports for Hanford, INEEL, Pantex, and SRS are identified in Appendixes J.1.1.4, J.2.1.4, J.3.1.4, and J.4.1.4, respectively. The worker doses from accidents were calculated by the GENII computer code using the source terms from the same data reports. Those doses were converted into LCFs using somewhat lower risk estimators than those for the public to reflect the absence of children in the workforce (see Appendixes F.10.2 and K.1.4.3).

Also calculated were the plutonium and americium doses delivered via all potential dose pathways. For the public, the dominant pathways would be inhalation and ingestion, which result in internal doses only. Worker doses

I have severe doubts about DOE's commitment to 100 percent noncontamination. DOE has a poor track record in protecting the environment. Every DOE site except Pantex has been contaminated by DOE operations. 116

I understand Pantex's need for new missions, but I'm unconvinced that DOE has changed. I have heard stories from retired workers and of workers being exposed without fully knowing the associated risks. I see money with the new mission, but no assurance for safety. I am frightened by the implication of a plutonium processing mission. I don't see any definitive answers in the SPD EIS; what should have been researched and analyzed wasn't. 117

DOE should make use of LANL resources. As a former LANL worker, I was never concerned for personal safety because of the plutonium processing mission. If I thought plutonium processing could hurt Pantex, I would actively oppose the mission, but that's not the case. 118

from normal operations would be mainly from external exposure to gamma rays emitted from the plutonium and americium radionuclides; accidental doses would be attributable mainly to inhalation.

Health effects studies conducted in and around Hanford, INEEL, Pantex, and SRS are discussed in Sections 3.2.4.3, 3.3.4.3, 3.4.4.3, and 3.5.4.3, respectively.

PANTEX–116 **DOE Policy**

DOE acknowledges the commentor's concern regarding contamination of the environment. The proposed surplus plutonium disposition facilities would be designed, constructed, operated, and deactivated in accordance with applicable Federal, State, and local environmental, safety, and health requirements. Within these limits, DOE believes that the level of contamination should be kept as low as is reasonably achievable, so that the benefit of reducing the already low level of contamination would warrant the additional cost of that reduction. Chapter 5 summarizes the applicable environmental statutes, regulations, and permits that cover emissions, waste, and ALARA standards.

PANTEX–117 **DOE Policy**

DOE acknowledges the commentor's concern regarding worker safety during surplus plutonium disposition activities at Pantex. The analyses conducted for this SPD EIS indicate potential environmental and human health impacts would likely be minor at Pantex. Results of the analyses are presented by alternative in Chapter 4 of Volume I. Detailed information on the potential impacts on human health at Pantex is presented in Appendix J.3. As shown in these sections, operation of the proposed facilities at Pantex would be well within the limits prescribed by Federal, State, and local laws and regulations.

PANTEX–118 **Human Health Risk**

DOE acknowledges the commentor's support of LANL and Pantex. Both LANL and Pantex staff have assisted in the development of information and analyses to support the surplus plutonium disposition program. Appendix J.3 describes the results of the human health risk analyses for Pantex. Potential impacts of construction and operation at Pantex would likely be minor and within the limits prescribed all applicable Federal, State, and local laws and regulations.

We have plutonium in the country, in Texas, and at Pantex. We have it and need to do something with it. DOE needs to establish priorities, design a process that allows no releases, engineer controls to ensure the process, and enhance personal protective equipment. 119

The accelerator mission to produce tritium at SRS would cause SRS to exceed water limits. Has the Department considered the cumulative impacts of this mission along with the accelerated tritium mission at SRS? 120

Beryllium is an extremely hazardous substance to some people and can cause berylliosis. DOE has known about this problem for 30 years. STAND submitted 21 pages of questions asking for definitions and doses. What is the range of doses to personnel? It's 60 percent higher in LANL documents for personnel doses in plutonium processing facilities than estimated for the proposed facilities. 121

PANTEX–119 **Human Health Risk**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. DOE has identified as its preferred alternative the hybrid approach (immobilization and MOX fuel fabrication) to disposition surplus plutonium. Selection of that alternative would provide for processing that could be conducted in such a manner as to minimize impacts on the environment. Although a goal of no releases of radioactivity to the environment would be unattainable, the proposed surplus plutonium disposition facilities would be designed and operated as appropriate to maintain ALARA releases. Engineered controls, the use of remote equipment and other effective design features, and strict adherence to operational procedures would ensure that operations are conducted safely, and efficiently, and thus would likely have minor impacts on workers and the public.

PANTEX–120 **Water Resources**

In a ROD published in the Federal Register on May 18, 1999 (64 FR 26369), DOE decided not to construct an accelerator at SRS. Therefore, Section 4.32.4.1 of this SPD EIS was revised to remove the large amount of water that would be used by an accelerator. Accordingly, as indicated in Table 4–248, cumulative water usage falls well within the capacity of the SRS potable water system.

PANTEX–121 **Human Health Risk**

The 1994 analysis performed by LANL referred to the possibility of airborne releases of beryllium, a hazardous air pollutant, from pit disassembly and conversion. Subsequent analysis from LANL indicates that there would not be any airborne releases of beryllium *(Pit Disassembly and Conversion Facility, Environmental Impact Statement Data Report—Pantex Plant* [LA-UR-97-2909, June 1998]). Because the beryllium is expected to remain in metal form at all times, the health hazards are minimized. The beryllium would be present in large pieces and cuttings created when the pit was bisected. These cuttings would be too large to become airborne. There would be no grinding; thus, there would not be any pieces of beryllium small enough to become airborne. Section 2.4.1 was revised to include a discussion of beryllium as a potential impurity, as well as the reasons why beryllium processing would not be an issue at the pit conversion facility.

Modern day standards are a result of years of caution in handling nuclear materials. Industrial, commercial safety devices and standards are a result of DOE operations. Public benefits are not always linked to DOE. A better understanding of health effects was learned through DOE. The berylliosis information came from commercial industries (aerospace, etc.). 122

No one has any answers about what is going on in the environment or with health issues. 123

Nuclear power plants are primarily located in the east, so it's cheaper to transport from SRS. 124

More transportation increases risks and the possibility of proliferation. 125

PANTEX–122 **Other**

DOE acknowledges the commentor's observation that DOE and commercial industries have contributed to the development of health and safety standards, procedures, and devices.

PANTEX–123 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's environmental and health-related concerns. This SPD EIS was prepared to provide a comprehensive description of proposed actions and their potential environmental impacts of the surplus plutonium disposition program. DOE believes that all activities that are part of the proposed action and alternatives are analyzed adequately in this SPD EIS. As described in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of construction and operation of the proposed surplus plutonium disposition facilities would likely be minor.

PANTEX–124 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PANTEX–125 **Transportation**

DOE acknowledges the commentor's concern that more transportation increases the risks of proliferation. In order to address security against terrorist-related incidents, all intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications and additional couriers. Further, the DOE disposition facilities proposed in this SPD EIS are all at locations where

[redacted]

plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Security for the Pantex facilities would be implemented commensurate with the usability of the material in a nuclear weapon or improvised nuclear device. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed inside are adequately protected. Closed-circuit television, intrusion detection, motion detection, and other automated materials-monitoring methods would be employed. Furthermore, the physical protection, safeguards, and security for the MOX facility and domestic,

I am proud that diverse ideologies can come together in turning swords to plowshares. The plutonium disposition mission is critical to the nation wherever it is performed. 139

Pantex workers have reported that there are 10 weapons pits missing. I would like the issue looked into and security tightened at the site. 140

DOE stated that packaging would be redone by 2000. Twenty pits were to be repackaged suitable for shipping last year. Is other shipping being evaluated? 141

Was a NEPA action performed for onsite storage? When will the supplemental analysis be released for public review? 142

Will there be long-term storage in Zone 4? 143

information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999.

PANTEX–139 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PANTEX–140 **DOE Policy**

DOE acknowledges the commentor's concern regarding management of pits at Pantex. Since this issue is beyond the scope of this SPD EIS, the comment has been referred to the DOE Amarillo Area Office.

PANTEX–141 **DOE Policy**

DOE acknowledges the commentor's question regarding management of pits at Pantex. Since this issue is beyond the scope of this SPD EIS, the comment has been referred to the DOE Amarillo Area Office.

PANTEX–142 **DOE Policy**

Onsite storage of plutonium pits at Pantex is analyzed in the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996), and in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). The latter document is available on the MD Web site at http://www.doe-md.com.

PANTEX–143 **DOE Policy**

The ROD for the *Storage and Disposition PEIS* presents the long-term storage plan for plutonium pits at Pantex. Storage facilities in Zone 12 South will be upgraded by 2004 to store, pending disposition, the surplus pits currently stored at Pantex, and surplus pits from RFETS. Storage facilities in Zone 4 will continue to be used for these pits prior to completion of the upgrade.

DOE should release court records on the man who died of leukemia in 1982. | 144

I have worked in the oil and gas industry for 18 years. Competition is good for business. Nuclear competition is healthy for oil and gas. | 145

PANTEX–144 **DOE Policy**

This issue is unrelated to the surplus plutonium disposition program and is beyond the scope of this SPD EIS.

PANTEX–145 **Other**

DOE acknowledges the commentor's support of competition.

What is the definition of a preferred alternative? Has there ever been an instance of a preferred alternative changing? 1

Full immobilization is the best option for DOE. There is no need for a pure level of plutonium. Immobilization requires fewer facilities, plutonium travels less, there is less of a security risk, and there are fewer high-level-waste impacts. DOE will not have to deal with licensing resistance from communities. 2

AIKEN–1 **General SPD EIS and NEPA Process**

A preferred alternative is the alternative that an agency believes best accomplishes the proposed action, giving consideration to environmental, technical, economic, and other information available at the time. In accordance with CEQ implementing regulations (40 CFR 1502.14(e)), the agency shall identify its preferred alternative or alternatives, if one or more exists, in the draft EIS and must identify one in the final EIS. While DOE has identified its preferences in this SPD EIS, it is open to any new information that may become available and will use this information in making a decision, which will be published in a ROD. There have been instances in which a preferred alternative was changed in the period between the draft to final versions of an EIS, and others in which a preferred alternative was not chosen in the ROD. For example, the preferred alternative in the *Shutdown of the River Water System at the Savannah River Site* was to shut down the system; however, the No Action Alternative was chosen in the ROD.

AIKEN–2 **Alternatives**

DOE acknowledges the commentor's support for the immobilization-only approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The

I am concerned about the last six alternatives for immobilizing plutonium. Plutonium is a national resource and treasure. Fifty metric tons of weapons-grade plutonium is the equivalent of 200 million metric tons of coal at $150 per metric ton.
Fifty metric tons of plutonium is worth about $29.5 billion.
Fifty metric tons of plutonium can provide enough electricity to power three counties for 50 years. Do not immobilize plutonium that could be used for nuclear power. 3

transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS.

DOE has a classified design basis threat document for guidance in the design, construction, and evaluation of all security systems associated with the proposed surplus plutonium disposition facilities. That document was prepared in coordination with the law enforcement agencies (Federal, State, and local) and the intelligence community, and is reviewed periodically to ensure currency with emerging threats. Current DOE safeguards and security orders would also be used in the design, construction, and evaluation of the security systems.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

AIKEN–3 **Alternatives**

DOE acknowledges the commentor's concern regarding the market value of surplus plutonium. The purpose of the MOX approach is not to generate electricity, but to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

DOE reviewed the chemical and isotopic composition of the surplus plutonium and determined in the *Storage and Disposition PEIS* ROD that about 8 t (9 tons) of surplus plutonium were not suitable for use in making MOX fuel. Furthermore, DOE has identified an additional 9 t (10 tons) for a total of 17 t (19 tons) that have such a variety of chemical and isotopic compositions that it is more reasonable to immobilize these materials and avert the processing complexity that would be added if these materials were made into MOX fuel. The criteria used in this identification included the level of impurities, processing requirements, and the ability to meet the MOX fuel specifications.

MOX experience is untried; weapons-grade plutonium has never been used in commercial reactors. Weapons materials increase the wear and tear on commercial reactors and needs to be addressed. 4

I am concerned about the reprocessing of MOX fuel. DOE should fully expand nonreactor options to dispose of plutonium. Communities will cry nix MOX and will not support MOX. 5

AIKEN–4 **MOX Approach**

Although no domestic, commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core. The fabrication of MOX fuel and its use in commercial reactors have been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium. While plutonium from warheads may never have been used in MOX fuel, its behavior in fuel is essentially the same as that of non-weapons-origin plutonium, and so does not present a situation different from MOX fuel experience to date. Plutonium from the different origins is chemically indistinguishable. The difference is isotopic: there is less plutonium 239 in non-weapons-origin plutonium than was produced for use in weapons. MOX fuel, regardless of the origin of the plutonium, has a higher flux than LEU fuel, therefore, it can cause more wear on the reactor than LEU fuel. However, this flux differential would be taken into account during the development of fuel management strategy for the reactor core. Section 4.28 was revised to present the reactor-specific analyses, including accident analyses, for the reactors proposed to use MOX fuel.

AIKEN–5 **Alternatives**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for

Pit disassembly and conversion increases the inventory of sites for cleanup. | 6

The SPD EIS process is cooked. The United States should not make MOX fuel if it's not going to use it. | 7

reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

AIKEN–6 **Pit Disassembly and Conversion**

The pit disassembly and conversion process declassifies plutonium from pits and clean metal and converts the plutonium to an oxide. This is a necessary first step for surplus plutonium disposition. This SPD EIS identifies and analyzes potential environmental impacts that might result from the construction and operation of the pit conversion facility at the candidate sites. As described in Chapter 4 of Volume I, these potential impacts would likely be minor. D&D is discussed in Section 4.31. DOE will evaluate options for D&D or reuse of the proposed facilities at the end of the surplus plutonium disposition program. At that time, DOE will perform engineering evaluations, environmental studies, and further NEPA review to assess the consequences of different courses of action.

AIKEN–7 **Alternatives**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities.

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process.

MOX costs more. DOE should cancel the MOX option and use the savings from the canceled option for more productive purposes. 8

Will the utilities wind up paying more to use MOX fuel? 9

Who pays to provide free plutonium to utilities? Utilities could be paid twice, once by ratepayers, and once by the government. DOE needs to address in what way subsidies provide unfair advantage to some utilities over others. Is DOE willing to buy out commercial utilities to keep MOX going? Who will buy utilities from MOX reactors? Consumers want alternative choices for energy. 10

AIKEN–8 **Cost**

DOE acknowledges the commentor's opposition to the MOX approach based on cost. Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for response. For a better understanding of the cost and schedule estimates for each alternative, consult *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) and *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999). These documents are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

AIKEN–9 **MOX RFP**

DOE's intention is for the use of MOX fuel to be revenue neutral for utilities. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

AIKEN–10 **DOE Policy**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The surplus plutonium would be free to the selected team, DCS, in which the utilities are a partner. DCS would have access to the U.S. Government–owned MOX facility to fabricate fuel for use in the reactor of its choice, in exchange for irradiation of the MOX fuel that would convert the plutonium to meet the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The contract between DOE and DCS does not provide for subsidies to utilities. The supply of electricity by MOX fuel irradiated in the reactor would be determined by the demand for electricity in the reactor's service area.

SRS costs $60 million less than the Pantex option. DOE's own experts estimate savings to exceed $1.5 billion based on eliminating duplicative costs. 11

I have reviewed DOE's cost estimates for accuracy, and I do not believe that DOE's numbers are reflective of actual savings. 12

I recommend that the United States pursue with Russia a course that will yield the best use of available funds. 13

The United States to date has not established plutonium as a commodity. MOX will set this precedent and will remove a credible basis for the nation to oppose international proliferation from military to commercial practices. MOX increases the risk of proliferation. No plutonium should be turned into MOX fuel. 14

AIKEN–11 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

AIKEN–12 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

AIKEN–13 **DOE Policy**

DOE agrees that close cooperation between the United States and Russia is essential to achieve the objectives of nonproliferation and arms reduction, and to ensure secure management of nuclear weapons materials. To that end, the United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile.

AIKEN–14 **Nonproliferation**

DOE acknowledges the commentor's opposition to the MOX approach. Consistent with the U.S. policy of discouraging the civilian use of plutonium,

DOE needs to establish a zero release policy. There is no acceptable amount of release, and DOE should have 100 percent containment. 15

DOE needs to include redundancy in controlling contamination. It needs to adopt an "as low as achievable standard" for workers rather than an "as low as reasonably achievable" standard. 16

Regarding Texas' support for the pit disassembly and conversion mission: the Texas State Republican Platform opposed hazardous waste as an energy source in an agricultural area or above a water source. 17

a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

AIKEN–15 **DOE Policy**

DOE acknowledges the commentor's support of a zero release policy. Operation of the proposed surplus plutonium disposition facilities would comply with applicable Federal, State, and local laws and regulations governing radiological and hazardous chemical releases. DOE would also establish an effective ALARA program to ensure that doses are reduced to levels that are as low as is reasonably achievable.

AIKEN–16 **DOE Policy**

DOE acknowledges the commentor's support of redundancy in controlling contamination. The proposed surplus plutonium disposition facilities would be designed, constructed, operated, and deactivated in accordance with applicable Federal, State, and local environmental, safety, and health requirements. Within these limits, DOE believes that the level of contamination should be kept as low as is reasonably achievable, so that the benefit of reducing the already low level of contamination would warrant the additional cost of that reduction. Worker safety is also a major consideration in construction and operation of the proposed facilities, and safety assessment is an integral part of the design process.

AIKEN–17 **Other**

The surplus plutonium is not hazardous waste, but separated weapons-usable plutonium that the United States is now trying to put into a proliferation-resistant form. By working in parallel with Russia to reduce stockpiles of excess plutonium, the United States can reduce the chance that weapons-usable nuclear material could fall into the hands of terrorists or rogue states and help ensure that nuclear arms reductions will never be

It's in the best interest of the nation to consolidate the plutonium disposition mission at SRS. SRS welcomes two components of the plutonium disposition mission and would like the third component as well. It makes sense to locate the mission at a site where the expertise resides. SRS employs 14,000 workers, and another 10,000 workers have retired from the site. SRS has first-hand knowledge in handling plutonium. 18

There are concerns about Pantex being chosen for pit disassembly and conversion. Pantex has no workforce experience in handling unclad plutonium and no experience with plutonium release. The Pantex workforce is not familiar with the finer aspects of plutonium (i.e., safeguarding in various forms). Processing plutonium requires special skills and extensive experience. Pantex is not designed for the type of work required to process plutonium. 19

SRS has been a good neighbor. DOE provided grants to United Way to offset impacts of downsizing. DOE made it possible for communities to respond to displaced workers. 20

MOX increases the amount of waste. 21

reversed. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

AIKEN–18 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN–19 **Alternatives**

DOE acknowledges the commentor's concerns regarding siting the pit conversion facility at Pantex. The candidate sites for the proposed surplus plutonium disposition facilities would have levels of protection and control compliant with applicable DOE environmental, safety, and health requirements. Training would be provided to all workers involved in the surplus plutonium disposition program. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN–20 **Socioeconomics**

DOE acknowledges the commentor's appreciation of SRS and of efforts by DOE to minimize the impacts of downsizing.

AIKEN–21 **Waste Management**

As discussed in Appendix H and Chapter 4 of Volume I, some additional waste would be generated if DOE decided to convert 33 t (36 tons) of the

What is the rationale for commercializing the MOX fuel fabrication process? Commercial reactors are not designed to accommodate MOX fuel. DOE needs to consider the impacts of MOX on individual commercial reactors. Until this is done, the SPD EIS is not complete. 22

The MOX option increases the risk of accidents in commercial reactors. Aging reactors are being closed by communities. MOX licensing opens the door for prolonging the life of some of these reactors. Chernobyl was bad, and an accident with MOX will be worse. 23

surplus plutonium to MOX fuel rather than to immobilize all of the plutonium. This can be seen by comparing Alternative 2 at Hanford, which would involve immobilizing 17 t (19 tons) and fabricating 33 t (36 tons) into MOX fuel, with Alternative 11A, under which all 50 t (55 tons) would be immobilized.

AIKEN–22 **MOX RFP**

DOE's proposed action for surplus plutonium disposition is not a privatization effort, although the acquisition of MOX fuel fabrication and irradiation services has some similarities to DOE's privatization initiative. DOE conducted a procurement process to acquire these services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process.

Although no domestic, commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core. An amendment to a reactor's NRC operating license would be required before MOX fuel could be used. In addition, core load and safety analyses would be performed and an NRC license amendment approved before MOX fuel was introduced into any reactor. Section 4.28 was revised to discuss the procurement process as well as the potential environmental impacts of the reactors that would use the MOX fuel.

AIKEN–23 **Facility Accidents**

The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. As discussed in Section 4.28.2.5, studies by NAS have led it to the following conclusion: "no important overall adverse impact of MOX use on the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities will involve factors not related to fuel composition and hence unaffected by the use of MOX rather than LEU fuel." The analysis reflected in Section 4.28 indicates that the change in consequences to the population within 80 km (50 m) of the reactors for the beyond-design-basis

There are more thermal impacts from MOX that haven't been evaluated in the SPD EIS. 24

I am concerned about transporting materials from Rocky Flats and Richland and the added volume it will bring to the region. 25

I am aware of DOE 6450-01-P, Citations for Concerns regarding shipment security. The rise in national and international terrorism mandates that shipments be kept secret. Citizens do not know about foreign fuel shipments unless they go through channels. Citizens do not get the word from DOE. I found out about a DOE shipment through the Internet. I camped out and saw a video shot from a helicopter of a television news team. The shipment was spotted with a $150 telescope. The point is that shipments are vulnerable to terrorists if those terrorists want to get to them. 26

accidents involving MOX fuel would range from minus 4 to plus 14 percent. For the design basis accidents, the incremental change in consequences from MOX fuel would range from minus 6 to plus 3 percent.

AIKEN–24 **MOX Approach**

Following irradiation, the MOX fuel would be removed from the reactor and managed at the reactor site as spent fuel in accordance with the site's normal spent-fuel-handling procedures. In all likelihood, the MOX spent fuel would be stored in a water pool until it could be sent to a potential geologic repository for ultimate disposition pursuant to the NWPA, as amended. Reactors would require NRC operating license amendments and, as part of that process, safety and operational arrangements (e.g., spent fuel management plans) and specific safety and operational issues (e.g., any thermal differences between MOX and LEU fuels) would be evaluated. In any event, it would be the licensee's responsibility to ensure that spent fuels, MOX or LEU, were safely managed. Analyses performed thus far show that MOX fuel would be treated the same as commercial spent fuel, and that no new waste package design would be needed. Should the potential geologic repository not qualify to receive spent fuel, then DOE would make recommendations to the U.S. Congress on how to proceed.

AIKEN–25 **Transportation**

DOE acknowledges the commentor's concern about the transportation of materials in the SRS region. This SPD EIS describes the impacts of the increase in traffic in Section 4.32.4.5. Note that the increase as a result of the surplus plutonium disposition program is about 1 percent. Table L–6 summarizes the potential transportation impacts associated with all SPD EIS alternatives. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

AIKEN–26 **Transportation**

DOE acknowledges the commentor's concern about shipment vulnerability, and recognizes the possibility of terrorist-related incidents during the disposition of surplus plutonium. Appendix L.6.5 describes the potential

Communities are actively opposed to nuclear materials and waste shipments. DOE's plan to ship powder or oxide form across six states is ridiculous. The potential impacts from an accident are enormous. It's harder to contain the material, and the impact to the public is unacceptable. 27

NRC regulations no longer require double wall containers. DOE should voluntarily use double wall containers for shipping. 28

impacts of a terrorist attack during transportation of the nuclear materials involved in implementing the proposed action. Appendix L.3.2 contains information on the security provided by the Transportation Safeguards System. Appendix L.6.5 was revised to provide more information on safeguards and security for plutonium.

AIKEN–27 **Transportation**

DOE acknowledges the commentor's concern about the shipment of nuclear material and waste. Table L–6 summarizes the potential transportation impacts associated with all surplus plutonium disposition alternatives. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected. Transportation risk is just one of many issues that DOE will consider before selecting an alternative. Alternatives 1, 2, 3, 6A, 6B, 7, 8, 9, 10, 11A, and 12A do not require shipping oxide that was converted from the pits and metal.

AIKEN–28 **Transportation**

The Type B packages that would be used to transport plutonium pits, metal, and oxide are designed to withstand test conditions described in Appendix L.3.1.6 which represent extremely severe accidents (estimated to be more severe than over 99 percent of all accidents that could occur) and still contain the packaged radioactive contents. Type B packages have been used for years to ship radioactive materials in the United States and around the world. To date, no Type B package has ever been punctured or released any of its contents, even in actual highway accidents. As described in Appendix L.3.1.5, the Type B package is extremely robust and provides a high degree of confidence that even in extremely severe accidents the integrity of the package would be maintained with essentially no loss of the radioactive contents or serious impairment of the shielding capability. Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material.

DOE should note that citizens' organizations in Russia also oppose MOX.	29
As a minister, I am tempted to go to a higher authority than elected officials to encourage our DOE officials to make the correct decision for our entire nation.	30
DOE should conduct meetings in Barnwell and Allendale counties as well as in Augusta.	31
The opposing comments offered at this meeting are not being made by locals and do not represent the South Carolina community. DOE has heard from a diversity of community members, and all support the plutonium disposition mission. The SRS Retiree Association Board of Directors support a consolidated mission at SRS. SRS is strongly supported by local citizens.	32

AIKEN–29 **Alternatives**

DOE acknowledges the commentor's observation that citizens' organizations in Russia also oppose the MOX approach.

AIKEN–30 **Other**

DOE acknowledges the commentor's position. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

AIKEN–31 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for additional hearings in Barnwell and Allendale Counties. During the comment period, July 17 through September 16, 1998, DOE hosted five public hearings that provided opportunities for oral and written comment on the SPD Draft EIS. Afternoon and evening workshops were held at the five hearings. The hearing in North Augusta, South Carolina, was held at the North Augusta Community Center, a location near Barnwell and Allendale Counties, on August 13. For persons unable to attend these hearings, DOE provided opportunities for submitting comments by various means: mail, a toll-free telephone and fax line, and the MD Web site. All comments were given equal consideration, regardless of how they were submitted.

AIKEN–32 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Commercial reactor communities are not as supportive of the MOX option as DOE Complex communities. 33

DOE is not considering communities where commercial reactors are located. DOE needs to hold meetings in the vicinity of commercial reactors being considered to burn MOX fuel to allow communities the chance to influence the MOX decision. 34

AIKEN–33 **MOX Approach**

DOE acknowledges the commentor's observation that reactor communities may not be as supportive of the MOX approach as DOE complex communities. Commercial reactors in the United States are capable of safely using MOX fuel. The fabrication of MOX fuel and its use in commercial reactors have been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium. The environmental, safety, and health consequences of the MOX approach, as well as the production and disposal of any waste, are addressed by DOE in this SPD EIS. The MOX facility would be licensed by NRC under 10 CFR 70, and NRC would continue to be responsible for licensing the reactors that use MOX fuel, and as such would have to approve the use of MOX fuel through the license amendment process.

DOE used several means to solicit comments on the surplus plutonium disposition program from the public; State, local and tribal officials; special interest groups; and other interested parties. These include mail, a toll-free telephone and fax line, and the MD Web site. In addition, DOE has conducted public hearings in excess of the minimum required by the NEPA regulations on the weapons-usable fissile materials disposition program and discussed materials disposition in many other public forums.

AIKEN–34 **General SPD EIS and NEPA Process**

The SPD Final EIS was not issued until specific reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. A hearing was held in Washington, D.C. on specific reactor information. After careful consideration of its public involvement opportunities, including information availability and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement*. DOE provided other

What is DOE planning to do about the spent fuel from MOX?	35
I support nuclear energy.	36
The technology proposed at Pantex would require "high-fire" oxide, which is usable for MOX without extensive pretreatment. If aqueous processing is required to meet the MOX standard, how will DOE do it? Will DOE use a polishing process?	37

means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. The *Supplement* was mailed to those stakeholders who requested it as well as those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, Sourth Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

AIKEN–35 **MOX Approach**

Following irradiation, the MOX fuel would be removed from the reactor and managed at the reactor site as spent fuel in accordance with the site's normal spent-fuel-handling procedures. In all likelihood, the MOX spent fuel would be stored in a water pool until it could be sent to a potential geologic repository for ultimate disposition pursuant to the NWPA, as amended. Reactors would require NRC operating license amendments and, as part of that process, safety and operational arrangements (e.g., spent fuel management plans) and specific safety and operational issues (e.g., any thermal differences between MOX and LEU fuels) would be evaluated. In any event, it would be the licensee's responsibility to ensure that spent fuels, MOX or LEU, were safely managed. Analyses performed thus far show that MOX fuel would be treated the same as commercial spent fuel, and that no new waste package design would be needed. Should the potential geologic repository not qualify to receive spent fuel, then DOE would make recommendations to the U.S. Congress on how to proceed.

AIKEN–36 **Other**

DOE acknowledges the commentor's support for nuclear energy.

AIKEN–37 **Plutonium Polishing and Aqueous Processing**

Appendix N of the SPD Draft EIS discusses the environmental impacts of adding a small plutonium-polishing process into either the pit conversion or MOX facility as a contingency. On the basis of public comments on the SPD Draft EIS, and the analysis performed as part of the MOX procurement,

Why is the pit disassembly and conversion facility so much cheaper to build than the other facilities?	38
Is the variance projected in the Cost Report due to uncertainties (equipment needs, etc.)?	39
The cost numbers seem low and should be double checked to ensure consistency. The $2,400 per square foot seems low.	40

DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

AIKEN–38 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

AIKEN–39 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

AIKEN–40 **Cost Report**

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

There are hidden costs in startup. SRS has extensive expertise with a long history of operation and startups. Discipline is required for startups, and it benefits from extensive experience. 41

SRS is the best site for a consolidated mission. It's the right thing to do, just do it. 42

SRS has the best qualified workforce and site for plutonium processing. Other sites have adopted a lot of SRS' training practices. 43

AIKEN–41 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN–42 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN–43 **Alternatives**

DOE acknowledges the commentor's support for the SRS workforce and for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Westinghouse is an added reason and benefit for bringing a consolidated mission to SRS. Safety is the company's top priority. The company looks at the big picture and has the supporting management and infrastructure in place to be competitive. 44

If the plutonium needs to be purified, SRS offers the flexibility to go to aqueous processing by using the canyon facilities. 45

All waste management activities and processes are in place at SRS to support a plutonium disposition mission. SRS would not require a new waste management infrastructure. 46

In the Stockpile Stewardship and Management PEIS, the decision was made that Pantex would not be contaminated with plutonium. A 1996 decision document disqualified Pantex for processing (including dry processing). 47

AIKEN–44 **Alternatives**

DOE acknowledges the commentor's observations about Westinghouse and safety.

AIKEN–45 **Plutonium Polishing and Aqueous Processing**

An aqueous process for conversion of plutonium would have to be placed in a new facility. Existing canyon facilities at SRS are not configured for a surplus plutonium disposition mission and are either shut down or planned for shutdown and D&D. For example, use of F-Canyon at SRS would result in a requirement to reconfigure facilities and to keep the canyon operating for at least another 10 years. DOE has already made a commitment to the public, the U.S. Congress, and DNFSB to shut the canyon down.

AIKEN–46 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

AIKEN–47 **Alternatives**

The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (SSM PEIS) (DOE/EIS-0236, September 1996) states that the pit fabrication mission would not be introduced into a site that does not have an existing plutonium infrastructure because of the high cost of new plutonium facilities and the complexity of introducing plutonium operations into sites without current plutonium capabilities. The SSM PEIS states further that an important element of the site selection strategy is to maximize the use of existing infrastructure and facilities as the nuclear weapons complex becomes smaller and more efficient in the 21st century; thus, no new facilities were to be built to accommodate stockpile management missions.

Does DOE plan not to comply with NRC Regulation 0800 [*refers to aircraft crash scenarios*]? | 48

Accordingly, DOE considered as reasonable only those sites with existing infrastructure capable of supporting a pit fabrication mission. Although Pantex has the infrastructure to carry out its current weapons assembly and disassembly mission and nonintrusive pit reuse program, it was not considered a viable alternative for the pit fabrication mission because it did not possess sufficient capability and infrastructure to meet the SSM PEIS siting assumption stated above. Among the operations that were considered in developing siting alternatives for pit fabrication in the SSM PEIS were plutonium foundry and mechanical processes, including casting, shaping, machining, and bonding; a plutonium-processing capability for extracting and purifying plutonium to a reusable form either from pits or residues; and assembly operations involving seal welding and postassembly processing.

When comparing the site selection strategy for pit disassembly and conversion with that used for the pit fabrication mission, the siting criteria in the SSM PEIS have little or no bearing on siting criteria used in this SPD EIS. Pit disassembly and conversion do not require the foundry and mechanical processes discussed in the SSM PEIS and can be accomplished in a stand-alone facility. Also, the SSM PEIS siting assumptions include a requirement to use existing facilities, whereas, the pit conversion facility would be a new structure no matter where it is located.

AIKEN–48 **Facility Accidents**

The aircraft crash analysis for this SPD EIS was performed in accordance with *Accident Analysis for Aircraft Crash Into Hazardous Facilities* (DOE-STD-3014-96, October 1996). DOE was cognizant of NRC NUREG-0800 in its development of DOE-STD-3014.

How many years will it take to complete the disposition process? 1

When will the decision [*by DOE*] be made? 2

I support the hybrid approach for plutonium disposition. I support 33 metric tons going to MOX fuel. For immobilization of the 17 metric tons, I suggest that 7 metric tons be immobilized, and the decision on the rest (10 metric tons) be delayed until the two processes are demonstrated. 3

PORTLD–1 **Alternatives**

Appendix E includes schedules for the proposed surplus plutonium disposition facilities. Under the hybrid approach, the proposed facilities would cease operation by 2019. Section 4.30.2 includes a discussion and analysis of a slightly extended period of operation to account for potential delays due to issues such as negotiations with other countries and facility startup experiences. By 2016, the immobilization effort would be complete, and the HLW canisters containing the immobilized plutonium would be in storage awaiting disposition at the potential geologic repository. However, some of the MOX fuel assemblies might still be in reactors or awaiting insertion; DOE's *RFP for MOX Fuel Fabrication and Reactor Irradiation Services* (May 1998) specified a timetable that included a date for last insertion of MOX fuel into a reactor of no later than 2019. If the last insertion occurs in 2019, these assemblies could be undergoing irradiation until 2022. If all the surplus plutonium were dispositioned through immobilization, that effort would be completed by 2016.

PORTLD–2 **General SPD EIS and NEPA Process**

DOE will announce its decision regarding the surplus plutonium disposition program in the SPD EIS ROD. The ROD will be issued no sooner than 30 days after publication of this EIS.

PORTLD–3 **Alternatives**

DOE acknowledges the commentor's support of the hybrid approach to surplus plutonium disposition. The amount of surplus plutonium directed to each option is related to the suitability of the plutonium for use as MOX fuel. In the ROD for the *Storage and Disposition PEIS*, DOE decided that approximately 8 t (9 tons) of the current surplus plutonium were not suitable for use in MOX fuel, and would therefore be immobilized. As described in this SPD EIS, an additional 9 t (10 tons) were identified as unsuitable for MOX fuel fabrication. The 17 t (19 tons) of surplus plutonium are not suitable for fabrication due to the complexity, timing, and cost that would be involved in purifying the material. The remaining 33 t (36 tons) of the 50 t (55 tons) of surplus plutonium would be fabricated into MOX fuel. Both immobilization and MOX technologies are sufficiently mature and demonstrated. Therefore,

I support the can-in-canister technology/approach. What is the difference between the can-in-canister technology and regular vitrification? Is the canister made of steel? When will the container dissolve? Will it last for 10,000 years? When things disintegrate is a primary question when dealing with hot materials. DOE needs to go high-quality, not cut costs at the expense of safety. 4

Where will the vitrification occur? 5

decisions on the amount of plutonium to be dispositioned by each method can be made. In fact, MOX fuel is routinely fabricated and used in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium. Any R&D currently underway or planned for the near future would only contribute to fine-tuning and increasing the efficiency of the processes, but would not affect disposition technology decisions.

PORTLD–4 **Immobilization**

DOE acknowledges the commentor's support of the can-in-canister immobilization approach to surplus plutonium disposition. In the "regular" vitrification approach, the surplus plutonium would be blended directly with molten glass and HLW to form a homogenous mixture that would then be poured into large, stainless steel canisters. In the can-in-canister approach, however, the plutonium would first be immobilized in ceramic or glass, and loaded into smaller individual stainless steel cans. A number of these cans would then be placed inside the stainless steel canister, which in turn would be filled with HLW glass. The can-in-canister approach is described further in Section 2.4.2, and the potential environmental impacts associated with the homogenous vitrification and can-in-canister immobilization approaches are compared in Section 4.29. The waste canister used in either approach would be the same as those currently used in DOE's HLW vitrification program, and as such would meet all repository acceptance and performance criteria.

PORTLD–5 **Alternatives**

Immobilization in either glass or ceramic form could take place at either Hanford or SRS. As indicated in Section 1.6, SRS is preferred for the immobilization facility. The preferred can-in-canister approach at SRS complements existing missions, takes advantage of existing infrastructure and staff expertise, and enables DOE to use an existing facility (DWPF). DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout.

I support the SPD EIS, but would like to see full immobilization and no MOX. 6

I'm opposed to the MOX option. There are safety concerns, more waste will be generated, and it will incur cost overruns. 7

DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PORTLD–6 **Alternatives**

DOE acknowledges the commentor's support for the immobilization-only approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PORTLD–7 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach based on safety, waste, and cost concerns. DOE continually evaluates equipment performance to identify potential health and safety problems. New design features can be incorporated and operational procedures modified, as necessary, to reduce or even eliminate these problems. As stated in Section 2.4, the designs of the plutonium disposition facilities are not final. They are subject to modification during the design and construction process. Modifications, as appropriate, may be made to reduce radiation exposures

The National Academy of Science is opposed to MOX; they say it is too costly. 8

and optimize equipment placement and process flow. The proposed surplus plutonium disposition facilities would incorporate design features and be operated in a manner that reduces doses to workers and the public to levels that are as low as is reasonably achievable.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PORTLD–8 **MOX Approach**

DOE acknowledges the commentor's concern regarding cost of the MOX approach. An NAS panel of investigators found the MOX approach promising for the timely disposition of surplus plutonium. In the report, *Management and Disposition of Excess Weapons Plutonium, Reactor-Related Options* (1995), NAS compared the costs of the immobilization and MOX approaches. Both approaches were comparable in cost for most of the MOX fuel options discussed.

If the Department goes to commercial burn, who owns the fuel? | 9

Will the commercial reactors need to be modified for MOX fuel? | 10

DOE stated that MOX fuel fabrication has to be performed on DOE land. Siemens Nuclear Fuels, Inc., is located across the street from FMEF on public land. Siemens is a missed opportunity because it is located on commercial land, but is located adjacent to FMEF. Siemens Nuclear Fuels would be a good choice as a pilot test plant at Hanford. | 11

The MOX mission puts the economy at risk. The Washington Public Power Supply System (WPPSS) is putting out an RFP for MOX. WPPSS has a history of cost overruns. | 12

PORTLD–9 **DOE Policy**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. DOE would own the unirradiated fuel until it was received at the reactor site, at which time the reactor licensee would take ownership.

PORTLD–10 **MOX RFP**

Commercial reactors in the United States are capable of safely using MOX fuel. An amendment to a reactor's NRC operating license would be required before MOX fuel could be used. For this amendment, the licensee would have to demonstrate that all safety, testing, and environmental impacts had been addressed.

PORTLD–11 **Lead Assemblies**

DOE acknowledges the commentor's suggestion that lead assemblies be fabricated at the Siemens Nuclear Fuels facilities adjacent to FMEF at Hanford. Existing facilities at five candidate DOE sites were evaluated in this SPD EIS. As discussed in the revised Section 1.6, based on consideration of capabilities of the candidate sites and input from the DCS on the MOX approach, DOE prefers LANL for lead assembly fabrication. LANL is preferred because it already has fuel fabrication facilities that would not require major modifications, and takes advantage of existing infrastructure and staff expertise. Additionally, the surplus plutonium dioxide that would be used to fabricate the lead assemblies would already be in inventory at the site. Decisions on lead assembly fabrication will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PORTLD–12 **MOX RFP**

DOE conducted a competitive procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well

Commercial reactors are approaching their life expectancy. | 13

Cost savings are a mirage; the project savings are bull. There is a history of cost overruns in commercial reactors, as well as within DOE. The general public assumption is that there will be cost overruns. | 14

Regarding the $2 billion program costs, is the money appropriated? | 15

as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. Selection criteria employed ensured that the reactors chosen were capable of safe and successful surplus plutonium disposition. The criteria included, among other factors, recent facility operating history. WPPSS is not one of the reactors chosen to use MOX fuel.

PORTLD–13 **DOE Policy**

Qualification criteria used to select the domestic, commercial reactors included the ability of the reactors to complete the surplus plutonium disposition program within their operational lives as dictated by their licenses. The operating licenses for Catawba Units 1 and 2 expire in 2024 and 2026, respectively; those for McGuire Units 1 and 2, in 2021 and 2023, respectively; and those for North Anna Units 1 and 2, in 2018 and 2020, respectively. Section 4.28 was revised to discuss the potential environmental impacts of operating these reactors.

PORTLD–14 **Cost**

DOE acknowledges the commentor's position. Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PORTLD–15 **Cost**

Since the estimates span the lifetime of the surplus plutonium disposition program, which is upwards of 20 years, the money has not yet been appropriated. For fiscal year 1999, money has been appropriated; for near-term out-years (the next 2 years), a budget request will be submitted to the U.S. Congress; for out-years (5 years), a projection is provided to Congress with the fiscal year 2000 budget request of what the program's liability or mortgage will be. More information on the Federal Budget Process may be obtained at http://arc.org.tw/law/majorlaws/96-912.htm.

How much will MOX cost? | 16

Is MOX fuel less expensive than fuel made with highly enriched uranium? | 17

MOX subsidizes commercial utilities; the program should not be used to subsidize commercial utilities. | 18

"Waste produced at commercial reactors" assumes that commercial reactors will continue to operate. Who pays? | 19

PORTLD–16 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PORTLD–17 **Cost**

LEU, not HEU, fuel is used in the U.S. commercial nuclear industry. If the effective value of MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

PORTLD–18 **DOE Policy**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. The remainder of this comment is addressed in response PORTLD–17.

PORTLD–19 **Cost**

The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. These reactors would be operational even if they were not selected to irradiate MOX fuel. As described in

Hanford has facilities, such as FMEF, which lend themselves to reducing plutonium disposition costs. FMEF reduces costs by $50 million; other independent estimates are higher at $200 million to $900 million. 20

Currently, infrastructure costs at Hanford are paid out of cleanup dollars; an additional mission such as MOX could share the infrastructure and overhead expense, and leave more money for cleanup. 21

Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Therefore, DCS would pay for the disposal of MOX spent fuel in the same manner as it would that of LEU spent fuel. Ultimately, the consumer pays the cost of operating the commercial reactor. However, DCS would not have to continue to use MOX fuel if it determined that it was uneconomical to operate the reactor. This would preclude the continuation of reactor operations solely for purposes of the surplus plutonium disposition program. Furthermore, DCS would only be reimbursed for costs solely and exclusively related to the MOX fuel irradiation. This would ensure that the taxpayers were not underwriting otherwise uneconomical electricity-generating assets.

PORTLD–20 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PORTLD–21 **Cost**

Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

The Kremlin determines the amount of money spent on defense. It seems that Russia is still in the driver's seat for reducing weapons. 22

Russia's economy is crumbling. The MOX option is a slow process and could possibly slow the declassification of pit materials. 23

PORTLD–22 **DOE Policy**

The United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain surplus plutonium disposition activities in order to encourage the Russians and set an international example.

PORTLD–23 **DOE Policy**

In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Further, selection of the disposition technology (immobilization and/or MOX approach) should not impact the pace of pit declassification. Pit declassification would more likely depend on the agreements reached with Russia.

MOX creates a new plutonium infrastructure that is counter to the nonproliferation treaty. The Atoms for Peace program advocates keeping military nuclear materials separate from commercial nuclear materials. In addition, back in the Eisenhower administration, it was agreed that weapons plutonium could not be used for civilian purposes. 24

Is the program creating plutonium (MOX fuel) that could be used to make a weapon? 25

Hanford should be considered for MOX and immobilization. FMEF is designed for MOX fuel fabrication and meets NRC and other requirements (i.e., National Quality Assurance Standard). FMEF could handle two of the three options; pit disassembly and conversion at Pantex requires a new facility. Pits should remain at Pantex and oxide should be shipped to Hanford. 26

PORTLD–24 **DOE Policy**

DOE acknowledges the commentor's opposition to the commercial use of weapons-usable plutonium. The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

PORTLD–25 **DOE Policy**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. The purpose of the MOX approach is to convert the surplus plutonium to a form that meets the Spent Fuel Standard, thereby providing evidence of irreversible disarmament and establishing a model of proliferation resistance. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

MOX fuel fabrication involves blending the plutonium dioxide with uranium dioxide, forming the mixed oxide into pellets, loading the pellets into fuel rods, and assembling the fuel rods into fuel assemblies. The fuel assemblies would be transported to the commercial reactors selected to irradiate the MOX fuel. Following irradiation, the MOX fuel would be removed from the reactor and managed at the reactor site as spent fuel. Final disposition would be at a potential geologic repository pursuant to the NWPA, as amended.

PORTLD–26 **Alternatives**

DOE acknowledges the commentor's support for siting the immobilization and MOX facilities in FMEF at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying

It's logical that FMEF be considered since [*plutonium*] materials reside at Hanford. 27

By using FMEF at Hanford, the timetable for bringing the mission online could be shortened. 28

Original research for MOX fuel was performed at Hanford; the original concept used plutonium. The MOX pilot plant in Richland was the original breeder reactor. Hanford is experienced in handling MOX fuel. 29

preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–27 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program using FMEF at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–28 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program using FMEF at Hanford. Use of FMEF for disposition activities would not shorten the timetable for bringing the proposed surplus plutonium disposition facilities online. FMEF would require extensive renovation for use as a surplus plutonium disposition facility, and would also require construction of annexes for both the immobilization and MOX facilities. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–29 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus

Hanford has about 4 metric tons of scrap plutonium in the Plutonium Finishing Plant, and the new Hanford vitrification facility could handle scrap plutonium disposition. 30

DOE has proclaimed cleanup as Hanford's No. 1 mission. Congressman Hastings and U.S. Senator Gorton agree with the cleanup mission, but also support FMEF for plutonium disposition mission. SRS has a cleanup mission as well. If SRS can handle it in addition to a plutonium disposition mission, so can Hanford. Other missions at the site will keep federal funds flowing to Hanford. 31

Not every company at Hanford needs to be involved with cleanup. Other companies can be brought in to perform the MOX mission. 32

plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–30 **Alternatives**

DOE acknowledges the commentor's support for the surplus plutonium disposition program at Hanford. The 4 t (4.4 tons) of surplus nonpit plutonium referred to in this comment is part of the 17 t (19 tons) of surplus plutonium destined for immobilization under all alternatives analyzed in this SPD EIS except the No Action Alternative. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–31 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities using FMEF at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–32 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

How much waste will be produced by MOX? 33

Regarding the comment [*refers to DOE's response at the meeting to another comment*] about accidents and latent cancer fatalities, the tone is too flippant. Citizens have serious concerns about any deaths occurring. 34

Cancer risk projections are a myth. DOE cannot substantiate numbers that say the program does not cause deaths. 35

PORTLD–33 **Waste Management**

Estimates of the amounts of TRU, LLW, mixed LLW, hazardous and nonhazardous wastes that would be generated by construction and operation of the MOX facility are presented in Appendix H. Appendixes H.1.2.3, H.2.2.2, H.3.2.2, and H.4.2.3 describe the wastes that would be generated by the MOX facility at Hanford, INEEL, Pantex, and SRS, respectively.

PORTLD–34 **Facility Accidents**

DOE is committed to public and worker safety during construction, operation, and deactivation of the proposed surplus plutonium disposition facilities, and would implement appropriate controls and procedures to ensure compliance with all applicable Federal, State, and local laws, regulations, and requirements. DOE would also establish an effective ALARA program to ensure that radiological and hazardous chemical doses are reduced to levels that are as low as is reasonably achievable.

PORTLD–35 **Human Health Risk**

The cancer risk projections used in this SPD EIS (see Appendix K.1.4.3) are based on the latest risk estimators available to the scientific community. These estimators are given in Section 3.4.2 of *1990 Recommendations of the International Commission on Radiological Protection* (ICRP Publication 60, November 1991). They are based on updated information on the probability of radiation-induced cancer deaths from the continuing assessment of the more than 90,000 survivors of the atomic bombings of Japan and from other cancer studies. A detailed discussion of all the pertinent sources of information is provided as Annex B of the ICRP publication. The risk estimators were used to project the LCF values given for normal operations and postulated accidents in Chapter 4 of Volume I.

DOE does not claim that its surplus plutonium disposition program would cause no adverse health effects, but rather demonstrates that the risk of fatal cancers among workers and the general public is minimal.

Any new waste generated at Hanford is too much.	36
Northwest citizens are concerned about health and safety for workers and the public; the health of the Columbia River and fish must be preserved.	37
The proper weight was not given to the analysis of dose reconstruction. We're not convinced of the argument to give new missions to Hanford.	38

PORTLD–36 **Waste Management**

Estimates of the amounts of TRU, LLW, mixed LLW, hazardous and nonhazardous wastes that would be generated by construction and operation of the proposed surplus plutonium disposition facilities are presented in Appendix H. Appendix H.1.2.3 describes the wastes that would be generated by the MOX facility at Hanford.

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

PORTLD–37 **Human Health Risk**

DOE is committed to protecting the safety and health of the public and its workers, which includes designing, constructing, and operating its facilities in such a way as to provide a level of safety and reliability that meets or exceeds that characterized by modern commercial standards.

In regard to any concerns that may be associated with the Columbia River and the aquatic life therein, as described in Section 4.26.1.2, surface water would not be used in construction and operation of the proposed surplus plutonium disposition facilities at Hanford. Due to the dilution capability of the Columbia River, as well as FMEF's location relative to the Columbia River, there would be no discernible contamination of aquatic biota (fish) or drinking water resulting from the proposed facilities at Hanford, either from minute quantities of air deposition into the river or from any other potential wastewater releases. Therefore, no discernible impacts on the Columbia River would be expected.

PORTLD–38 **Human Health Risk**

Potential health impacts (i.e., doses and associated cancer risks) of the different alternatives that involve Hanford are elaborated in the Human Health Risk and Facility Accident sections in Chapter 4 of Volume I, as well as Appendixes J and K. The depth of the dose analyses is in compliance with NEPA (42 U.S.C. 4321 et seq.) and with *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements* (DOE Office of NEPA Oversight, May 1993).

I represent organic farmers in the Columbia Basin striving for environmentally responsible farming. There is a challenge that continued activities from the nuclear and agricultural industries not impact the land. Friends and family members in the Tri-Cities area experienced health problems. They consumed game and river products. 39

PORTLD–39 **Human Health Risk**

DOE acknowledges the commentor's concern regarding potential health effects of historical releases at Hanford. Section 3.2.4 presents information on past and existing human health risk characteristics. Included are discussions of radiation exposure, chemical exposure, and health effects studies, as well as an accident history.

The Atomic Energy Act of 1954 authorizes DOE to establish standards to protect health and minimize dangers to life. DOE designs, locates, constructs, and operates its facilities in such a way as to provide a level of public safety that meets or exceeds the standards of modern commercial plants. Radiation protection standards are based on keeping radioactive releases at ALARA levels in recognition of the potential risk of radiation exposure. All alternatives proposed in this EIS would conform to those radiation protection standards.

As described in Appendix J.1.1.3, agricultural Census food production data established via DOC were used in the radiological dose assessments for this SPD EIS. These data were separated into eight individual categories: leafy vegetables, root vegetables, fruits, grains, beef (livestock), poultry, milk, and eggs. Analysis of per-county production provided for a high degree of accuracy in the assessment of dose via the ingestion pathway.

As shown in Appendix J.1.2.7.2, if the proposed surplus plutonium disposition facilities were located at Hanford, a very small incremental annual dose to the surrounding public from normal operations would result via radiological emission deposition on agricultural products. This dose (about 6.9 person-rem/yr) would be 0.006 percent of the radiation dose that would be incurred annually from natural background radiation.

Due to the dilution capability of the Columbia River, as well as FMEF's location relative to the Columbia River, there would be no discernible contamination of aquatic biota (fish) or drinking water resulting from surplus plutonium disposition activities at Hanford, either from minute quantities of air deposition into the river or from any potential wastewater releases. Thus, it is estimated that no component of the public dose would be attributable to liquid pathways.

DOE needs to consider the effects of an accident on surrounding communities. Columbia Basin farmers bring their agricultural products to Portland. There is a lot of farmland within the impact zone/sphere of influence of Hanford. It's time that Hanford is removed from service. Optics of a closed site are better for farmers. 40

What kind of security is proposed when moving materials from site to site? Will it be as tight and secure as Navy transports? 41

What will happen to Hanford's plutonium? Will it be transported offsite? 42

Is special handling required to transport the spent fuel once the MOX burn is complete? 43

PORTLD–40 **Facility Accidents**

The effects of hypothetical accidents are analyzed in this SPD EIS in terms of the estimated population dose within 80 km (50 mi). Doses are conservatively estimated. Economic costs such as those associated with crop loss due to potential accidents have not been estimated; most of the potential contamination would occur on the Hanford site.

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

PORTLD–41 **Transportation**

All intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications and additional couriers. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Details of the security systems are described in Appendix L.3.2. Special nuclear material shipments would be carried out in much the same manner in which the Navy transports HEU.

PORTLD–42 **Transportation**

Depending on the decision made by DOE, the surplus plutonium could be either (1) placed in long-term storage at Hanford (i.e., the No Action Alternative) or (2) immobilized at Hanford or shipped to SRS for immobilization, and subsequently shipped to a potential geologic repository for disposition.

PORTLD–43 **Transportation**

The licensee irradiating the MOX fuel for DOE would handle the MOX spent fuel in the same basic manner as it does the normal LEU spent fuel. There would be no need for new or separate facilities (spent fuel pool), storage containers, or shipping containers.

I disliked receiving 5 pounds of materials that I could not understand. The Department should provide a one page summary of what the EIS is about. 44

The SRS decision is politically motivated (Strom Thurmond, Newt Gingrich). SRS is important to that region politically. 45

Any EIS being produced is driven by politics. The decisions are politically based, not technically based. 46

Why is it so difficult to get adequate funding for cleanup if funding is so readily available for this project? 47

Funding for cleanup is inadequate at Hanford. Cost savings are critical to future cleanup success. If a weapons mission starts up again, it will take away funding for cleanup. I'm skeptical that Hanford will get adequate funding for cleanup, which drives how stakeholders approach getting new missions. Hanford's waste legacy must be dealt with. 48

PORTLD–44 **General SPD EIS and NEPA Process**

The size of this SPD EIS is attributable in part to the level of information required for compliance with NEPA. Other factors are the complexity of the proposed action and the need to include a range of reasonable alternatives. Because of the document's size, DOE has prepared a fact sheet for the purpose of directing readers to information of specific interest, and, also in accordance with NEPA, a short summary of the information.

PORTLD–45 **General SPD EIS and NEPA Process**

Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PORTLD–46 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on the basis for EIS decisionmaking. This SPD EIS contains the best information and analyses available to allow for a fair comparison among the candidate sites for the proposed surplus plutonium disposition facilities. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PORTLD–47 **DOE Policy**

Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably. Further, since Hanford's cleanup mission and funding are not part of the surplus plutonium disposition program, they should not be impacted by decisions made in connection with this SPD EIS.

PORTLD–48 **DOE Policy**

DOE acknowledges the commentor's concern for adequate funding for cleanup. Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably. Further,

It's time to get the Tri-Cities off of the public dole. Recruiting new missions is contrary to moving the Tri-Cities away from government missions. The public supports Hanford cleanup, not new missions. 49

The current history of DOE privatization efforts, such as for the Tank Waste Remediation System, proves that privatization is more expensive than if managed by the government. 50

Once the MOX fuel rods are passed through the reactor, where will the spent fuel be stored? 51

I am concerned about the waste. There is spent fuel in temporary storage all over the country with no place available (repository) for permanent storage. The United States is not making any real progress in handling the waste. We should not be generating new waste until the first problem is solved. 52

since Hanford's cleanup mission and funding are not part of the surplus plutonium disposition program, they should not be impacted by decisions made in this SPD EIS.

PORTLD–49 **DOE Policy**

DOE acknowledges the commentor's opposition to new missions at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

PORTLD–50 **DOE Policy**

DOE's proposed action for surplus plutonium disposition is not a privatization effort, even though the acquisition of MOX fuel fabrication and irradiation services has some similarities to the TWRS privatization efforts.

PORTLD–51 **MOX Approach**

Following irradiation, the MOX spent fuel would be removed from the reactor and stored in the spent fuel pond or in dry storage casks at the reactor site until final disposal at a potential geologic repository pursuant to the NWPA, as amended. Additional information on MOX spent fuel management is provided in Section 4.28.2.8.

PORTLD–52 **Repositories**

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository. The characteristics of the MOX spent fuel would be similar to those of normal spent LEU fuel. This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the

Geologic problems at Yucca Mountain have not been solved yet, so we can't depend on Yucca Mountain for permanent storage. It has a water problem. 53

The nuclear industry is out of control and is struggling to meet current requirements. There should be no new nuclear reactors; the nuclear industry has outlived its worth. 54

U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

PORTLD–53 **Repositories**

As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain, Nevada, is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. Thus, this SPD EIS assumes, for the purposes of analysis, that Yucca Mountain would be the final disposal site for all immobilized plutonium and MOX spent fuel. The suitability of Yucca Mountain as a potential geologic repository for HLW and spent nuclear fuel is beyond the scope of this EIS. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. DOE submitted the *Viability Assessment for a Repository at Yucca Mountain* (DOE/RW-0508, December 1998) to the President and Congress. Based on the results of the viability assessment, DOE believes that scientific and technical work at Yucca Mountain should proceed to support a decision by the Secretary of Energy in 2001 on whether to recommend the site to the President for development as a potential geologic repository.

PORTLD–54 **Other**

DOE acknowledges the commentor's concern regarding the nuclear industry. DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are

Who makes the decision [*refers to preferred alternative*]? | 55

How did DOE arrive at its preferred alternative? How much influence has the nuclear industry had on the decision? | 56

subject to the completion of the NEPA process. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program; no new reactors would be built to support the surplus plutonium disposition program. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

PORTLD–55 **General SPD EIS and NEPA Process**

The Secretary of Energy will make the decision on surplus plutonium disposition. This decision will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PORTLD–56 **Purpose and Need**

A preferred alternative is the alternative that an agency believes best accomplishes the proposed action, giving consideration to environmental, technical, economic, and other information available at the time. In accordance with CEQ implementing regulations (40 CFR 1502.14(e)), the agency shall identify its preferred alternative, if one or more exists, in the draft EIS and identify such alternative in the final EIS. While DOE has identified its preferences in this SPD EIS, it is open to any new information that may become available and will use this information in making a decision, which will be published in a ROD.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

As indicated in the revised Section 1.6, SRS is preferred for the proposed surplus plutonium disposition facilities because the site has extensive experience with plutonium processing, and these facilities complement existing

I agree with the preferred alternative to not site missions at Hanford. 57

Are there problems in converting plutonium metals to oxides? 58

DOE should go to 100 percent immobilization of plutonium because it is safer, requires less handling, and is cheaper with fewer hidden costs. Vitrification is the best form for dispositioning surplus plutonium. 59

missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. Nuclear industry comments will be given the same consideration as any other public input.

PORTLD–57 **Alternatives**

DOE acknowledges the commentor's support for the preferred alternative. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

PORTLD–58 **Pit Disassembly and Conversion**

Conversion of plutonium metals to oxides is made through a hydride-oxidation process in which the plutonium metal reacts with hydrogen, nitrogen, and oxygen at controlled temperatures and pressures to produce plutonium dioxide. This process is rather straightforward and would produce plutonium dioxide that can be used for immobilization or fabrication into MOX fuel. A description of the conversion process is provided in Section 2.4.1.2.

PORTLD–59 **Alternatives**

DOE acknowledges the commentor's support for the immobilization-only approach. DOE is committed to public and worker safety during the construction, operation, and deactivation of the proposed surplus plutonium disposition facilities and would implement appropriate controls and procedures to ensure compliance with all applicable Federal, State, and DOE rules, regulations, and requirements.

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against any uncertainties of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for

I am a retired Hanford worker; working on cleanup was my priority. I support the hybrid approach for plutonium disposition, specifically Alternative 4B. I support 33 metric tons of plutonium converted to MOX. Scrap plutonium should be immobilized (7 metric tons). The decision on immobilizing the other 10 metric tons should be delayed until it is better understood. I support the can-in-canister approach. 60

DOE has a history of working with glass for immobilization. Why are we considering shifting to ceramic forms now? 61

reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PORTLD–60 **Alternatives**

DOE acknowledges the commentor's support of Alternative 4B, which would use the hybrid approach to surplus plutonium disposition. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–61 **Immobilization**

This SPD EIS considers the immobilization of surplus plutonium in two forms, ceramic and glass; both would be produced using similar processes based on a can-in-canister approach. In order to establish a preferred alternative for the immobilized form and focus research efforts, DOE conducted a series of evaluations to determine whether the properties associated with ceramic or glass would be better suited for immobilizing surplus plutonium. Although

Why is DOE considering MOX? MOX waste is more deadly, more radioactive than before. I do not want to see the MOX burn option. MOX is the worst method for disposing of surplus plutonium. It generates additional waste, costs more, and slows the overall disposition process. I oppose plutonium use in commercial reactors. The MOX option should be rejected because of the increased instability of commercial reactors. 62

past analyses have indicated that both ceramic and glass would be acceptable for immobilizing plutonium, these recent studies indicate that the use of ceramic may present certain advantages over glass. The ceramic form was found: to be more resistant to the threat of theft, diversion, or reuse due to the greater difficulty associated with trying to extract plutonium from the ceramic; likely be more durable over a long period of time under geologic repository conditions; to offer reduced exposure risks to workers; and to potentially provide significant cost savings. In addition, the ceramic technology was found to be more flexible in accommodating potential changes in programmatic or technical requirements.

PORTLD–62 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

The MOX argument as the only way to make surplus plutonium unavailable is faulty. You can immobilize plutonium, mix it with ceramic, and surround it with high-level waste. It would make the material difficult to get to. 63

Will the [*MOX*] fuel be run through a full cycle, or will it be an "in and out" proposition? 64

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PORTLD–63 **Alternatives**

DOE acknowledges the commentor's support for immobilization of the surplus plutonium using the ceramic can-in-canister approach. That approach is accorded full consideration in this SPD EIS; DOE has not characterized MOX fuel fabrication and irradiation as the only way to make plutonium unavailable. In fact, DOE has identified as its preferred alternative the hybrid approach of using both immobilization (ceramic form) and MOX fuel fabrication. Pursuing this approach provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

PORTLD–64 **MOX Approach**

As discussed in Chapter 2 of Volume I, MOX fuel would be left in the reactor for a full cycle. Under the current reactor options, there are no plans to leave it there only long enough to meet the Spent Fuel Standard.

Will taxpayer dollars be used to convert materials? Taxpayers will bear the cost of plutonium regardless of where the mission is sited. Taxpayers will be subsidizing nuclear utilities. How much money will be made by private corporations? 65

Why does the United States feel bound to go forward with the most expensive process [*refers to MOX*]? 66

PORTLD–65 **Cost**

The conversion of various plutonium forms to plutonium-oxides suitable for immobilization or use in MOX fuel would be accomplished solely by U.S. Government funds. For plutonium immobilization, the Government pays the entire sum for the disposition, which includes all capital construction and operating costs. For the MOX fuel option, the government is only responsible for the capital costs for the mission. DOE is proceeding on the basis that DCS will pay for operations of the MOX facility and the reactors without significant federal support. It is assumed the private sector will realize its return on investment in the operating phase by securing a lower cost fuel supply. The amount of money to be made by industry would be determined by its business decisions and the terms and conditions it negotiates with DOE for the contract. DOE is entering into a mutually beneficial situation where a competitively bid private company would make a fair profit, gain a useful product, and the U.S. Government dispositions it's surplus plutonium into a form unattractive to terrorist diversion.

PORTLD–66 **Cost**

As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach, which includes both immobilization and MOX fuel, would be more expensive than the immobilization-only approach. However, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The cost report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at

Taxpayer dollars are supporting MOX when they should support cleanup instead. | 67

FMEF saves about $200 million over any other facility at any other site. The high range of savings is $500 million saved if FMEF is used. | 68

FMEF value is relative. Retrofitting a building to fit in a different missions is so expensive that any cost savings is lost. | 69

http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

PORTLD–67 **Cost**

Funds for the surplus plutonium disposition program and the environmental cleanup program come from different appropriation accounts allocated by the U.S. Congress that cannot be used interchangeably.

PORTLD–68 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PORTLD–69 **Cost**

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

I am grateful for the United States/Russian decision to reduce nuclear weapons and that the government is pursuing disoposal of surplus plutonium. 70

Is Russia still producing plutonium? Does the United States have a deal with Russia to stop new plutonium production? 71

DOE is splitting hairs on what can actually be produced. Russia has committed to using plutonium. What is the United States gaining? 72

PORTLD–70 **DOE Policy**

DOE acknowledges the commentor's support of DOE and its surplus plutonium disposition program. The United States and Russia are working hard to achieve the objectives of nonproliferation and arms reduction and to ensure secure management of nuclear weapons materials.

PORTLD–71 **Nonproliferation**

Russia is still producing weapons-usable plutonium in the reactors at Tomsk and Krasnoyarsk. The United States is working with Russia to convert those reactors to nonplutonium production reactors.

PORTLD–72 **DOE Policy**

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provided general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

Russian cooperation is not the only reason DOE has identified the hybrid approach for the disposition of U.S. surplus plutonium. Pursuing both the immobilization and MOX approaches provides important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

If the United States is truly going to set an example, then it needs to recognize its mistake in using the MOX option. The MOX option violates the long-standing U.S. policy to not use military materials in commercial reactors (nuclear proliferation). A mixed message is sent if the United States expands infrastructure while urging other countries to reduce theirs. The United States needs to take leadership role seriously. Lead by example, no MOX. 73

DOE is committing to a single pass with no reprocessing. Russia has not committed to stopping after one time. What assurance does the United States have that Russia's use will be a one-time passthrough only? Would plutonium be civilian plutonium in Russia after process? 74

PORTLD–73 **DOE Policy**

DOE acknowledges the commentor's opposition to the MOX approach. U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. In keeping with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

PORTLD–74 **Nonproliferation**

Close cooperation between the United States and Russia is essential to achieve the objectives of nonproliferation and arms reduction, and to ensure secure management of nuclear weapons materials. To that end, in late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. Because each country is responsible for separately dispositioning its own stockpile of surplus plutonium, this statement contains provisions for developing methods and technology for verification. This includes appropriate international verification measures and stringent standards of physical protection, control, and accounting for the management of plutonium. As discussed in Section 2.4, there are provisions for international inspections of each of the proposed

Oregon and Washington and Congress are opposed to MOX. The support is because of the pressure of jobs at Hanford. Is Russia just a bone to get the American public on board with the program? 75

I see a collusion between the nuclear industry, Russia, and the United States. MOX is an attempt by the nuclear industry to subsidize nuclear power. MOX is a bad idea. 76

surplus plutonium disposition facilities. Russia is not committed to a once-through cycle; it has only agreed that it would not reprocess MOX spent fuel until all surplus plutonium was in the form of spent fuel. By that time, it will have verified that the surplus plutonium had been removed from the weapons-usable plutonium stockpile and committed to civilian use.

PORTLD–75 **DOE Policy**

DOE acknowledges the commentor's opposition to the MOX approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

Because the Russians have expressed concern that immobilization would not destroy any plutonium, it is conceivable that the Russians would not eliminate their plutonium stockpile if the United States were to implement an immobilization-only approach. Therefore, the hybrid approach provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

PORTLD–76 **DOE Policy**

DOE acknowledges the commentor's opposition to the MOX approach. The use of MOX fuel in commercial, domestic reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by

Can plutonium be extracted from spent fuel and can it be refined into weapons? Is plutonium 241, 242, and 243 included? Which plutonium can be used for a bomb?	77
A weapon was made using reactor-grade plutonium. It was inefficient and hard to make, but proved that it could be done.	78
It's insignificantly more difficult to build a weapon from reactor plutonium than weapons plutonium. Given today's technology with lasers, it is no more difficult.	79

meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

PORTLD–77 **Nonproliferation**

Plutonium has 15 isotopes with mass numbers ranging from 232 to 246. Weapons-usable plutonium contains mainly plutonium 239, with less than 7 percent plutonium 240. Spent fuel contains plutonium 239, 240, 241, and 242. It is possible to extract plutonium 239 from spent fuel, but the process is extremely dangerous, time consuming, and costly because the plutonium is an integral part of massive spent fuel assemblies that emit large doses of radiation.

PORTLD–78 **Nonproliferation**

DOE has no knowledge of a weapon made with reactor-grade plutonium. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. The purpose of the MOX approach is to convert surplus plutonium to a form that meets the Spent Fuel Standard, thereby providing evidence of irreversible disarmament and establishing a model for proliferation resistance. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. While it is possible to extract plutonium from this spent nuclear fuel, the process is extremely dangerous, time consuming, and costly because the plutonium is an integral part of massive spent fuel assemblies that emit large doses of radiation.

PORTLD–79 **Nonproliferation**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. The purpose of the MOX approach is to convert surplus plutonium

House legislature reaffirmed direction in House Bill 3640. DOE should follow the provisions in [*Oregon*] House Bill 3640. 80

Pits classified in weapons is the same type of classification and security in the pit disassembly and conversion facility. I don't think it's safe. We don't need a plutonium bomb, just radioactive materials and a big bomb to kill people. 81

to a form that meets the Spent Fuel Standard, thereby providing evidence of irreversible disarmament and establishing a model for proliferation resistance. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. While it is possible to extract plutonium from this spent nuclear fuel, the process is extremely dangerous, time consuming, and costly because the plutonium is an integral part of massive spent fuel assemblies that emit large doses of radiation. Any discussion of the processes required to build a nuclear weapon is classified and is beyond the scope of this SPD EIS.

PORTLD–80 **DOE Policy**

DOE acknowledges Enacted Oregon House Bill 3640 relating to nuclear facilities. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

PORTLD–81 **DOE Policy**

DOE acknowledges the commentor's concern regarding the safety and security of classified nuclear materials. The proposed DOE surplus plutonium disposition facilities are all at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Security for the facilities would be implemented commensurate with the usability of the material in a nuclear weapon or improvised nuclear device. Physical barriers; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed

The nuclear premise was that it was helpful to humankind; nuclear is harmful, not helpful. DOE has not accepted or developed a new premise. DOE needs to clean house and bring in people that agree with the new premise. There is a blatant disrespect for life in using nuclear weapons. Nuclear weapons are about power. Nuclear weapons/power is evil. 82

Hanford should be used for MOX fuel fabrication, pit disassembly and conversion, and immobilization. Any new facility for pit disassembly and conversion will contaminate a clean facility. FMEF is built specifically to NRC standards for plutonium work and has a nearly completed MOX fuel line in it. Its use would reduce the timetable. Hanford has the most MOX fuel fabrication experience because the process was developed at Hanford. Hanford has a lower population density than the south and has more distance than SRS between the source and the groundwater. A site infrastructure for plutonium disposition already exists at Hanford. 83

Cleanup is the primary/only mission at Hanford. SRS has a cleanup mission as well as a tritium mission. Hanford can handle more than one mission at a time. 84

inside are adequately protected. Closed-circuit television, intrusion detection, motion detection, and other automated materials-monitoring methods would be employed. Furthermore, the physical protection, safeguards, and security for the MOX facility and domestic, commercial reactors would be in compliance with NRC regulations.

PORTLD–82 **DOE Policy**

DOE acknowledges the commentor's opposition to nuclear weapons. The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. In keeping with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing. The resulting MOX spent fuel would then be placed in a potential geologic repository pursuant to the NWPA, as amended.

PORTLD–83 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities using FMEF at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–84 **Alternatives**

DOE acknowledges the commentor's support for new missions at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was

Hanford employment levels dropped by thousands. MOX would create new jobs. We have a right to be concerned about jobs. 85

The decision to not use FMEF is based on "not in my back yard," not technology. 86

Oregon opposes MOX. I am grateful that Oregon represents a sane perspective for disposal and that the SPD EIS does not consider Hanford for the preferred alternative. 87

taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

PORTLD–85 **Alternatives**

DOE acknowledges the commentor's concern about future employment in the Hanford area. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

PORTLD–86 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concern regarding the decision to not use FMEF at Hanford. The preferred alternative was chosen based on the best information and analyses available to allow for a fair comparison among the candidate sites for the surplus plutonium disposition facilities. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–87 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach and support of DOE's decision not to include Hanford as a preferred location for the proposed surplus plutonium disposition facilities. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

My dad worked at Hanford and died of cancer. A friend lives in Idaho near INEEL and most of his family is dead. 88

What is the total spent fuel tonnage? What is the generated waste stream, and how will it be disposed of? How much waste will be created from the MOX process? 89

PORTLD–88 **Human Health Risk**

As discussed in Section 3.2.4.3, epidemiological studies have been carried out on Hanford workers over the years. These studies have consistently shown a statistically significant elevated risk of death from multiple myeloma associated with radiation exposure among male workers. However, the elevated risk was observed only among workers exposed to 10 rads (approximately 10 rem) or more. The studies have also identified an apparent elevated risk of death from pancreatic cancer, but a recent analysis concluded that the risk was not elevated.

As discussed in Section 3.3.4.3, epidemiological studies were also conducted on communities surrounding INEEL to determine whether there are excess cancers in the general population. No excess cancer mortality was reported, and although an excess cancer incidence was observed, no association thereof with INEEL was established. Another study found excess brain cancers in the six counties surrounding INEEL, but a follow-up survey concluded that there was nothing that clearly linked all these cases to one another or to any one thing.

According to the detailed impact assessment presented in Chapter 4 of Volume I, no LCFs are expected as the result of the operations assessed in this SPD EIS. Whatever the alternative, site surveillance and health effects studies would continue throughout the operational period in order to provide a full assessment of impacts on human health.

PORTLD–89 **Waste Management**

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

Estimates of the amounts of TRU, LLW, mixed LLW, hazardous, and nonhazardous wastes that would be generated by construction and operation of the MOX facility are presented in Appendix H.

The Institute for Environmental Research has stated that reprocessing adds more waste, liquid waste. This flies in the face of answers given at this meeting. 90

MOX creates new wastes with no plan for long-term storage; it is not replacement waste. I resent additional input of poison into the environment without any place or way to handle the waste. There are 120 countries asking the United States not to go forward with MOX. 91

Appendixes H.1.2.3, H.2.2.2, H.3.2.2, and H.4.2.3 describe the wastes that would be generated by the MOX facility at Hanford, INEEL, Pantex, and SRS, respectively. These sections also describe facilities that may be used to treat, store, and dispose of these wastes.

PORTLD–90 **Waste Management**

U.S policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

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Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of

DOE has not informed people of all risks and uncertainties in processing plutonium; the SPD EIS does not include necessary impacts and risks. The latest EIS does not contain air quality concerns. 92

implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

PORTLD–92 **Human Health Risk**

Chapter 4 of Volume I provides the results of detailed impact analyses of plutonium processing in the proposed surplus plutonium disposition facilities. Risks and consequences are addressed as appropriate. The impacts on workers and the general population associated with normal operations and postulated accidents are included in these analyses. Included for separate assessment are the potential impacts on air quality and noise, geology and soils, water resources, ecological resources, cultural and paleontological resources, land use and visual resources, infrastructure, waste management, socioeconomics, human health, and transportation. Issues such as environmental justice are also assessed. Detailed analyses of the resources are provided in the appendixes.

Appendix F describes the methods used to perform the evaluations. More detail on facility accident and transportation assessment methods is provided in Appendixes K and L, respectively. These two appendixes also feature discussions of the calculational uncertainties inherent in accident and transportation assessments. All of the assessments for this SPD EIS involved the use of models and techniques that are accepted in the scientific community and have been used in the preparation of numerous other NEPA documents.

Potential air quality impacts associated with each of the alternatives assessed are included in Chapter 4 and discussed in more detail in Appendixes G and J. The incremental concentrations of nonradiological air pollutants were calculated using the ISCST3 computer code. These concentrations are below the appropriate Federal and State ambient air quality standards, indicating that no adverse effects on the environment would be attributable to the surplus plutonium disposition program.

I am concerned about any action that impacts the Columbia River. Will there be groundwater contamination? What's happening to Hanford groundwater with relation to the Columbia River? There are contaminants in the river. There were recent initiatives to coordinate the groundwater program through Bechtel. A report will be coming out to the public by the end of the year. It's the first time a consolidated study will be available. Successful initiatives are underway and there is still a lot of work to do. Hanford, INEEL, and Pantex have about 100 feet of vadose zone above groundwater, and SRS has none. 93

I oppose contaminating any clean land or facility at Hanford. 94

What will the Department do if a MOX reactor explodes? What is the worst case scenario of a reactor accident at a DOE facility? Placing plutonium in the hands of the commercial nuclear industry increases risks, increases transportation, etc. 95

PORTLD–93 **Water Resources**

DOE acknowledges the commentor's concerns regarding groundwater and surface water contamination at Hanford, although the impacts of existing contamination at Hanford are beyond the scope of this SPD EIS. Activities to remediate existing contamination at Hanford are ongoing.

As discussed in Sections 4.26.1.2, 4.26.2.2, 4.26.3.2, and 4.26.4.2, there would be no discernible impacts on surface water or groundwater quality at Hanford, INEEL, Pantex, or SRS from construction and operation of the proposed surplus plutonium disposition facilities.

PORTLD–94 **Alternatives**

DOE acknowledges the commentor's concern regarding potential contamination at Hanford. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

PORTLD–95 **Facility Accidents**

Design basis and beyond–design basis accidents at the proposed reactors have been evaluated in Section 4.28 of this SPD EIS. As discussed in Section 4.28.2.5, studies by NAS have led it to the following conclusion: "no important overall adverse impact of MOX use on the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities will involve factors not related to fuel composition and hence unaffected by the use of MOX rather than LEU fuel." The analysis reflected in Section 4.28 indicates that the change in risk to the population within 80 km (50 m) of the reactors for the beyond-design-basis accidents involving MOX fuel would range from minus 4 to plus 14 percent. For the design basis accidents, the incremental change in risk from MOX fuel would range from minus 6 to plus 3 percent.

How will materials be transported? How will safety be ensured? What are the transportation accident scenarios?	96
Will Russian plutonium be coming through Oregon? Will Hanford plutonium be coming through Oregon?	97
Will the public know how, when, and where materials will be transported? I oppose transporting materials.	98

PORTLD–96 **Transportation**

Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. Safety is ensured by compliance with stringent DOE, NRC, and DOT standards for containers, vehicles, and driving. The accident scenarios range from minor accidents that release no hazardous materials to hypothetical, extremely severe accidents. A quantification of the risks associated with these scenarios is presented in Appendix L.

PORTLD–97 **Transportation**

The disposition of Russian plutonium in the United States is not being considered by DOE and is therefore beyond the scope of this SPD EIS. DOE is considering alternatives that include immobilization at SRS, under which the Hanford plutonium would pass through Oregon, as well as alternatives that include immobilization of the surplus plutonium at Hanford, in which it is possible that plutonium from several DOE sites would pass through Oregon. The impacts of transporting nuclear materials to disposition 50 t (55 tons) of surplus plutonium are summarized in Chapter 4 of Volume I and Appendix L. As indicated in Section 2.18, no traffic fatalities from nonradiological accidents or LCFs from radiological exposures or vehicle emissions are expected.

PORTLD–98 **Transportation**

DOE acknowledges the commentor's opposition to transporting materials. The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be stipulated. These plans would be coordinated with State, tribal, and local officials. The shipment of waste would be done in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). Transportation of

There is an increased risk of accidents from transporting materials for the MOX option. 99

I am grateful that DOE decided to hold a meeting in Oregon. I am grateful for citizen participation and the opportunity to testify. Oregon needs the opportunity to fully participate. 100

What is DOE doing to inform the American public about what's going on with this program? 101

special nuclear materials would use DOE's SST/SGT system. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, was included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

PORTLD–99 **Transportation**

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are evaluated in this SPD EIS. The risk of transporting plutonium materials is presented in Table L–6.

PORTLD–100 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's support of the public outreach program regarding the surplus plutonium disposition program. In compliance with NEPA, DOE provided appropriate opportunities and means for public comment on the program, and gave equal consideration to all comments, regardless of how they were submitted.

PORTLD–101 **General SPD EIS and NEPA Process**

DOE provides information on the disposition of fissile materials to the public in various forms. These include public hearing presentations, fact sheets, exhibits, technical reports, visual aids, and a video. Information is distributed by such mechanisms as mail, email, fax, the MD Web site, telephone, and press interviews. It is important to note that DOE uses most of these same mechanisms to obtain comments from the public as part of its decisionmaking process.

Regarding national security of pit configuration—what does information security mean? I am concerned about making nuclear weapons without a communication process; the Department is bringing down the veil of secrecy again. How will this affect the public process? Will the auxiliary process also be classified? How can the public ensure that the process scope is actually what's proposed in the EIS if information is classified? 102

I object to the structure of the meeting. DOE is taking up comment time. 103

Environmentalists should be allowed on the program. 104

The heart of the issue is that DOE has been lying to the public for 50 years. There are more issues, and the DOE is hurting people no matter what it's talking about. Taxpayers will pay the price of the MOX program. What is DOE going to do for the U.S. public? 105

PORTLD–102 **General SPD EIS and NEPA Process**

Information security refers to a national security program whereby access to specific information is restricted to individuals who need that information to perform their official duties. DOE has for a number of years been engaged in a formal process to ensure that only information meeting this criterion remains classified. This process should allow for improved public knowledge of the actions being proposed by DOE for surplus plutonium disposition. Two types of information involved in the disposition of surplus plutonium are typically classified: (1) pit information (e.g., the design, construction, and disassembly of individual pit types), and (2) special nuclear material transportation information (e.g., shipping routes and times). It is expected that no other disposition-related processes would be classified, and that, in fact, unclassified processes in the pit conversion, immobilization, and MOX facilities would be subject to international inspection.

PORTLD–103 **General SPD EIS and NEPA Process**

DOE used an interactive hearing format so that participants could obtain immediate answers to their questions and provide DOE with comments that truly represented their concerns. Written comments were also accepted at these hearings from participants who preferred not to speak. The hearings continued until all participants desiring to speak had the opportunity.

PORTLD–104 **General SPD EIS and NEPA Process**

NEPA compliance is DOE's responsibility. Environmentalists are encouraged to participate through the comment process.

PORTLD–105 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on DOE policy and programs. DOE is committed to providing the public with comprehensive environmental reviews of its proposed actions in accordance with NEPA.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost

The most significant fact in the universe is the existence of life; preservation of life is important. We cannot preserve life while endangering others. The nuclear situation began with a lie, and it remains a lie. Biological weapons deterrence is a lie, nuclear weapons deterrence is a lie. All public meetings are a lie. 106

WPPSS is responding to the procurement. 107

Hanford's sole mission should be cleanup, and the mission must remain on schedule. Keep the focus on safety and cleanup at Hanford. Hanford's cleanup job is so large that it requires the undivided attention of the workforce focused on the job. 108

It is pointless to discuss cleaning up wastes if the nuclear industry keeps generating wastes. I would like DOE to comment on the Waste Isolation Pilot Plant (WIPP) site shutdown. What happens to the waste resulting from plutonium disposition? What if Yucca Mountain does not open? There is no long-term storage available. Material needs to be stored in a safe location where no one can get to it. 109

estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

PORTLD–106 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's views on the importance of the preservation of life. DOE is committed to providing the public with comprehensive environmental reviews of its proposed actions in accordance with NEPA, and to providing ample opportunity for public comment on those actions.

PORTLD–107 **MOX RFP**

DOE acknowledges the commentor's observation. Information on the procurement is provided in the revised Section 4.28. WPPSS is not one of the reactors chosen to use MOX fuel.

PORTLD–108 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

PORTLD–109 **Repositories**

The management of TRU wastes generated by the proposed surplus plutonium disposition facilities is evaluated in this SPD EIS. DOE alternatives for TRU waste management are evaluated in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS*

There is a large amount of waste in the ground [*refers to Hanford*]; 450 billion gallons went into the ground; over 1 million gallons/ curies leaked from tanks to the soil. The timeframe to handle materials equals 750 generations; it is too vast of a time to think in. 110

I protest PUREX [*refers to the Plutonium-Uranium Extraction Facility*] and uranium tailings. DOE needs to recognize impacts to Native Americans. Tailings went into the fill below their high school. The Navaho recycle and they use items on their houses that came from the plant. 111

(DOE/EIS-0026-S-2, September 1997). WIPP began receiving shipments of TRU waste for permanent disposal on March 26, 1999. As for MOX spent fuel, following irradiation, the MOX fuel would be removed from the reactor and managed at the reactor site as spent fuel in accordance with the site's normal spent-fuel-handling procedures. This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. If at some future time it were determined that Yucca Mountain was not a suitable location for these activities, Congress would have to decide on an alternative path forward for the disposal of spent nuclear fuel and other HLW slated for the repository. The immobilized plutonium and MOX spent fuel would be included in any such decision and managed in the same fashion.

PORTLD–110 **DOE Policy**

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

PORTLD–111 **Environmental Justice**

DOE acknowledges the commentor's concern regarding impacts of the surplus plutonium disposition program on Native Americans. However, the PUREX facility and uranium tailings are beyond the scope of this SPD EIS. Impacts on minorities resulting from the surplus plutonium disposition program are analyzed in the Environmental Justice sections of Chapter 4 of Volume I. DOE consulted with Native American groups in the environs of all candidate sites considered in this SPD EIS.

Shut all commercial reactors down. Get rid of nuclear industry. 112

What the government has done to the environment is wrong. The Mesabe Range is completely trashed. Turn away from military-focused missions. Don't bring new materials to the Northwest. We have only one world—don't destroy what we have. It's time to stop the military complex. 113

PORTLD–112 **Other**

DOE acknowledges the commentor's opposition to nuclear power.

PORTLD–113 **Alternatives**

DOE acknowledges the commentor's concern regarding the contamination of the environment resulting from military-focused missions. DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

One-hundred percent immobilization does not require gallium removal. The polishing process is not needed. Why was this not included in the analyses? 1

Nonpit materials: can the chosen facility be modified to accommodate a hydride-oxidation process for single processing? Did the Department analyze pit disassembly and conversion without gallium removal, or can it be attached to the facility? 2

IDFALS–1 Plutonium Polishing and Aqueous Processing

The commentor is correct in that immobilization of the full 50 t (55 tons) of surplus plutonium is not anticipated to require a plutonium polishing process to remove gallium concentrations. This SPD EIS analyzed the option to immobilize all the surplus plutonium as discussed in Alternatives 11 and 12. In terms of hybrid alternatives, which also consider plutonium disposition through a combination of immobilization and use as MOX fuel, there has been some discussion that the pit conversion process might not be able to produce plutonium dioxide powder that would consistently meet specifications for MOX fuel. On the basis of public comments received on the SPD Draft EIS and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Section 2.4.3 and the hybrid alternatives analyses in Chapter 4 of Volume I were revised to include a discussion of plutonium polishing.

IDFALS–2 Plutonium Polishing and Aqueous Processing

The final configuration of the pit conversion facility, which could also process nonpit plutonium metal and oxide, will be based on information collected from the demonstration project under way at LANL. This could include a hydride-oxidation process.

At the time DOE issued the SPD Draft EIS, it believed the gallium content in the plutonium dioxide feed specifications for MOX fuel could be reached using the dry, thermal gallium removal method included in the pit conversion process. However, in response to public interest on this topic and to ensure adequate NEPA review in the event that the gallium specification could not be met with the thermal process, an evaluation of the potential environmental impacts of including a small-scale aqueous process (referred to as plutonium polishing) as part of either the pit conversion or MOX facilities was presented in Appendix N of the SPD Draft EIS. On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

DOE should go with the No Action Alternative and store the material in a secure place.	3
Define a pit. Immobilizing pits could be as little as changing shape?	4
Is it technically possible to attach immobilization to the front end of pit disassembly and conversion?	5
How was the decision made to designate some plutonium for MOX and some for immobilization?	6

IDFALS–3 **Alternatives**

The No Action Alternative would not satisfy the purpose of and need for the proposed action, which is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. DOE has identified as its preferred alternative the hybrid approach (i.e., immobilization and MOX) to surplus plutonium disposition.

IDFALS–4 **Pit Disassembly and Conversion**

A pit, the design of which is classified, is the core component of a nuclear weapon's "primary" or fusion component. The immobilization process is more complicated than just changing the shape of the pits. Changing the shape of the pits would not render the plutonium proliferation resistant or remove the classified nature of the pit. The plutonium, present in pits as metal, must be removed from the other components of the pit and converted to an oxide powder before it can be further processed for disposition. This process would occur at the pit conversion facility. The plutonium dioxide powder would then be transferred to the immobilization facility where it would be mixed with other materials and turned into a ceramic or vitrified form, then loaded into stainless steel cans approximately the size of a coffee can. These cans would then be placed on racks and loaded into HLW canisters which would then be filled with the vitrified HLW.

IDFALS–5 **Pit Disassembly and Conversion**

It is technically possible to locate the two processes together. However, pit disassembly and conversion would have to occur prior to immobilization.

IDFALS–6 **Alternatives**

The amount directed to each option is related to the suitability of the plutonium for use as MOX fuel. In the ROD for the *Storage and Disposition PEIS*, DOE decided that approximately 8 t (9 tons) of the current surplus plutonium were not suitable for use in MOX fuel and therefore would be immobilized. As

I support DOE's efforts to get plutonium off the market. The nuclear proliferation threat is a real danger and must be contained. I advocate full immobilization as the single source disposition method. MOX costs more, has a longer timeframe for startup, and threatens the nonproliferation policy. The Program's goal should be to get rid of plutonium, not to produce electricity. Given these factors, the SPD EIS should address decision factors for determining whether to go to MOX or to full immobilization. This issue needs to be further addressed. 7

described in this SPD EIS, an additional 9 t (10 tons) of surplus plutonium were identified as unsuitable for MOX fuel fabrication. The 17 t (19 tons) of surplus plutonium are not suitable for fabrication due to the complexity, timing, and cost that would be involved in purifying the material. The remaining 33 t (36 tons) of the 50 t (55 tons) of surplus plutonium would be fabricated into MOX fuel.

IDFALS–7 **Alternatives**

DOE acknowledges the commentor's support for the immobilization-only approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to produce electricity. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated

I am amazed at the number of people making their livelihood maintaining problems. MOX as the preferred option falls short. 8

There are a lot of misconceptions in the public about plutonium. Plutonium has always been burned in reactors; there's nothing new about burning plutonium in reactors. The hybrid strategy was chosen in case one of the options fails. 9

with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

IDFALS–8 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

IDFALS–9 **Alternatives**

DOE acknowledges the commentor's support for the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

We know that 17 metric tons must be immobilized, so why is MOX still being considered? What are the factors for determining success or failure? 10

Is the MOX fuel fabrication process designed to fabricate Russian-originated plutonium? 11

The INEEL Citizens' Advisory Board (CAB) researched and considered the MOX decision. We could not reach a consensus, but will continue looking at the issue. The INEEL CAB has concerns about the MOX program. 12

Immobilizing plutonium is disposing $2.5 billion dollars. Taxpayers are throwing money down the hole in the form of glass. DOE is making plutonium available free. Recycling it is not hazardous. It's reducing waste, not adding it. 13

IDFALS–10 **Purpose and Need**

Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

IDFALS–11 **Alternatives**

MOX fuel fabrication is essentially the same regardless of the origin of the plutonium used in the process. The surplus plutonium disposition program proposed in this SPD EIS would only process 50 t (55 tons) of U.S.-origin plutonium.

IDFALS–12 **MOX Approach**

DOE acknowledges the commentor's concern regarding the MOX approach. Decisions on the surplus plutonium disposition program at INEEL will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

IDFALS–13 **Alternatives**

DOE acknowledges the commentor's opposition to the immobilization approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of

Is the end use of MOX to replace highly enriched uranium for power purposes? Is there a commitment from power companies to use MOX?	14
Will the commercial industry's response determine the final decision of whether to use MOX or to go to a 100 percent immobilization option? Does DOE's decision of going to 33 metric tons or 0 metric tons [*for MOX fuel*] depend on commercial end-users?	15
MOX fuel replaces commercial fuel that would exist anyway. The facilities analyzed in SPD EIS are anticipated to classify material to meet WIPP waste acceptance criteria requirements. Shouldn't the MOX facility be a classified facility?	16

implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

IDFALS–14 **DOE Policy**

The MOX approach is not intended to affect the viability of nuclear power. The purpose of the MOX approach is to convert surplus plutonium to a form that meets the Spent Fuel Standard, thereby providing evidence of irreversible disarmament and setting a model for proliferation resistance. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process.

IDFALS–15 **DOE Policy**

Potential users of MOX fuel have been identified by DOE and are part of the DCS team contracted to operate the MOX facility and offer irradiation services in the hybrid approach is selected.

IDFALS–16 **DOE Policy**

It is DOE's policy that the various wastes generated from the surplus plutonium disposition program would meet the performance criteria for disposal at the respective repositories. The feed material for the MOX facility, plutonium dioxide, is made from pits or pure plutonium metal that have been declassified. The MOX fuel produced from the facility (licensable by NRC) would be used in domestic, commercial reactors. Therefore, the MOX facility would not be a classified facility.

I am aware of the economic impact on nuclear energy. I am concerned about the economic impact of MOX. What will the program cost? Who bears the cost? 17

Modifications to commercial reactors will be required for MOX, also relicensing will be required. Who is responsible for paying for this? Any estimate on cost? 18

IDFALS–17 **Cost**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

Because cost issues are beyond the scope of this EIS, this comment has been forwarded to the cost analysis team for response. For a better understanding of the cost and schedule estimates for each alternative, consult *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999). These documents are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

IDFALS–18 **MOX RFP**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. As a result of this procurement process, DOE identified the reactors proposed to irradiate MOX fuel, Catawba, McGuire, and North Anna, as part of the proposed action in this SPD EIS. Because commercial reactors in the United States are capable of safely using MOX fuel. DOE believes that the cost to make these reactors suitable for using MOX fuel would be relatively low. The costs would be limited to some analyses and

What is Russia planning to do? Are there agreements in place to ensure that Russia will follow through?	19
What other technologies are being looked at by Russia other than MOX?	20

operating license amendments, and would be reimbursable to the utilities by DOE under the terms of the RFP. Irrespective of the combination of actions implemented, costs to the taxpayer would be associated with the disposition of surplus U.S. plutonium. A separate report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), analyzes the site-specific cost estimates for each alternative. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

IDFALS–19 **Nonproliferation**

The United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain surplus plutonium disposition activities in order to encourage the Russians and set an international example.

IDFALS–20 **Nonproliferation**

Like the United States, Russia is pursuing studies to address both the immobilization and MOX approaches to surplus plutonium disposition. A feasibility study, in parallel with small-scale testing, is currently under way in Russia to determine the technology to be used to convert Russian plutonium to a form suitable for disposition and international inspection. The Russian pilot-scale study would demonstrate the capability to convert plutonium metal to an oxide form, suitable for either disposition approach (i.e., immobilization or MOX).

Was the United States asked by Russia to assist in funding a safe, secure facility? 21

I have heard of low-enriched uranium or highly enriched plutonium being redirected or lost. There's no indication that the material was ever used. There may be leakage of nuclear materials at the universities in Russia. 22

Don't invest huge sums in the United States until the confidence level in Russia's commitment to do down the MOX path is higher. 23

IDFALS–21 **Nonproliferation**

Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

IDFALS–22 **Nonproliferation**

DOE acknowledges the commentor's concern regarding the safety and security of nuclear materials in Russia. While the quantities and condition of Russian nuclear materials are beyond the scope of this SPD EIS, safeguards and security issues are being addressed in negotiations between the United States and Russia. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. One of the principles of this agreement states acceptable methods and technology for transparency measures, including appropriate international verification measures and stringent standards of physical protection, control, and accounting for the management of plutonium would be developed.

IDFALS–23 **DOE Policy**

DOE acknowledges the commentor's concern regarding investment of U.S. dollars without evidence of Russia's commitment to a MOX approach. The United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and

To what extent will the United States fund pit conversion. Clarify the bounds of the European program. Why does it keep them from handling U.S. fuel? | 24

Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. However, in order to avoid putting the United States at a strategic disadvantage in future negotiations with Russia as well as to avoid the large-scale expenditure of funds until necessary, the Administration has made it clear that it will not construct new facilities for disposing of U.S. surplus plutonium unless there is significant progress on plans for plutonium disposition in Russia.

IDFALS–24 **DOE Policy**

The pit disassembly and conversion process recovers plutonium from pits and clean metal and converts the plutonium to an unclassified form. It is a necessary first step for accomplishing plutonium disposition. Funding for the surplus plutonium disposition program is appropriated annually by the U.S. Congress.

The U.S. Government held discussions with the European governments and the European MOX industry concerning this issue. The Europeans are not interested in processing U.S. weapons-usable plutonium in their MOX facilities because their program has reached a balance between the cycle times of the reactors served and the fuel processing and fabrication schedules. The introduction of U.S. surplus plutonium into that balance would disrupt the equilibrium of their fuel cycle, increase plutonium inventories and storage requirements, and increase cost for the European MOX industry. In addition, administrative barriers, including the need to negotiate multiple agreements with other governments, transportation concerns, and working through permit requirements would result in schedule delays in the U.S. surplus plutonium disposition program. This in turn would make it more difficult to reach a surplus plutonium disposition agreement with the Russian government in a timely manner.

Russia lacks the money to go after "Fort Knox" in Russia. There are limited funds for the Russian space program. Russia lacks the money to do anything. I do not think that Russia is going to invest in a multibillion dollar MOX program. 25

When Senator Dominici was visiting in Russia, did he hear that Russia would accept the immobilization process? 26

Both Russia and the United States agree about the benefits of working together and building a relationship between the countries. The United States has good reason to maintain a strong relationship with Russia. 27

IDFALS–25 **Nonproliferation**

The Russian economy is a concern, and the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

IDFALS–26 **Nonproliferation**

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. The principles include the acceptance of either the immobilization of plutonium in glass or ceramic form or the consumption of plutonium in MOX fuel in reactors.

IDFALS–27 **DOE Policy**

DOE agrees that close cooperation between the two countries is required to achieve the objectives of nonproliferation and arms reduction, and to ensure secure management of nuclear weapons materials. Toward that end, the United States and Russia recently made progress in the management and disposition of plutonium. In late July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. This agreement enables the two countries to explore mutually acceptable strategies for safeguarding and dispositioning surplus plutonium. During the first week of September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile.

Why is DOE planning for new construction adjacent to APSF when it already owns a state-of-the-art facility (FMEF) designed for MOX fuel production?	28
FMEF has design flaws that would be difficult and costly to correct in order to meet the MOX mission. It's much cheaper for the Department to dismantle a “cold” (clean) facility than it is to dismantle a “hot” (contaminated) facility.	29
INEEL has a basic advantage for manufacturing MOX fuel. Why is the Secretary so eager to reach a preferred alternative in siting the facility in the south?	30
INEEL has never been a weapons site or laboratory. In keeping with the “swords to plowshares” intent of the plutonium disposition concept, wouldn't the mission fit better at a nonweapons site, such as INEEL?	31

IDFALS–28 **Alternatives**

DOE believes that Hanford’s efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

IDFALS–29 **Alternatives**

DOE acknowledges the commentor’s opposition to siting the MOX facility in FMEF at Hanford. DOE believes that Hanford’s efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission, especially in regard to the use of existing facilities.

IDFALS–30 **Alternatives**

DOE acknowledges the commentor’s support for siting the MOX facility at INEEL. As indicated in Section 1.6, SRS is preferred for the MOX facility because this activity complements existing missions and takes advantage of existing infrastructure and staff expertise. Decisions on the surplus plutonium disposition program at INEEL will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

IDFALS–31 **Alternatives**

DOE acknowledges the commentor’s support for siting the proposed surplus plutonium disposition facilities at INEEL. Decisions on the surplus plutonium disposition program at INEEL will be based on environmental analyses, technical and cost reports, national policy and nonproliferation

If all spent fuel rods slated to be moved to Nevada are stored at INEEL on a temporary basis, doesn't it make sense to site the MOX mission at INEEL? 32

The Advanced Mixed-Waste Facility at INEEL is used for TRU waste. DOE is proposing to build a new facility that will ultimately become alpha-contaminated. The facility will be used to contain a small amount of easily contained plutonium. The plutonium disposition program is going to generate more TRU waste. It doesn't make sense. 33

considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

IDFALS–32 **Alternatives**

DOE acknowledges the commentor's support for siting the MOX facility at INEEL. Only 10 lead assemblies would be made and fewer than that number irradiated. Only a small number of rods from those assemblies would be sent for postirradiation examination. This small number of fuel rods that could be stored at INEEL, should the rods be sent to ANL–W for postirradiation examination, does not, on its own, support siting the MOX facility at INEEL.

As discussed in the revised Section 1.6, DOE prefers ORNL for postirradiation examination activities because the site has existing facilities and staff expertise needed to perform postirradiation examination as a matter of its routine activities; no major modifications to facilities or processing capabilities would be required. In addition, ORNL is about 500 km (300 mi) from the reactor site that would irradiate the fuel. Decisions on the surplus plutonium disposition program at INEEL will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

IDFALS–33 **Waste Management**

Although waste generation would be minimized to the extent possible, alternatives for the disposition of surplus plutonium would generate some additional TRU waste. As shown in Section 4.14.2.2, and Appendix H.2.2.3, if both the pit conversion and MOX facilities were located at INEEL, 64 m^3/yr (83 yd^3/yr) of TRU waste would be generated. This is approximately 1 percent of the 6,500-m^3/yr (8,500-yd^3/yr) planned capacity of the Advanced Mixed Waste Treatment Project. In addition, the 640 m^3 (837 yd^3/yr) of TRU waste generated over the 10-year operating period of the surplus plutonium disposition facilities would be less than 1 percent of the 39,300 m^3 (51,400 yd^3) of TRU waste in storage at INEEL.

The SPD EIS is yet another EIS that doesn't answer questions on high-efficiency particulate air filters and their ability to contain exhausts in processing facilities. Air quality questions are not answered regarding particulate filtration. I am concerned about public health and safety if an accident occurs. The general public does not want to be downwind if an accident occurs. Accident analyses need to be put back into air quality permitting. 34

IDFALS–34 **Human Health Risk**

The chemical and radiological emissions associated with each of the proposed surplus plutonium disposition facilities would be processed through HEPA filters prior to their release to the atmosphere. The post HEPA filter emission rates for chemical releases are given in Appendix G, those for radiological releases in Appendix J. These rates represent the source terms analyzed by the computer codes (described in Appendixes F and J) to determine the air concentrations of chemical releases at the site boundary and to determine doses to the public from radiological releases. For chemical releases, the increases in air pollutant concentrations represent small fractions of the Federal and State ambient air quality standards and would be expected to have an insignificant effect on human health. In addition, analyses of the hazardous chemical releases to the atmosphere indicate that no cancers or other adverse health effects to the public or onsite workers would be expected from operations of any of the proposed facilities. For radiological releases, the resulting doses would be well within regulatory limits and would not cause any cancer fatalities. Chapter 4 of Volume I presents these impacts in detail.

If an accident involving chemical releases were to occur, temporary exceedances of ambient air quality standards could occur. The State regulatory agencies would be kept informed of developments, and appropriate actions would be taken in accordance with existing procedures to minimize adverse impacts on the public and workers. No fatal cancers are predicted for any accident having the potential to release radioactive material to the environment.

In response to the commentor's concerns, contacts have been made with the Idaho Division of Environmental Quality and with the contractor responsible for air quality permits for INEEL. There have been no State requirements to perform an accident analysis as part of the air-permitting process regardless of the type of pollutant that could be emitted (criteria pollutants, toxic pollutants, or radionuclides). Only routine operations are considered in the air-permitting process.

Low-level waste disposal is always an ongoing concern. | 35

The material would have to be processed through a classification facility (Mixed Waste Facility) before going to WIPP. TRU waste may be processed elsewhere. DOE is committing some facility to being contaminated with TRU waste. | 36

I disagree with fatality data from MOX for INEEL. There would be the same impacts from burning [*MOX fuel*] as other reactor fuel. | 37

IDFALS–35 **Waste Management**

DOE acknowledges the commentor's concerns regarding LLW disposal. Analyses presented in the Waste Management sections of Chapter 4 of Volume I and Appendix H indicate that there would likely be no major impacts to the LLW disposal infrastructure at the sites. The impacts of LLW disposal are evaluated in detail in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and in other NEPA documents prepared for the DOE sites.

IDFALS–36 **Waste Management**

As shown in Section 4.14.2.2 and Appendix H.2.2.3, INEEL already has 39,300 m^3 (51,400 yd^3) of TRU waste that will require certification and packaging before shipment to WIPP. The 640 m^3 (837 yd^3) of TRU waste generated over the 10-year operating period of the pit conversion and MOX facilities would be a small addition to the existing waste load at the site and would not be expected to appreciably change the levels of contamination in the TRU waste processing facilities.

IDFALS–37 **Human Health Risk**

DOE acknowledges the commentor's concern about the MOX approach. The commentor raises two separate issues: the fabrication of MOX fuel at INEEL, and the use of MOX fuel in a domestic, commercial reactor at another location.

Human health risks associated with MOX fuel fabrication at INEEL are addressed in Section 4.14. The risk assessments were performed using models accepted within the scientific community: the GENII computer code for the evaluation of normal operations; the MACCS2 code for the accident analysis; and best estimation of input parameters (e.g., radioactive source terms, meteorological conditions, population distributions, and agricultural data).

Section 4.28 was revised to provide reactor-specific analyses and discuss the potential environmental impacts of using a partial MOX core during routine operations and reactor accidents. These impacts have also been

Why wasn't a meeting held in Washington, D.C., for the SPD EIS? Considering the magnitude of the facility, it would seem that given the interest of nationally based groups, that a meeting would be warranted. 38

Will the [*commercial fuel*] plant need to be relicensed? Does the licensing process need to be completed before a commitment is made? 39

Will facility construction begin at the same time as the licensing process? Will MOX fuel fabrication begin before the licensing process is complete? 40

calculated using state-of-the-art computer models. The impacts associated with the use of MOX fuel are similar to those associated with the use of LEU fuel, the typical fuel used in U.S. commercial reactors.

IDFALS–38 **General SPD EIS and NEPA Process**

DOE held public hearings near the potentially affected DOE sites and Washington, D.C. Approximately 1,700 copies of the SPD Draft EIS were mailed, and an NOA letter was mailed to an additional 5,500 members of the public. Approximately 1,300 copies of the *Supplement to the SPD Draft EIS* were mailed, and an NOA postcard was mailed to an additional 5,800 members of the public. Several means were available for providing comments: mail, a toll-free telephone and fax line, and the MD Web site. All comments, regardless of how they were submitted, were given equal consideration.

IDFALS–39 **NRC Licensing**

The MOX facility would be licensed by NRC under 10 CFR 70. This would be a new license, not an amendment to an existing license, because the MOX facility would be a new facility, even if it were located in FMEF at Hanford. If the commentor is referring to a commitment to make MOX fuel, that decision would be made prior to completing, or even commencing, the licensing process. In fact, decisions regarding making MOX fuel, or immobilizing all the surplus plutonium will be made in the ROD for this SPD EIS. Theoretically, a facility could be completely constructed prior to issuance of a Part 70 license, but it would not be practical or prudent to do so. NRC must approve the safety and environmental reports, and the plant features relating to criticality and nuclear safety. Therefore, it would be in the best interest of the facility owners and operators to work closely with NRC during the design and construction process to ensure that NRC approves of the way its requirements are being met. However, MOX fuel fabrication will not begin before a license is issued for the MOX facility because special nuclear materials cannot be brought into the facility before the license is issued.

IDFALS–40 **NRC Licensing**

Fabrication of MOX fuel would not begin until a license was issued for the MOX facility under 10 CFR 70, because special nuclear materials may not be brought into an unlicensed facility. Theoretically, a facility could be completely

If DOE goes down the MOX path, and commercial reactors never burn MOX fuel, what then? Where will the MOX fuel be stored? Where besides Yucca Mountain? I am concerned about going down the path of investing and manufacturing MOX fuel and then not burning the fuel if communities resist. WIPP is a long ways off. DOE needs contingency planning for these issues. 41

constructed prior to issuance of a 10 CFR 70 license, but that would not be practical. NRC must approve the safety and environmental reports, as well as the plant features relating to criticality and nuclear safety. Therefore, it would be in the best interests of the facility owners and operators to work closely with NRC during the design and construction process to ensure that NRC approved of the way its requirements were being met.

IDFALS–41 **DOE Policy**

DOE conducted a procurement process to acquire MOX fuel fabrication and irradiation services. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. It is highly unlikely that fresh fuel would be fabricated for a reactor and then not irradiated by that reactor. Such a condition would be a contractual default by DCS, and would have to be remedied at DCS expense. Speculation as to the DCS response to this highly unlikely scenario would center on two courses of action: it could return the fuel to the fabricator for reuse in the fabrication of fuel for sister DCS reactors, or more likely, it could ship the MOX assemblies directly to sister reactors for use there (the reactor fuels would probably be interchangeable). Whatever its ultimate disposition, of course, the fresh fuel would at all times be subject to stringent security controls.

The resulting spent nuclear fuel would be placed in a potential geologic repository pursuant to the NWPA, as amended. This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

TRU and mixed waste would be certified on the site to current WIPP waste acceptance criteria prior to shipment to WIPP for disposal. DOE alternatives

I agree that DOE is supposed to take back the spent fuel (in a repository). A lawsuit is out on behalf of commercial reactors because Yucca Mountain is not open. Is it a possibility that the Consortium could tell DOE to take the MOX fuel back? 42

WIPP is not open, and may not have the capacity if it does open. I do not know if WIPP is expandable. WIPP is not large enough to handle the current TRU waste inventory. 43

for TRU waste management are evaluated in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). WIPP began receiving shipments of TRU waste for permanent disposal on March 26, 1999. DOE does not envision fresh fuel going directly to WIPP nor MOX spent nuclear fuel going anywhere but to Yucca Mountain. Section 4.28 was revised to discuss the potential environmental impacts of the reactors that would use the MOX fuel, and Section 1.8.2 describes the environmental documents associated with Yucca Mountain and WIPP.

IDFALS–42 **DOE Policy**

Operating criteria for the MOX facility stipulates that fabrication of the fuel shall meet the reactor demand schedules. However, to avoid excessive inventory at the fuel fabrication facility and the reactors, fuel would not be fabricated more than 18 months in advance of shipment to the reactor, and the fresh fuel would not be stored at the reactor site longer than the current and next scheduled reload. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a potential geologic repository built in accordance with the NWPA, as amended. This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

IDFALS–43 **Repositories**

The management of TRU wastes generated by the proposed surplus plutonium disposition facilities is evaluated in this SPD EIS. DOE alternatives for TRU waste management are evaluated in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*

What is the status with triple play [*refers to tritium production*]?	44
I am open-minded as to the future of the nuclear industry.	45
We need State rights to veto projects.	46
Senators are bought by nuclear advocates.	47

(DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). WIPP began receiving shipments of TRU waste for permanent disposal on March 26, 1999. As described in Appendix F.8.1 and the Waste Management sections in Chapter 4 of Volume I, it is conservatively assumed that TRU waste would be stored at the candidate sites until 2016, at which time it would be shipped to WIPP in accordance with DOE's plans. Expected TRU waste generated by the proposed facilities is included in the *WIPP Disposal Phase Final Supplemental EIS* cumulative impacts estimates, as well as in *The National TRU Waste Management Plan* (DOE/NTP-96-1204, December 1997).

IDFALS–44 **DOE Policy**

The "triple play," where MOX fuel fabricated from surplus plutonium would be used in a reactor to make tritium and generate electricity was analyzed in the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE/EIS-0161, October 1995). In May 1999, the Secretary of Energy decided that TVA's Watts Bar and Sequoyah reactors would produce a future supply of tritium (64 FR 26369). Therefore, the triple play option is no longer under consideration.

IDFALS–45 **Other**

DOE acknowledges the commentor's position regarding the future of the nuclear industry.

IDFALS–46 **Other**

DOE acknowledges the commentor's view that States should have the right to veto decisions made on the surplus plutonium disposition program. DOE has been charged by the U.S. Congress with determining how surplus plutonium will be dispositioned. Public input is a crucial component of this decisionmaking process. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

IDFALS–47 **Other**

DOE acknowledges the commentor's concern.

The United States should not be so dependent on fossil fuel. With more knowledge, people wouldn't be so afraid of nuclear power.	48
Is MOX utilization based on pure economics?	49
Was an economic analysis between highly enriched uranium and MOX performed? With a smaller quantity of fuel, is it cost effective to do?	50

IDFALS–48 **Other**

DOE acknowledges the commentor's support for nuclear power. However, the purpose of the surplus plutonium disposition program is not to generate energy. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner.

IDFALS–49 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

IDFALS–50 **Cost**

No economic comparison of MOX and HEU fuels was conducted in conjunction with this SPD EIS. HEU is dedicated to defense purposes only. Because cost issues are beyond the scope of this EIS, this comment has been forwarded to the cost analysis team for response. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

The current Administration is strictly antinuclear. The Russians consider plutonium a national treasure, and the United States should as well. 51

The United States should be using spent fuel for power. The nuclear industry is the safest source of power. We need to turn trend around and revitalize industry. 52

IDFALS–51 **DOE Policy**

DOE acknowledges the commentor's concern regarding the value of surplus plutonium. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. However, not all of the surplus plutonium would be made into MOX fuel because some of it is not suitable for fabrication due to complexity, timing, and cost that would be involved in purifying the material. Furthermore, pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. Decisions on the surplus plutonium disposition program will be based on national policy and nonproliferation considerations, environmental analyses, technical and cost reports, and public input.

IDFALS–52 **DOE Policy**

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Therefore, the United States will not build an inventory of plutonium that has been separated from commercial irradiated fuel.

DOE should plan to save plutonium in spent fuel and should use this fuel for environmental and economic reasons.	53
How did you arrive at the figure for TRU waste?	54
We need some means for recovering fuel. We need interim storage, not permanent storage.	55
The RFPs are due in September and will be awarded in November. Isn't this inconsistent with the overall timescale?	56

IDFALS–53 **DOE Policy**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel.

IDFALS–54 **Waste Management**

The waste generation data used in this SPD EIS were obtained from data reports prepared by the DOE national laboratories. The TRU waste volumes in these reports were estimated from process knowledge, or obtained by extrapolation of information on TRU waste generation at similar existing facilities. Supporting reports are available in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

IDFALS–55 **DOE Policy**

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. Section 122 of the NWPA requires DOE to maintain the ability to retrieve emplaced materials. Therefore, DOE would maintain the ability to retrieve spent nuclear fuel and HLW for at least 100 years, and possibly as long as 300 years.

IDFALS–56 **MOX RFP**

Fabrication of MOX fuel would not begin until a license was issued for the MOX facility under 10 CFR 70, because special nuclear materials may not be

brought into an unlicensed facility. Theoretically, a facility could be completely constructed prior to issuance of a 10 CFR 70 license, but that would not be practical. NRC must approve the safety and environmental reports, as well as the plant features relating to criticality and nuclear safety. Therefore, it would be in the best interests of the facility owners and operators to work closely with NRC during the design and construction process to ensure that NRC approved of the way its requirements were being met.

continue for up to 4 years, the information from the demonstration would be generated, gathered, and be available on a continuous basis throughout the facility design phase. This demonstration project and other R&D projects are described in the *Pit Disassembly and Conversion Demonstration EA* (DOE/EA-1207, August 1998), which is available on the MD Web site at http://www.doe-md.com.

7 Alternatives

DOE acknowledges the commentor's concern for potential shortcomings in the surplus plutonium disposition program. While it is correct that the disposition of large quantities of plutonium is a new endeavor, the various disposition alternatives are not. Several countries, including Russia and the United States have experience with immobilizing high-level wastes and the proposed can-in-canister approach, using ceramic instead of glass, offers advantages in the areas of proliferation resistance, repository durability, lower worker radiation exposure during processing, and cost effectiveness.

Commercial reactors in the United States are capable of safely using MOX fuel without any physical modifications to the reactor vessel or supporting systems. (Operating procedures, fuel management plans, and other activities would need to be modified.) The MOX technology is used in Europe, and therefore does not require extensive research and development for implementation in the United States. The R&D effort would be concentrated on fabricating samples of MOX fuel and conducting limited experiments and tests on those samples to assess fuel performance. The main objectives of this effort by DOE are to ensure that the plutonium and uranium feed materials will produce acceptable MOX fuel and to examine key issues relative to the performance of MOX fuel in commercial reactors.

Letter Expressing Support for Locating Disassembly and Conversion of Nuclear Weapons Plutonium Components at the Pantex Plant
Page 1 of 1

U.S. Department of Energy
Office of Missile Materials Disposition
MD-4 Forrestal Building
1000 Independence Avenue, SW
Washington D.C., 20585

As a citizen of Amarillo, I wish to express my feeling about the location of the disassembly and conversion of nuclear weapons plutonium components("pits") at the Amarillo Pantex Plant. I am totally in support of this function and hope you will consider the effort and the history of the Pantex plant in your decision making process for this site. 1

Sincerely,

Signature

Address

1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Petition / Opposed to MOX fuel transportation across the U.S.

We, the undersigned, are opposed to the fabrication and transportation of mixed oxide fuel (MOX), to be created from U.S. bomb plutonium. We oppose this government initiative because plutonium fuel, or MOX, presents many serious problems including: 1

1. Plutonium would be transported through the thumb area, the heart of the Great Lakes Region. Transport accidents would endanger millions of citizens and our precious environment.
2. Plutonium is a radioactive substance that lasts for thousands of years and one-millionth of a gram of plutonium can be lethal to a human being. 2
3. Use of MOX turns plutonium into high-level atomic waste, for which no safe storage solution is known. 3
4. The MOX program would allow foreign corporations to have significant control over plutonium - the most sensitive material in nuclear weapons - and would contradict more than 20 years of U.S. nuclear non-proliferation policy. 4

Full Name (please print) Address Signature (written)

1._____
2._____
3._____
4._____
5._____
6._____
7._____
8._____
9._____
10._____
11._____
12._____

Send completed petitions to: CAP, Citizens For a Healthy Planet, P.O. Box 335, Emmett, Mi. 48022

1 MOX Approach

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

The transportation of surplus plutonium through the Great Lakes Region is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. The transportation analyses in the Parallex EA indicate that no serious health effects would occur due to the transport of MOX fuel. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system as described in Appendix L.3.2. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material.

2 Human Health Risk

The small radiological release quantities expected from each of the proposed surplus plutonium disposition facilities are presented in the Source Term Data sections of Appendix J. The Atomic Energy Act of 1954

authorizes DOE to establish standards to protect health and minimize dangers to life. Radiation protection standards are based on controlling radioactive releases to ALARA levels in recognition of the potential risk of radiation exposure. The small cancer risks presented in this SPD EIS are a direct result of the small quantities of material (plutonium, etc.) expected to be released from the facilities. Calculation of these cancer risks is based on methodologies presented in the accredited National Research Council's publication *Health Effects of Exposure to Low Levels of Ionizing Radiation BEIR V* (1990). As is shown in the radiological impact tables in Chapter 4 of Volume I, the cancer risk (associated with the estimated plutonium releases) to members of the public is well below one, thus demonstrating that the quantity of plutonium released would not be close to the amount associated with causing a fatality.

3 Repositories

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

4 Nonproliferation

The DOE contract under which DCS would provide MOX fuel fabrication and irradiation services has very specific provisions that would not allow foreign corporations or governments to have control over the surplus plutonium or have the ability to access any sensitive U.S. technology information. Prior to awarding the contract, a National Interest Determination and a Foreign Ownership Control and Influence Determination were made to ensure that there would be, among other things, no breach of nonproliferation policy.

PETITION EXPRESSING SUPPORT FOR SITING THE PIT DISASSEMBLY AND CONVERSION FACILITY AT THE PANTEX PLANT
PAGE 1 OF 1

PETITION

We, the undersigned, believe it is in the best interests of our country and the Department of Energy, to site the Pit Disassembly and Conversion Facility at the Pantex Plant in Amarillo, Texas. 1

1 **Alternatives**

DOE acknowledges the commentor's support for siting the pit conversion facility at Pantex. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

PROTECT the Mission at Pantex!

An accident at the proposed Pit Disassembly and Conversion Facility (PDCF) could contaminate and close the nuclear weapon disassembly and pit storage missions at Pantex. We petition President Bill Clinton and the Department of Energy not to risk the much more important weapon disassembly mission. Please do not site the PDCF at Pantex. 1

Name	Address	City/ZIP

Original: Copy sent to President Clinton

1 **Facility Accidents**

DOE acknowledges the commentor's opposition to siting the pit conversion facility at Pantex. The accident risks associated with constructing and operating the pit conversion facility at Pantex are described in the Facility Accidents sections in Chapter 4 of Volume I and in Appendix K. The most severe design basis accidents were analyzed, and no LCFs in the general population would be expected to result. Decisions on the surplus plutonium disposition program at Pantex will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

Postcard Citing Savings From Consolidating All of DOE's Plutonium Disposition Missions at the Savannah River Site
Page 1 of 1

Dear Secretary Peña:

As I'm sure you know, a decision to consolidate all of DOE's plutonium disposition missions at the Savannah River Site would result in a near-term capital cost savings of over $500 Million and a total life cycle savings of about $1.6 Billion. 1

I and taxpayers throughout the nation will thank you for keeping our interests in mind when you make your plutonium decisions later this year.

Thank-You,

_____

Signature

_____

County of residence/affiliation

1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Because this comment relates directly to the cost analysis report, it has been forwarded to the cost analysis team for consideration. The *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, is available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

Postcard Citing Cost Savings and Support for Consolidating DOE's Plutonium Disposition Missions at the Savannah River Site
Page 1 of 1

Dear Mr. Secretary:

As you already know, consolidating the DOE's plutonium disposition missions at the Savannah River Site—pit disassembly and conversion, MOX fuel fabrication and immobilization—will save millions of dollars by reducing or eliminating operating costs of other DOE mission sites. 1

As a resident of the Central Savannah River Area, I can assure you that these missions are wanted and community support is strong.

Thank-You,

Signature

County of residence/affiliation

1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure.

Because cost issues are beyond the scope of this SPD EIS, this comment has been forwarded to the cost analysis team for consideration. The *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS and Washington, D.C.

Postcard Expressing Opposition to Plutonium Processing in the Texas Panhandle and Converting Military Plutonium for Use in Mixed Oxide Fuel
Page 1 of 1

☑	**YES!**	**Keep Texas Panhandle water, air, and soil safe from radioactive pollutants**	1
☑	**NO!**	**To any plutonium processing in the Texas Panhandle**	2
☑	**YES!**	**To minimal handling and processing of plutonium and other nuclear materials**	3
☑	**NO!**	**To converting military plutonium for use in mixed oxide (MOX) fuel**	4

Signed: _____

1 **Alternatives**

Sections 4.17, among others, and 4.26.3 describe the potential effects of the maximum impact alternative on air quality, water resources, and soil. These analyses indicate that the impacts of construction and normal operation of the pit conversion and MOX facilities on air, water, and soil at Pantex would likely be minor.

2 **Alternatives**

DOE acknowledges the commentor's opposition to the surplus plutonium disposition program at Pantex. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

3 **DOE Policy**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. DOE is committed to public and worker safety during the construction, operation, and deactivation of the proposed surplus plutonium disposition facilities, and would implement appropriate controls and procedures to ensure compliance with all applicable Federal, State, and local laws, rules, regulations, and requirements.

4 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Postcard Expressing Support for DOE's Plutonium Disposition Missions at the Savannah River Site and View That Excess Plutonium Can Be Converted into Mixed Oxide Fuel to Help Meet U.S. Electrical Energy Needs
Page 1 of 1

Dear Secretary Peña:

The Savannah River Site is ready to serve the nation in meeting its need to dispose of excess plutonium from nuclear weapons.

We know this plutonium can be converted into MOX fuel to help meet our electrical energy needs for years to come. We view plutonium as an important national resource not as a waste material, and we welcome DOE's plutonium disposition missions at the Savannah River Site. 1

We're prepared to do it all -- pit disassembly and conversion, MOX fuel fabrication and immobilization. We look forward to the opportunity to accomplish these missions at one of the safest and most proven facilities in the DOE complex.

Thank-You,

_____
Signature

_____
County of residence/affiliation

1 **Alternatives**

DOE acknowledges the commentor's support for siting the proposed surplus plutonium disposition facilities at SRS. As indicated in the revised Section 1.6, SRS is preferred for the proposed facilities because the site has extensive experience with plutonium processing, and these facilities complement existing missions and take advantage of existing infrastructure. Decisions on the surplus plutonium disposition program at SRS will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

US DOE needs to hear your voice NOW!

1. Should Clean Up be the sole mission at Hanford?
   Yes No

2. Should the United States Government maintain its longstanding policy against the use of weapons Plutonium to fuel civilian nuclear reactors?
   Yes No

3. Which alternative would you prefer to see the US Department of Energy pursue:
   Immobilization (encasement of plutonium in glass-like tombs)
   Or
   The MOX plan (burning plutonium to fabricate fuel for use in a civilian nuclear reactor)?

4. Should Plutonium, to be used for processing and fabrication of MOX fuel, be imported to the Hanford site along the Columbia River?
   Yes No

5. How concerned are you about the transportation of Plutonium through the Northwest?
   Not concerned slightly concerned very concerned completely opposed
   B. How concerned are you about the transport through the Northwest of fuel containing weapons Plutonium?
   Not concerned Slightly concerned Very concerned Completely opposed

6. Should commercial nuclear power plants be allowed to run on MOX fuel containing weapons Plutonium?
   Yes No
   B. Should they be subsidized with tax dollars to do so?
   Yes No

7. Should MOX fuel containing weapons Plutonium be used to restart the FFTF reactor at Hanford to produce Tritium for nuclear bombs?
   Yes No

Name_____
Address_____
Phone_____

Please return this to:
Hanford Action
25-6 NW 23rd Place #406
Portland, OR 97214
(503) 235-2531

1 DOE Policy

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

2 Nonproliferation

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program.

3 Alternatives

DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of

U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Under the hybrid approach, approximately 33 t (36 tons) of clean plutonium metal and oxides would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. DOE has determined that 17 t (19 tons) of the surplus plutonium would be immobilized due to the complexity, timing, and cost that would be involved in purifying those plutonium materials to make them suitable for use in MOX fuel. Therefore, fabricating all 50 t (55 tons) of surplus plutonium into MOX fuel is not considered a reasonable alternative at this time and is not analyzed; however, immobilizing all of the surplus plutonium is analyzed. Given the variability in purity of the surplus plutonium to be dispositioned, some of the plutonium currently considered for MOX fuel fabrication may also need to be immobilized. The incremental impacts that would be associated with a small shift in materials throughput are discussed in Section 4.30.

4 Transportation

The shipment of nuclear material (e.g., depleted uranium) using commercial carriers would be the subject of detailed transportation plans in which routes and specific processing locations would be discussed. These plans are coordinated with State, tribal, and local officials. The shipment of waste would be in accordance with the decisions reached on the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in this SPD EIS. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

5 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

6 **DOE Policy**

As discussed in Appendix D of the SPD Draft EIS, DOE did consider FFTF in the *Storage and Disposition PEIS*, but it was eliminated from further study because it was in a standby status and it could not satisfy the criterion of completing the disposition mission within 25 years using the historic FFTF plutonium enrichment specifications. In December 1998, the Secretary of Energy decided that FFTF would not play a role in producing tritium. As discussed in Section 1.7.4, Appendix D was deleted from the SPD Final EIS because none of the proposals to restart FFTF currently consider the use of surplus plutonium as a fuel source.

The U.S. Department of Energy needs to hear you voice NOW!
What do you think about a new era of nuclear proliferation?

Hanford Action of Oregon will forward this questionnaire to USDOE. Please circle your responses.

1. Should clean-up be the sole mission at Hanford?
   Yes No

2. Should the United States government maintain its longstanding policy opposing the use of weapons plutonium to fuel civilian nuclear reactors?
   Yes No

3. Should commercial nuclear reactors be allowed to run on MOX fuel containing weapons-grade plutonium?
   Yes No

3a. Should they be subsidized with tax dollars to do so?
   Yes No

4. Which alternative would you prefer to see the U.S. Department of Energy pursue:
   Immobilization (encasement of plutonium in glass logs or in cannisters for entombment)
   OR
   The MOX plan (processing plutonium into fuel for use in civilian nuclear reactors).

5. How concerned are you about the transportation of plutonium through the Northwest to Hanford?
   Not concerned Slightly Concerned Very Concerned Completely opposed

6. How concerned are you about transporting plutonium MOX fuel through the Northwest to Hanford?
   Not concerned Slightly Concerned Very Concerned Completely opposed

7. Should MOX fuel be used to restart the Fast Flux Text Facility (FFTF), a risky liquid-metal reactor at Hanford, to produce tritium for nuclear bombs?
   Yes No

Name _____

Address _____

Phone _____ e-mail _____

Please return to Hanford Action of Oregon by September 10, 1998.

Hanford Action of Oregon
25-6 NW 23rd Pl. #406 tel: (503) 235-2924 fax: (503) 736-0097 e-mail: hannie@aol.com

1 DOE Policy

DOE believes that Hanford's efforts should remain focused on its current high-priority cleanup mission. The importance of cleanup at Hanford was taken into consideration in identifying preferred sites for surplus plutonium disposition activities. However, no decision has been made, and DOE will continue to consider Hanford for surplus plutonium disposition or other programs that are compatible with the Hanford mission.

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Chapter 4
Comment Documents and Responses on the *Supplement*

This chapter presents scanned images or transcriptions of all oral or written comments submitted to DOE on the *Supplement*, with the DOE responses. In most instances, the response appears on the same page as the corresponding comment. Where many comments appear on a single page, however, the responses may extend to succeeding pages. The comments and responses are presented in the following order:

- Comments from Federal agencies.
- Comments from special interest groups and organizations from foreign countries. The comments are integrated alphabetically by country.
- Comments from State and local officials and agencies, special interest groups, organizations, companies, and individuals. The comments are integrated alphabetically by State.
- Oral comments recorded at the Washington, D.C. public hearing.
- Campaign statement of 126 nongovernmental organizations.

UNITED STATES DEPARTMENT OF THE INTERIOR
WILLIE R. TAYLOR, WASHINGTON, D.C.
PAGE 1 OF 1

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

ER 99/428

JUN 23 1999

Laura S. H. Holgate
Director
Office of Fissile Materials Disposition
U. S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

Dear Ms. Holgate:

The United States Department of the Interior has reviewed the supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement (EIS) and offers the following comments.

The proposal would include use of MOX fuel at existing reactors, with no new construction and no significant change in emissions. Accident risks and containment measures are described in the document; the associated risks to ecological systems would probably be similarly low as those described for humans. Since the use of MOX fuel in existing reactors would not be expected to result in any impacts to ecological resources, including listed species, we would concur with a "no effect" determination. 1

Thank you for the opportunity to review the draft EIS.

Sincerely,

Willie R. Taylor
Director
Office of Environmental Policy
and Compliance

MR015

MR015–1 **MOX Approach**

DOE acknowledges the Department of Interior's agreement that the use of MOX fuel in existing, commercial reactors would have "no effect" on ecological resources.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RICHARD E. SANDERSON, WASHINGTON, D.C.
PAGE 1 OF 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

JUL 2 1999

Ms. Laura H. Holgate
Director
Office of Fissile Materials
Disposition
U.S. Department of Energy
P. O. Box 23786
Washington, D.C. 20026-3786

Re: Surplus Plutonium Disposition Supplement

Dear Ms. Holgate:

In accordance with the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) and Section 309 of the Clean Air Act, the Environmental Protection Agency (EPA) has reviewed the Department of Energy Surplus Plutonium Disposition Supplement to the Draft Environmental Impact Statement (SEIS). The SEIS provides the preferred sites for the pit disassembly and plutonium conversion facility; the lead assembly fabrication; the immobilization facility; the mixed oxide fuel facility (MOX); and post-irradiation examination. Also included in this SEIS is a synopsis of DOE's environmental critique of the data submitted by the contractor. EPA commends DOE for providing this additional information. However, the issues addressed in our September 16, 1998 letter on the DEIS are not addressed and therefore remain the same. 1

We appreciate the opportunity to comment on the proposed project. If you have any questions please contact me (564-2400) or Marguerite Duffy (564-7148).

Sincerely,

Richard E. Sanderson
Director
Office of Federal Activities

Internet Address (URL) • http://www.epa.gov
Recycled/Recyclable • Printed with Vegetable Oil Based Inks on Recycled Paper (Minimum 20% Postconsumer)

MR026

MR026–1 **General SPD EIS and NEPA Process**

Issues raised in EPA's previous letter are addressed in Volume III, Chapter 3.

CAMPAIGN FOR NUCLEAR PHASEOUT
KRISTEN OSTLING
PAGE 1 OF 3

Campaign for Nuclear Phaseout / Campagne contre l'expansion du nucléaire
412-1 rue Nicholas St., Ottawa, Ontario K1N 7B7 Tel: (613) 789-3634 Fax: (613) 241-2292 cnp@web.net

June 28, 1999

U.S. Department of Energy
Office of Fissile Material Disposition
c/o Supplement to SPD EIS
P.O. Box 23786
Washington, DC 20026-3786

To the Office of Fissile Material Disposition:

The enclosed documentation and remarks contained herein are submitted in connection with the Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement.

I am writing on behalf of the Campaign for Nuclear Phaseout (CNP), a coalition of Canadian environmental groups concerned with the environmental, economic and strategic impacts of nuclear technology and nuclear power generation. Over 300 organizations representing a diverse cross-section of Canadians have endorsed the Campaign for Nuclear Phaseout. Supporting organizations and individuals reside in every province and territory in Canada.

CNP has a number of concerns related to the plan to import plutonium from American weapons stockpiles into Canada for the purposes of a "test-burn" at Chalk River Laboratories. For the reasons outlined below, it is our position that shipments of MOX fuel to Canada (for the purpose of a test burn or for other reasons) should not be approved. To date, no public consultations have been held in Canada. Additionally, the Government of Canada has not provided a clear explanation of the issues surrounding this project nor has reliable information about the project been made available.

Moreover, the crown corporation, Atomic Energy of Canada Limited (a principle proponent) has frequently provided misinformation on the project. For example, a spokesperson designated to speak on AECL's behalf has stated on numerous occasions (over a period of several months) that the fresh MOX fuel will not contain weapons usable material. This misinformation has gone uncorrected by the Government of Canada. 1

According to the 1997 DoE Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment, "environmental assessment of activities conducted in Canada would be the responsibility of the Canadian government" Repeated requests for such an assessment have gone unanswered by the Government of Canada.

There are also significant cost issues associated with the MOX plan in Canada. The four Bruce "A" reactors, which have been identified by AECL as the reactors which would eventually use MOX fuel are at present non-operational and their refurbishment will require a large capital investment. There has been no indication as to how repairs will be financed.

Concerns in Canada have grown over the MOX fuel plan and the and the Government of Canada's handling of the test burn issue.

/...2

MR017

MR017–1 **Parallex EA**

DOE acknowledges the commentor's concerns regarding the importation of U.S. weapons-usable plutonium into Canada for the purposes of a "test-burn" at Chalk River Laboratories. Shipments of a small quantity of MOX fuel from LANL to Canada are part of a separate proposed action, the Parallex Project; therefore, they are beyond the scope of the proposed action analyzed in this SPD EIS. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com. As indicated in Section 1.1, while the United States is participating in the Parallex Project, it is not actively pursuing the CANDU option as part of its plutonium disposition program. If Russia and Canada agree to disposition Russian surplus plutonium in CANDU reactors in order to augment Russia's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

DOE acknowledges the attachment of various documents concerning MOX fuel use in Canada.

CAMPAIGN FOR NUCLEAR PHASEOUT
KRISTEN OSTLING
PAGE 2 OF 3

In October 1996, a private seminar on the plan to use MOX fuel in Canadian civilian reactors was organized by a University of Toronto professor at the request of the Department of Foreign Affairs and others. The seminar included representatives from the Government of Canada who presented the case for MOX imports. It led to the production of a 1997 report and recommendation from Professor Franklyn Griffiths that the project be "consigned to oblivion" because it is "fundamentally flawed".

In December 1998, a Committee of the House of Commons (Standing Committee on Foreign Affairs and International Trade) consisting of members from all parties, including the governing party, recommended that the project be canceled on the grounds that "this option is totally unfeasible". The Government of Canada's subsequent rejection of this recommendation failed to address key issues put forward by intervenors at hearings held by the Committee.

In late March 1999, the Mayor of Sarnia, Ontario (a possible transit point for U.S. MOX shipments destined for Chalk River) expressed concern over the "veil of secrecy" around the project and lack of public consultation by the federal government.

In April 1999, the International Association of Firefighters called for a moratorium on plutonium fuel imports because of uncertainty as to whether their members would be able to handle an accident involving plutonium. Longshore workers at the port of Halifax (a possible entry point for Russian MOX fuel) also expressed concern about how the MOX shipments would be handled in Canada. 1

In May 1999, mayors of the Great Lakes and Saint Lawrence region passed a joint resolution calling on the governments of Canada and the United States to stop the weapons plutonium fuel plan.

A Presidential Executive Order requires the Department of Energy to implement the principles of environmental justice in its review process (Section 3.6 of the Parallex Environmental Assessment). The Parallex Environmental Assessment noted that the DoE was in the process of finalizing procedures for the implementation of the Executive Order.

In a September 17, 1997 letter to the DoE written in connection with the Parallex EA, CNP noted that while there is no stated requirement for a similar analysis of political impacts outside its borders, the United States has a moral obligation to consider the negative impacts of its actions on countries that it claims as allies. This should particularly be the case when the activities which follow from approval of the Parallex assessment will fundamentally change Canada's status with respect to nuclear weapons materials on its soil.

Despite the lack of formal public consultations, there is growing opposition to the MOX fuel importation plan in Canada. MOX fuel shipments to Canada should not go forward. Canadians have not been consulted on the fundamental policy question as to whether they want their country to become a recipient of weapons plutonium.

Thank you for your attention to this matter.

Sincerely,

Kristen Ostling
National Coordinator

encl.

MR017

List of enclosures

1. Newspaper clippings on the importation of MOX fuel into Canada

2. Allison Macfarlane & Adam Bernstein, "Canning plutonium: Cheaper and Faster", Bulletin of the Atomic Scientists, May-June 1999.

3. Excerpts from House on Commons, Parliament of Canada, Question Period dealing with the issue of MOX fuel imports.

4. Excerpt from Nova Scotia Legislature (Canada), April 7, 1999 regarding Russian MOX fuel to be shipped through Halifax Harbour.

5. Excerpt from *Canada and the Nuclear Challenge: Reducing the Political Value of Nuclear Weapons for the Twenty First Century*, Report if the Standing Committee on Foreign Affairs and International Trade, December 1998.

6. Franklyn Griffiths, "MOX Experience: The Disposition of Excess Russian and U.S. Weapons Plutonium in Canada", July 1997.

7. "Plutonium Shipments and Burning in the Great Lakes Region", Resolution passed at the International Great Lakes and St. Lawrence Mayors' Conference, May 21, 1999.

8. "Plutonium Shipments Risk Public Safety, Fire Fighters say", International Association of Fire Fighters, Media release, April 26, 1999.

9. "Background information on the weapons usability of MOX fuel: A comparison of claims made by AECL and other sources regarding the weapons usability of MOX fuel", produced by the Campaign for Nuclear Phaseout, June 1999

10. "Ten reasons to just say no to weapons plutonium fuel", produced by the Canadian Coalition for Nuclear Responsibility and the Campaign for Nuclear Phaseout, May 1999

11. "Pressure Intensifies on Government to Halt Plutonium Plan", Campaign for Nuclear Phaseout, Media Release, May 17, 1999.

12. "Environment Groups Slam Government for Pushing Plutonium Imports Under Guise of Disarmament", Campaign for Nuclear Phaseout, Media release, April 22, 1999.

MD017

ESDRC, University of New Brunswick
Jessie Davies
Page 1 of 2

I strongly oppose the importation of MOX fuel into Canada. I support this with the following reasons. Yours truly,
Jessie Davies

1) The shipment of MOX fuel should not be approved without adequate consultation of the Canadian population; to date, there has been none.

2) According to the Pre-Decisional Environmental Assessment from Los Alamos (Sept '97), "environmental assessment of activities conducted in Canada would be the responsibility of the Canadian government"; repeated requests for such an assessment have been refused by the government.

3) The Government of Canada has not provided the public with any reliable documentation containing solid information or even a clear explanation of the issues surrounding this project. 1

4) Atomic Energy Canada Limited (the proponent) has frequently given out misinformation on the project; for example, AECL's designated spokesman Larry Shewchuk has stated on numerous occasions (over a period of seven months) that the fresh MOX fuel will not contain weapons usable material. This misinformation has gone uncorrected by the Canadian government.

5) In October 1996, a private two-day seminar was organized by Professor Franklyn Griffiths at the urging of AECL and the Government of Canada. It led to a recommendation from Professor Griffiths that the project be "consigned to oblivion" because it is "fundamentally flawed."

WR006

WR006–1 **Parallex EA**

DOE acknowledges the commentor's opposition to the importation of MOX fuel into Canada. Shipments of a small quantity of MOX fuel from LANL to Canada are part of a separate proposed action, the Parallex Project; therefore, they are beyond the scope of the proposed action analyzed in this SPD EIS. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

6) In December 1998, an all party Committee of the House of Commons unanimously recommended that the project be cancelled; the Government of Canada rejected this recommendation without debate or discussion.

7) In April 1999, the International Association of Firefighters called for a moratorium on plutonium fuel imports because of uncertainty as to whether their members would be able to handle an accident involving plutonium.

8) A joint resolution was passed in May 1999 by mayors of the Great Lakes and Saint Lawrence region calling on the government of Canada and the United States to stop the weapons plutonium fuel plan.

9) All 4 Bruce "A" reactors (named by AECL as the reactors of choice to burn MOX eventually) are shut down and will require large investments of capital to repair – capital which the debt-ridden Ontario utility does not have at its disposal.

1

WR006

SIERRA CLUB OF CANADA
ELIZABETH MAY
PAGE 1 OF 11

Sierra Club of Canada

(Please Note: this letter and the materials which follow were faxed over several days without success to a number provided by the DoE in Washington, (202-488-3158))

June 25, 1999

U.S. Department of Energy
Office of Fissile Material Disposition
c/o Supplement to SPD EIS
P.O. Box 23786
Washington, DC 20026-3786

via fax: 202-596-2710 (11 pages)
cc. 202-488-4802 Att. Lynn Dean

To the Office of Fissile Material Disposition:

I am writing in connection with the Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement. We ask that the material included in this correspondence be made part of the Supplemental Pu Disposition EIS record. The Sierra Club of Canada is opposed to the planned test burn of American and Russian MOX fuel at Chalk River Laboratories in Canada. Our concerns, which include failure of the Government of Canada to consult the Canadian public and to undertake public assessment of environmental and social impacts have led us to conclude that shipments of MOX fuel to Canada should not proceed.

According to the 1997 Department of Energy Environmental Assessment for Parallex Project Fuel Manufacture and Shipment, "environmental assessment of activities conducted in Canada would be the responsibility of the Canadian government". As the attached correspondence indicates, the Sierra Club is in the process of attempting to determine whether the Government of Canada plans to undertake an environmental assessment and related measures. To date the government has failed to undertake such an assessment.

However, opposition to the MOX fuel project in Canada amongst those outside the nuclear industry who have examined the proposal is widespread. It includes the Committee of the House of Commons charged with reviewing Canada's nuclear weapons and non-proliferation policy (Standing Committee on Foreign Affairs and International Trade, SCFAIT). The Committee, consisting of members from all parties in the Canadian parliament, including the government party, recommended that the Canadian government not proceed with the plan to burn MOX fuel. The Government of Canada's subsequent rejection of this recommendation failed to address key issues underlying the Committee's conclusion. 1

An Executive Order of the President of the United States requires the Department of Energy to implement principles of environmental justice in its review process (Section 3.6 of the Parallex Environmental Assessment). While the United States does not have jurisdictional responsibility with respect to undertaking an environmental assessment in Canada, it does have an international obligation to consider whether principles of environmental justice are being consistently applied on its projects. I would suggest that this is particularly the case when the only formal review of the project to date in Canada (SCFAIT) recommended against continuance of the project's Canadian component.

Sincerely,

Elizabeth May
Executive Director

412-1 rue Nicholas St., Ottawa, Ontario K1N 7B7 Tél : (613) 241-4611 Fax / tc : (613) 241-2292 sierra@web.net

FR015

FR015–1 **Parallex EA**

DOE acknowledges the commentor's opposition to the test burn of U.S. and Russian MOX fuel at Chalk River Laboratories. Shipments of a small quantity of U.S. MOX fuel from LANL to Canada are part of a separate proposed action, the Parallex Project; therefore, they are beyond the scope of the proposed action analyzed in this SPD EIS. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

DOE acknowledges the attachments with questions to various Canadian officials.

Sierra Club of/du Canada

412-1 rue Nicholas St., Ottawa, Ontario K1N 7B7
Tél : (613) 241-9611 Fax / tc : (613) 241-2292

Concerned Citizens of Renfrew County and Area
P.O. Box 981, Pembroke, Ontario K8A 7M5
Tel.: (613) 735-4876 Fax: (613) 735-6444

June 16, 1999

The Honourable Christine Stewart
Minister of the Environment
Terrasses de la Chaudière
10 Wellington Street, 28th floor
Hull, Quebec
K1A 0H3

COPY

Dear ~~Mr.~~ Christine Stewart:

It has been reported that preparations are underway for the United States and Russia to transport MOX fuel (mixed oxide fuel from weapons usable plutonium) to Canada. The preparations arise out of work done in connection with the Parallex Project which involves the testing of MOX fuel in a nuclear reactor located at Chalk River Laboratories in Chalk River, Ontario.

Shipment of MOX fuel from the U.S. into Canada for the purposes of testing (a "test burn") at Chalk River Laboratories is reportedly imminent. It is understood that preparations are also underway to import MOX plutonium into Canada from Russia.

As you are aware, the importation of MOX fuel into Canada for use in Canadian reactors is a matter of considerable public interest. It is of particular interest to people in Canadian communities through which MOX fuel might be transported. Accordingly, we are seeking replies to the following questions:

1. The Minister of Transport stated in the House of Commons on April 26, 1999 that it is up to Transport Canada under the Transportation of Dangerous Goods Act to approve the transportation of plutonium fuel. Will Transport Canada or another agent of the Government of Canada issue (or have they issued) a permit in connection with the pending or current transport of MOX fuel into Canada?

2. How many shipments of MOX fuel from the United States into Canada will take place for the purposes of testing at Chalk River Laboratories?

3. How many shipments of MOX fuel from Russia into Canada will take place for the purposes of testing at Chalk River Laboratories?

4. Which port or ports of entry into Canada will MOX fuel be transported through? On what dates will MOX fuel be transported in Canada?

(continued)

FR015

(continued from page 1)

5. Is any department or agency of the Government of Canada providing a subsidy, loan or other form of financial assistance to support the testing?

6. Have the shipping packages to be used as part of the Parallex tests (Model 4H Enriched Fuel Bundle Shipping Package, TNB-0145 Shipping Package or other) been subject to Canadian testing and environmental assessment in connection with the transport of MOX fuel into and through Canada?

7. Has a shipping certificate or other certificate been issued by Transport Canada or another agent of the Government of Canada in connection with the importation into Canada of MOX fuel, for the purposes of a test in a nuclear reactor at Chalk River Laboratories?

8. Has an emergency response plan been submitted in connection with the transport of MOX fuel in Canada?

9. Will an environmental assessment be undertaken in connection with activities related to the Parallex Project or any related ongoing project conducted within Canada, including the transportation of MOX fuel for the purposes of testing at Chalk River Laboratories? What measures are in place to ensure that the safety of Canadians and the environment of Canada are protected?

Your cooperation in ensuring that these questions are addressed in an open and publicly accountable fashion would be appreciated.

Sincerely,

Ole Hendrickson
Researcher
Concerned Citizens of Renfrew County and Area

COPY

Elizabeth May
Executive Director
Sierra Club of Canada

FR015

Sierra Club of/du Canada

412-1 rue Nicholas St., Ottawa, Ontario K1N 7B7
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Concerned Citizens of Renfrew County and Area
P.O. Box 981, Pembroke, Ontario K8A 7M5
Tel.: (613) 735-4876 Fax: (613) 735-5444

June 16, 1999

The Honourable Lloyd Axworthy
Minister of Foreign Affairs
Lester B. Pearson Building
A-10, 125 Sussex Drive
Ottawa, Ontario
K1A 0G2

COPY

Dear Mr. Axworthy:

It has been reported that preparations are underway for the United States and Russia to transport MOX fuel (mixed oxide fuel from weapons usable plutonium) to Canada. The preparations arise out of work done in connection with the Parallex Project which involves the testing of MOX fuel in a nuclear reactor located at Chalk River Laboratories in Chalk River, Ontario.

Shipment of MOX fuel from the U.S. into Canada for the purposes of testing (a "test burn") at Chalk River Laboratories is reportedly imminent. It is understood that preparations are also underway to import MOX plutonium into Canada from Russia.

As you are aware, the importation of MOX fuel into Canada for use in Canadian reactors is a matter of considerable public interest. It is of particular interest to people in Canadian communities through which MOX fuel might be transported. Accordingly, we are seeking replies to the following questions:

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4. Which port or ports of entry into Canada will MOX fuel be transported through? On what dates will MOX fuel be transported in Canada?

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FR015

SIERRA CLUB OF CANADA
ELIZABETH MAY
PAGE 5 OF 11

(continued from page 1)

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Your cooperation in ensuring that these questions are addressed in an open and publicly accountable fashion would be appreciated.

Sincerely,

Ole Hendrickson
Researcher
Concerned Citizens of Renfrew County and Area

COPY

Elizabeth May
Executive Director
Sierra Club of Canada

Page 2 of 2

FR015

Sierra Club of/du Canada

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Concerned Citizens of Renfrew County and Area
P.O. Box 981, Pembroke, Ontario K8A 7M5
Tel.: (613) 735-4876 Fax: (613) 735-6444

June 16, 1999

Dr. Agnes Bishop
President
Atomic Energy Control Board
280 Slater Street, 4th floor
Ottawa, Ontario
K1A 0S4

COPY

Dear Dr. Bishop:

It has been reported that preparations are underway for the United States and Russia to transport MOX fuel (mixed oxide fuel from weapons usable plutonium) to Canada. The preparations arise out of work done in connection with the Parallex Project which involves the testing of MOX fuel in a nuclear reactor located at Chalk River Laboratories in Chalk River, Ontario.

Shipment of MOX fuel from the U.S. into Canada for the purposes of testing (a "test burn") at Chalk River Laboratories is reportedly imminent. It is understood that preparations are also underway to import MOX plutonium into Canada from Russia.

As you are aware, the importation of MOX fuel into Canada for use in Canadian reactors is a matter of considerable public interest. It is of particular interest to people in Canadian communities through which MOX fuel might be transported. Accordingly, we are seeking replies to the following questions:

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FR015

SIERRA CLUB OF CANADA
ELIZABETH MAY
PAGE 7 OF 11

(continued from page 1)

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Your cooperation in ensuring that these questions are addressed in an open and publicly accountable fashion would be appreciated.

Sincerely,

Ole Hendrickson
Researcher
Concerned Citizens of Renfrew County and Area

COPY

Elizabeth May
Executive Director
Sierra Club of Canada

FR015

Sierra Club of/du Canada

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Concerned Citizens of Renfrew County and Area
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Tel.: (613) 735-4675 Fax: (613) 735-6444

June 16, 1999

COPY

The Honourable David Collenette
Minister of Transport
Place de Ville, Tower C
29th floor, 330 Sparks Street
Ottawa, Ontario
K1A 0N5

Dear Mr. Collenette:

It has been reported that preparations are underway for the United States and Russia to transport MOX fuel (mixed oxide fuel from weapons usable plutonium) to Canada. The preparations arise out of work done in connection with the Parallex Project which involves the testing of MOX fuel in a nuclear reactor located at Chalk River Laboratories in Chalk River, Ontario.

Shipment of MOX fuel from the U.S. into Canada for the purposes of testing (a "test burn") at Chalk River Laboratories is reportedly imminent. It is understood that preparations are also underway to import MOX plutonium into Canada from Russia.

As you are aware, the importation of MOX fuel into Canada for use in Canadian reactors is a matter of considerable public interest. It is of particular interest to people in Canadian communities through which MOX fuel might be transported. Accordingly, we are seeking replies to the following questions:

1. The Minister of Transport stated in the House of Commons on April 26, 1999 that it is up to Transport Canada under the Transportation of Dangerous Goods Act to approve the transportation of plutonium fuel. Will Transport Canada or another agent of the Government of Canada issue (or have they issued) a permit in connection with the pending or current transport of MOX fuel into Canada?

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FR015

SIERRA CLUB OF CANADA
ELIZABETH MAY
PAGE 9 OF 11

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Your cooperation in ensuring that these questions are addressed in an open and publicly accountable fashion would be appreciated.

Sincerely,

Ole Hendrickson
Researcher
Concerned Citizens of Renfrew County and Area

Elizabeth May
Executive Director
Sierra Club of Canada

COP

Page 2 of 2

FR015

Sierra Club of/du Canada

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P.O. Box 981, Pembroke, Ontario K8A 7M5
Tel.: (613) 735-4876 Fax: (613) 736-6444

COPY

June 16, 1999

The Honourable Ralph Goodale
Minister of Natural Resources
Sir William Logan Building
21st Floor, 580 Booth Street
Ottawa, Ontario
K1A 0E4

Dear Mr. Goodale:

It has been reported that preparations are underway for the United States and Russia to transport MOX fuel (mixed oxide fuel from weapons usable plutonium) to Canada. The preparations arise out of work done in connection with the Parallex Project which involves the testing of MOX fuel in a nuclear reactor located at Chalk River Laboratories in Chalk River, Ontario.

Shipment of MOX fuel from the U.S. into Canada for the purposes of testing (a "test burn") at Chalk River Laboratories is reportedly imminent. It is understood that preparations are also underway to import MOX plutonium into Canada from Russia.

As you are aware, the importation of MOX fuel into Canada for use in Canadian reactors is a matter of considerable public interest. It is of particular interest to people in Canadian communities through which MOX fuel might be transported. Accordingly, we are seeking replies to the following questions:

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FR015

SIERRA CLUB OF CANADA
ELIZABETH MAY
PAGE 11 OF 11

(continued from page 1)

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Your cooperation in ensuring that these questions are addressed in an open and publicly accountable fashion would be appreciated.

Sincerely,

Ole Hendrickson
Researcher
Concerned Citizens of Renfrew County and Area

COPY

Elizabeth May
Executive Director
Sierra Club of Canada

Page 2 of 2

FR015

SOCIETY PROMOTING ENVIRONMENTAL CONSERVATION
NORMAN ABBEY
PAGE 1 OF 2

spec Society Promoting Environmental Conservation
2150 Maple St., Vancouver, BC V6J 3T3
Phone: (604) 736-7732; Fax: (604) 736-7115
E-Mail: enviro@spec.bc.ca

SINCE 1969 ENVIRONMENTAL ADVOCACY, EDUCATION, AND CONSERVATION

June 26, 1999

U.S. Department of Energy
Office of Fissile Material Disposition
P.O. Box 23786
Washington, DC 20026-3786

VIA FAX: (202)488-3158

Dear Sir/Madame,

Re: "Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement"

The Society Promoting Environmental Conservation requests that you not approve MOX fuel shipments to Canada. Canadians don't want it and have made the reasons crystal clear to our Government.

In fact an all-party House of Commons Committee that studied this issue recommended unanimously on Dec. 10 1998 that the project was "totally unfeasible." It is unfortunate that our government simply overruled that recommendation without debate, and plans to proceed regardless. The disastrous economic and safety record of the CANDU reactors in which they intend to 'burn' this fuel is further cause for concern.

Environmental assessment of these activities in Canada (as required by the Pre-Decisional Environmental Assessment from Los Alamos, in September, 1997) has not been done, nor has the Canadian government provided reliable information to the public or even explained the issues. On the contrary, government agencies such as AECL have deliberately disseminated misinformation - such as that fresh MOX fuel will not contain weapons usable material. The International Association of Firefighters doubt their ability to handle an accident involving plutonium MOX, and have called for a moratorium. Municipal governments have likewise asked that the project be scrapped. We agree. 1

Attached is a news release on this issue published in 1998 in Vancouver, by a number of local, national and international groups.

Sincerely,

Norman Abbey
SPEC - Nuclear issues

Enclosed: News Release - "Keep Plutonium Out of Canada" (March 13, 1998)

FR010

FR010–1 **Parallex EA**

DOE acknowledges the commentor's opposition to MOX fuel shipments to Canada. Shipments of a small quantity of MOX fuel from LANL to Canada are part of a separate proposed action, the Parallex Project; therefore, they are beyond the scope of the proposed action analyzed in this SPD EIS. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

DOE acknowledges the attachment of a news release expressing opposition to importing MOX fuel.

SOCIETY PROMOTING ENVIRONMENTAL CONSERVATION
NORMAN ABBEY
PAGE 2 OF 2

Nanoose Conversion Campaign

2150 Maple Street, Vancouver, BC, Canada, V6J 3T3 (604)739-0432 Tel/Fax e-mail: convert@alternatives.com

For release March 13, 1998

KEEP PLUTONIUM OUT OF CANADA

VANCOUVER - "Don't bring nuclear weapons plutonium into Canada!" say BC groups participating in the launch of a global NIX-MOX campaign. They want to stop Ottawa from importing plutonium mixed oxide (MOX) as an experimental fuel for Ontario Hydro's accident plagued Candu reactors. Plutonium is a nuclear bomb ingredient, and one of the most dangerous carcinogens on the planet.

The Women's International League for Peace and Freedom (WILPF-BC), the Nanoose Conversion Campaign (NCC), Veterans Against Nuclear Arms (VANA), and the Canadian Voice of Women for Peace (VOW-BC) will sponsor a plutonium "information vigil" at noon on Mon., Mar. 16 at Robson Square in downtown Vancouver.

Simultaneous news conferences are planned in Ottawa and around the world. Candu reactor exports to Turkey are also being opposed at a seperate Mar. 16 news conference in Istanbul.

Prime Minister Jean Chretien intends to begin importing MOX this spring from nuclear weapons labs in Los Alamos, New Mexico. Parliament, however, has yet to debate the matter.

"If it enters Canada, it will never leave", says NCC director Norman Abbey. "Thousands of years from now Canadians may wonder why Chretien couldn't have simply waited a few weeks: until the all-party committee reviewing nuclear policy (including MOX) had completed its report. Pre-empting the process and avoiding debate casts real doubt on the sincerity of this government's very laudable invitation for Canadians to 'comment' on nuclear issues." 1

The Vancouver vigil organizers advocate proven safe-energy alternatives that don't contribute to nuclear proliferation, and they will distribute a "Nuclear Map of Canada" documenting Canada's extensive participation in the nuclear fuel chain - from Ontario's Chalk River Labs to the Nanoose Bay test range for nuclear submarines in BC.

WILPF, with SECTIONS in 45 countries, was founded at the Hague in 1915. VANA was founded in 1982 during the most dangerous years of the cold war, and the Nanoose Conversion Campaign was formed in 1984 to convert the nuclear submarine facility at Nanoose Bay to peaceful uses.

- 30 -

More information:

NCC: Norman Abbey, 604-351-1416
WILPF-BC: Silvia McFadyen-Jones, 604-536-3047 or Carolyn Kline, 604-731-4585
VANA: David Morgan, 604-985-7147
Campaign for Nuclear Phaseout: Kristen Ostling, 613-789-3634
Nuclear Map of Canada: http://ccnr.org/atomic map

FR010

CENTER FOR HUMAN ECOLOGY
KATHLEEN SULLIVAN
PAGE 1 OF 2

Hello this is Dr. Kathleen Sullivan phoning from the Center for Human Ecology in Edinburgh, Scotland. I am calling to lodge my complaint against the U.S. DOE's present disposition plans for plutonium. The use of weapons grade plutonium in commercial nuclear reactors, otherwise known as MOX fuel, will involve all of the risks inherent to the nuclear industry, transportation risks, contamination risks, social risks that would cause certain affected communities, impoverished and ethnic communities, to be feeling more of a punch than the white privileged communities of America. 1

We understand here that the DOE has recently signed a contract with COGEMA and Duke Engineering & Services and Stone & Webster and they are now doing an analysis of producing MOX fuel which is presently, as I understand it, going through an ESI, EIS that is, and that in this proposal they would advocate preparing plutonium for MOX in South Carolina, North Carolina and Virginia. I also understand that the DOE has never held a hearing near any of the potential reactor sites which would use MOX fuel. 2

I would like to state my absolute condemnation against the program of MOX which would continue to advocate a plutonium economy in a world that is already saturated with fissile materials. The production of MOX is a crazy idea and it is no solution at all. Again this is Dr. Kathleen Sullivan phoning from the Center for Human Ecology in Edinburgh. Although I am living in the U.K., I am a U.S. citizen and my U.S. home in Boulder, Colorado, close to Rocky Flats which will be affected by any MOX fuel plan for the U.S. I can be reached at 44-131-624-1975. My address is Center for Human Ecology, P.O. Box 1972, Edinburgh, EH 12QL, Scotland. Thank you very much. 3

PR003

PR003–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Chapter 4 of Volume I provide the results of detailed impact analyses of the proposed surplus plutonium disposition facilities and reactors. Risks and consequences are addressed. The impacts on workers and the general population associated with normal operations and postulated accidents are included in these analyses. Included are the potential impacts on waste management, socioeconomics, and transportation. Chapter 4 also includes an analysis of the potential impacts on minority and low-income populations for each of the alternatives considered. Appendix M describes the process that was used to obtain these impacts and gives additional detail on the minority and low-income populations surrounding each of the candidate sites.

PR003–2 **General SPD EIS and NEPA Process**

In March 1999, DOE awarded a contract to a team known as DCS, which is comprised of Duke Engineering & Services, COGEMA Inc., and Stone & Webster to provide MOX fuel fabrication and irradiation services.

DOE acknowledges the commentor's concern regarding public hearings near the proposed reactor sites that would use the MOX fuel. During the public comment period on the *Supplement to the SPD Draft EIS*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Although DOE decided not to hold additional hearings on the *Supplement*, DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis,

DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina. Moreover, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be pursued per the SPD EIS ROD.

PR003–3 **DOE Policy**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to advocate a plutonium economy. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel) and therefore does not support building a plutonium economy.

EAST BAY PEACE ACTION
DALE NESBITT ET AL.
PAGE 1 OF 2

To: Mary Olson, NIRS
From; Dale Nesbitt, and associates from the S. F. Bay area
Statement of be presented on our behalf at the 6-15-99 DOE hearings on MOX fuels.

We the undersigned representing either organizations or ourselves hereby submit the following comments for the June 15, 1999 MOX hearings in Washington D C.

First we believe that holding only one hearing in Washington D C fundamentally violates the public's right to express its views on this vital issue. We demand that the DOE hold several additional hearings, near communities that may be effected. In addition, at least hearing should be held on the west coast. We suggest Oakland CA as a logical location. 1

Second, we believe that the U.S.-Russian governmental plan to use MOX fuel from surplus military plutonium in commercial nuclear reactors will prove disastrous. The MOX program poses unreasonable risks to public health and the environment, and seriously undermines U.S. nonproliferation goals. While less important than the above it also appears to be uneconomical. 2

Third, we understand that although the EIS process is not yet complete, a consortium including Cogema, Stone & Webster, Duke Power and Virginia Power has already been selected by the DOE to carry out the U.S. MOX program and was recently given a contract to begin design work on a MOX fabrication plant. We feel that this demonstrates a contemptible disregard for due process and also is questionable from a legal standpoint. 3

Signed by;
Dale Nesbitt & Elizebeth Brown for East Bay Peace Action, and as individuals.
Jacqueline Cabasso, Executive Director, Western States Legal Foundation, for the the organization & as an individual
Gene Bernardi, for the Committee to minimize Toxic Waste, and as an individual.
The following as individuals:
Frank McDonald
L. A. Wood
Gordon Wright
Nori Neiude

DCR011

DCR011–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentors' request for additional hearings near communities that may be affected by the use of MOX fuel in reactors. After careful consideration of its public involvement opportunities, including information availability and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be pursued per the SPD EIS ROD. Moreover, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public meeting held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be selected. DOE does not believe that a hearing in Oakland, California is necessary in part because all three of the proposed reactors are located in the Eastern United States. Public hearings on this SPD EIS have been held in the Western United States in or near many of the potentially affected communities including hearings in Idaho, Washington, and Oregon.

DCR011–2 **MOX Approach**

DOE acknowledges the commentors' opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity

for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Section 4.28 provides reactor-specific analyses and discusses the potential environmental impacts and risks associated with using a partial MOX core during routine operations and reactor accidents at the proposed reactors.

The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

The MOX approach is not intended to affect the viability of nuclear power generation at any particular reactor. DCS would not have to continue to use MOX fuel if it determined that it was uneconomical to operate the reactor.

DCR011–3 General SPD EIS and NEPA Process

DOE conducted its procurement process in accordance with DOE NEPA regulations, 10 CFR 1021.216. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. As stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are decided and announced in the SPD EIS ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before the ROD is issued, and options that would allow construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach.

ROCKY MOUNTAIN CONFERENCE, UNITED CHURCH OF CHRIST
ROBERT A. KINSEY
PAGE 1 OF 1

MOX fuel is a bad idea. It further extends the Nuclear Power industry which has no intelligent idea – nor does anyone, including the DOE – about responsible ways for dealing with the increased nuclear waste. I mean using it to make depleted uranium ordinance is about as irresponsible as you can get and yet you allow that. Using it to power space craft that could crash into the atmosphere is another example of irresponsibility. So employing weapons grade Plutonium to make electricity is encouraging the production of more waste. All you seem to be able to think about is underground storage and have ignored for years the suggestion of nuclear guardianship as a way of warning future generations that we really don't know what to do with waste. Comments made at "Stakeholder hearings" are regularly discounted by your establishment and often don't even make it into print in the volumes you create out of our forests. When is the DOE going to stop being a tool of the nuclear power and nuclear weapons 1

WR003

WR003–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry or produce electricity. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. Use of nuclear materials to make depleted uranium ordinance or for use in spacecraft is beyond the scope of this EIS.

DOE acknowledges the commentor's preference for nuclear guardianship. This EIS includes the No Action Alternative, whereby the surplus plutonium would remain in storage at their current DOE locations. However, this alternative does not reduce the nonproliferation concerns associated with surplus plutonium.

Comments made at "stakeholder hearings" are carefully considered by DOE. Generally, at the hearings notetakers capture the main points of issues or concerns raised by the commentors; therefore, comments are not a verbatim transcript of the hearings. DOE's notetakers make every effort to ensure the essence of each participant's comment(s) has been presented in a clear, concise, and accurate manner. In addition to oral comments received at the public hearings held for the SPD Draft EIS and the *Supplement to the SPD Draft EIS*, written comments were also accepted at the hearings or could have been submitted via fax, mail, or Web site. Equal consideration was given to all comments, regardless of how or where they were received. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 1 OF 9

STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

"Helping Floridians create safe, vibrant, sustainable communities"

JEB BUSH
Governor

STEVEN M. SEIBERT
Secretary

May 24, 1999

Mr. Howard R. Canter
U.S. Department of Energy
Office of Fissile Materials Disposition
Post Office Box 23786
Washington, D.C. 20026-3786

RE: Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement (DEIS - SAI # FL9808110565C)

Dear Mr. Canter:

The Florida State Clearinghouse has received the Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement dated April 1999. Based on the changes in this document, our previous determination remains in effect (enclosed). 1

Upon completion of the Final Environmental Impact Statement, please forward to the Florida State Clearinghouse at the address below.

Thank you for the opportunity to comment on this document. If you have any questions regarding this letter, please contact Ms. Cherie Trainor, Clearinghouse Coordinator, at (850) 922-5438.

Sincerely,

Chris McCay

for Ralph Cantral, Executive Director
Florida Coastal Management Program

RC/ct

Enclosure

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100
Phone: (850) 488-8466/Suncom 278-8466 FAX: (850) 921-0781/Suncom 291-0781
Internet address: http://www.dca.state.fl.us

FLORIDA KEYS
Area of Critical State Concern Field Office
2796 Overseas Highway, Suite 212
Marathon, Florida 33050-2227

GREEN SWAMP
Area of Critical State Concern Field Office
205 East Main Street, Suite 104
Bartow, Florida 33830-4641

MR007

MR007–1 General SPD EIS and NEPA Process

DOE acknowledges the State's receipt of the *Supplement to the SPD Draft EIS* and its determination that the proposed action is consistent with the Florida Coastal Management Program. As requested, a copy of the SPD Final EIS was sent.

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 2 OF 9

STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

"Helping Floridians create safe, vibrant, sustainable communities"

LAWTON CHILES
Governor

JAMES F. MURLEY
Secretary

September 29, 1998

Mr. Howard R. Canter
U.S. Department of Energy
Office of Fissile Materials Disposition
Post Office Box 23786
Washington, DC 20026-3786

RE: U.S. Department of Energy - Surplus Plutonium Disposition - Draft Environmental Impact Statement - Statewide
SAI: FL9808110565C

Dear Mr. Canter:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the above-referenced project.

Based on the information contained in the draft environmental impact statement and the enclosed comments provided by our reviewing agencies, the state has determined that, at this stage, the above-referenced action is consistent with the Florida Coastal Management Program. 1

Thank you for the opportunity to review the draft environmental impact statement. If you have any questions regarding this letter, please contact Ms. Cherie Trainor, Clearinghouse Coordinator, at (850) 922-5438.

Sincerely,

Chris McCay

for Ralph Cantral, Executive Director
Florida Coastal Management Program

RC/cc

Enclosures

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100
Phone: 850.488.8466/Suncom 278.8466 FAX: 850.921.0781/Suncom 291.0781
Internet address: http://www.state.fl.us/comaff/dca.html

FLORIDA KEYS
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Marathon, Florida 33050-2227

GREEN SWAMP
Area of Critical State Concern Field Office
155 East Summerlin
Bartow, Florida 33830-4641

SOUTH FLORIDA RECOVERY OFFICE
P.O. Box 4022
8600 N.W. 36th Street
Miami, Florida 33159-4022

MR007

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 3 OF 9

COMMENTS DUE-2 WKS: 08/28/1998
CLEARANCE DUE DATE: 09/25/1998
SAI#: FL98081105

Message:

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
X Agriculture Community Affairs Environmental Protection Game and Fresh Water Fish Comm OTTED State Transportation		Environmental Policy/C & ED

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

___ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

_X_ Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

___ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

___ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of Energy - Surplus Plutonium Disposition Draft Environmental Impact Statement - Florida.

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- [x] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [x] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:
Division/Bureau: Florida Division of Forestry
Forest Resource Planning
& Support Services Bureau
3125 Conner Boulevard
Tallahassee, Florida 32399-1650
Reviewer: James Eric Ford
Date: 9/8/98

MR007

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 4 OF 9

Message:

CLEARANCE DUE DATE: 09/25/1998
SAI#: FL980811056

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Agriculture Community Affairs Environmental Protection Game and Fresh Water Fish Comm OTTED State Transportation	RECEIVED SEP 02 1998 State of Florida Clearinghouse	X Environmental Policy/C & ED

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

___ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

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___ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of Energy - Surplus Plutonium Disposition Draft Environmental Impact Statement - Florida.

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- [x] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:
Division/Bureau: EOG/OPB ENV
Reviewer: Paula L Allen
Date: ~~September~~ August 31, 1998

MR007

FLORIDA COASTAL MANAGEMENT PROGRAM
CHRIS MCCAY
PAGE 5 OF 9

COMMENTS DUE-3 WKS: 09/04/1998
CLEARANCE DUE DATE: 09/25/1998
SAI#: FL98081105

Message:

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Agriculture Community Affairs X Environmental Protection Game and Fresh Water Fish Comm OTTED State Transportation	RECEIVED SEP 23 1998 State of Florida Clearinghouse	Environmental Policy/C & ED

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

___ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

_x_ Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

___ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

___ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of Energy - Surplus Plutonium Disposition Draft Environmental Impact Statement - Florida.

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- [x] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From: FDEP
Division/Bureau: Ecosystem Mgt / OIP
Reviewer: April D. Wells
Date: 9/21/98

MR007

To: Department of Energy
June 28, 1999

From: Patricia McCracken
413 Scotts Way
Augusta, Georgia 30909
706-7389451
by fax to 202-586-4078

Re: Spent Fuel (MOX)

To date no one at any public meetings or at the library sources can show a comprehensive transportation alternative study regarding any of the programs. People just talk about transportation but no documents seem to exist. One would want to know more about the design and structure of the DOE truck that is displayed at various meetings. What alternative modes of transportation exist in the nuclear world? 1

I attended a meeting on June 24, 1999 at the Gressette Building State House Complex, Columbia, South Carolina hosted by Senator Phil Leventis. I called the Office NEPA Compliance and Outreach for a handout of the program and nothing existed in Washington or at the meeting. After the meeting, I was still not sure what we were commenting about. Questions were difficult for the representative from Cogema, as we needed an interpreter. Will the Cogema representatives who build the MOX building speak English? 2

I was unable to get some clarification from the DOE representatives from Washington because of the bully police type persons at the meeting, with no badges, who indicated no one could approach the group. However, other persons with some hearing devices and no badges or identification escorted around certain members of the audience. What are those gadgets in their ears and whom were they communicating with at the meeting. I did get to ask Mr. Stevenson to explain what the representative from Cogema said about his military connections and France's plutonium depletion policies. Mr. Stevenson was rushed and I did not really understand the answer. 3

Please indicate how we can get answers from the man from Cogema? I am particularly interested in the energy consumption comparison numbers for various alternative DOE projects including the MOX plant. No one on the panel 4

FR014

FR014–1 **Transportation**

In order to address security against terrorist-related incidents, all intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system as described in Appendix L.3.2. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications equipment and additional couriers. While DOE prefers to minimize the transportation of plutonium that is still desirable for weapons use, plutonium is routinely and safely transported in the United States. As described in Appendix L.3.3, transportation of nuclear materials would be performed in accordance with all applicable DOT and NRC transportation requirements. Interstate highways would be used, and population centers avoided, to the extent possible.

Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

Alternative modes of transportation exist in the commercial nuclear world and consist of specially designed trucks and rail cars. However, the universal requirement for the transportation of most nuclear materials is the NRC-licensed shipping cask. NRC requires that shipping casks be able to survive a sequential series of tests that are intended to represent severe accident stresses. The tests are a 30-foot drop onto an unyielding flat surface, a shorter drop onto a vertical steel bar, engulfment by fire for 30 minutes, and, finally, immersion in 50 feet of water.

FR014–2 **General SPD EIS and NEPA Process**

DOE regrets the difficulty encountered in obtaining information on the meeting hosted by Senator Leventis. This meeting was not arranged by DOE but at the invitation of Senator Leventis. DOE attended and answered questions regarding the surplus plutonium disposition program. Additional information

on the program can be found on the MD Web site at http://www.doe-md.com or by calling (202) 586-5368.

The MOX facility would be built at one of four candidate DOE sites in the United States by DCS should the decision be made in the SPD EIS ROD to pursue the MOX approach. Personnel involved in planning, constructing, managing and working at the MOX facility would communicate in English.

FR014–3 General SPD EIS and NEPA Process

The meeting in Columbia, South Carolina was sponsored and coordinated by Senator Leventis' office. The senator's office was responsible for the meeting logistics, including the security arrangements. Mr. Stevenson tried to explain that there is no connection between COGEMA and the French military.

FR014–4 Infrastructure

Questions for COGEMA should be directed to Ms. Christi A. Byerly. Her address is: 7401 Wisconsin Avenue; Bethesda, MD 20814. She may also be contacted by telephone at (301) 941-8367. Her fax number is (301) 652-5690, and her email address is cbyerly@cogema-inc.com.

could answer the question nor did they have any reference materials at the meeting. The representative from Cogema did spell the name of the French oil company Total that owns 20% of Cogema, 80% being the French government. 4

Does the MOX process require oil?

The first and only time I saw Mr. Nulton, he was telling an audience about how we needed British Nuclear Fuel Limited to help our country with nuclear management(MOX). Now I see Mr. Nulton again with the French company Cogema. Their new contract apparently includes constructing the MOX plant at SRS. Who else do we need to help us with a process that we developed in 1969. The DOE has many experiences with blending of nuclear materials. Out of approximately 160,000 nuclear persons twelve people decided that we needed another MOX group to help us build a building. Did we buy and import a process or a building design plan from Cogema? Did the contract reviewers know the US process from 1969. BNFL has built a plant and DOE has visited and hired BNFL. Did the twelve people who selected Cogema know that BNFL is already at SRS? 5

According to DOE/MC-0006 page 8, "In 1969, reactors at Big Rock Point ran for about a year using MOX fuel. They had no problems. This is not an experimental technology. It is 25 years old."

If we have so much extra plutonium then why have some commentaries stated that we have been buying plutonium from other countries? The comments give some broad terms for plutonium. Plutonium I am sure has various properties. 6

Why isn't the French military depleting their plutonium? The military apparently does not use Cogema to reprocess their weapons grade plutonium. 7

While the bully DOE police keep the public from asking questions at public meetings, who is policing and guarding our environmental technologies being developed at the facilities? Apparently all contractors have the ability to patent anything they develop with government money and sell the technology. Maybe the bully police should be guarding something besides the public meetings. According to the GAO/RCED-94-172 report nuclear technologies are needed throughout the world. Many opinions exist in this report. 8

FR014

FR014–5 **MOX Approach**

The MOX process does not use oil.

Duke Engineering & Services, COGEMA Inc., and Stone & Webster formed a team, DCS, to respond to DOE's *Request for Proposals for MOX Fuel Fabrication and Reactor Irradiation Services* (May 1998). Through this competitive procurement process, DOE awarded the contract to DCS to construct and operate the MOX facility on the basis that their proposal was determined to be the most responsive, best value offer submitted.

The commentor is correct that MOX fuel fabrication technology is not new. A small amount of MOX fuel was fabricated and tested in the United States in the late 1960s and early 1970s. DOE is not "importing" the MOX technology. However, COGEMA is one of only a few companies with recent commercial MOX fuel fabrication experience, and this experience will contribute to the success of DOE's MOX fuel fabrication effort. BNFL's contract for work at SRS is completely separate and different from its MOX fuel fabrication efforts in the United Kingdom. The team that selected DCS to build and operate the MOX facility, should the MOX approach be chosen in the SPD EIS ROD, was aware of BNFL's role at SRS.

DOE is not sharing information about U.S. weapons with COGEMA. The plutonium will have been removed from the pits and converted to an unclassified plutonium dioxide before it is transferred to the MOX facility.

Awarding the contract to DCS does not make the United States dependent on foreign entities. DCS is a U.S.-based company and the majority of the companies that comprise DCS are American.

FR014–6 **Other**

DOE is unaware of the source of the commentor's information that the United States is buying plutonium from other countries. The United States is not buying plutonium from other countries. If the United States were to buy any, it would only be done to keep the material from ending up in the hands of terrorists or rogue nations seeking nuclear weapons technology.

FR014–7 **Other**

This SPD EIS addresses the disposition of approximately 50 t (55 tons) of plutonium that President Clinton has declared surplus to national security needs. Russia also agreed to remove the same amount from its stockpile during a Moscow summit held in September 1998. (See Appendix A of Volume II). Plutonium belonging to France is not within the scope of this SPD EIS.

FR014–8 **DOE Policy**

DOE's policy is to transfer technology that has been developed at its laboratories and other facilities to the private sector if these technologies are thought to benefit society. DOE encourages, supports, and enables the transfer of unclassified technologies that have applications outside the DOE programs to the private sector and in return receives royalties or other forms of payment for the rights to use Government-developed technologies.

Is this a 5% process of plutonium and what is the percentage that Cogema uses in France? 9

Historically the disposal process was developed for domestic waste and somehow this concept has broadened beyond the original scope of the legislation. 10

We stated at the meeting that we were grateful that Duke Power is participating and we wonder where the rest of the nuclear community is during this process. They have been given a lot of help and we are developing a disposal facility and working on other nuclear technologies that could help the industry and they don't even offer an advisory board or anything. Just where are they and why are they not accountable for participation? The DOE comment books do not even say who says the comments. Who at GAO made those trips around the world to see the plants? Why don't they comment during this process? How can we ask them questions? 11 12

The GAO report states something like this under the British Waste Program heading on page 57: "The utility plans to construct a dry storage facility to hold spent fuel for up to 100 years. Some environmental groups in the United Kingdom consider aboveground storage to be the "least-worst" option for managing high-level waste. They believe that additional study of various disposal options is needed before a method is selected." Who are these environmental groups and who are their spokespersons? We hear that the United States is already dependent on buying electricity from nuclear plants in Canada. We apparently are importing technology and importing energy from other countries. Why isn't this discussed at the public meetings? 13

The notice we received to attend a workshop on the technical documents was not conducted. 14

Page 41 of the GAO/RCED-94-172 states that because the Japanese plan to store their waste for 30 to 50 years before disposal, officials said they sense no immediate urgency to dispose of the waste. The report further states that the Japanese have not yet developed safety standards for disposing of high-level waste. So maybe somebody might sell them some technology! Other countries like Russia were mentioned as needing technology. Sweden uses ships for transporting. So where is our transportation plan, explaining all the modes used throughout the world? 15 1

FR014

FR014–9 **MOX Approach**

Reactor MOX fuel in Europe is fabricated to similar enrichment levels (about 5 percent plutonium 239) to the levels being proposed for the U.S. reactors that would be used to irradiate MOX fuel.

FR014–10 **DOE Policy**

DOE believes the commentor is referring to disposal of spent fuel in a potential geologic repository. Irradiated MOX fuel would be spent fuel and would be managed as such by the licensee for the reactor in which the fuel was irradiated, and so would not be beyond the scope of the legislation.

FR014–11 **MOX RFP**

As discussed in response FR014–5, DOE selected DCS, of which Duke Engineering & Services is a member, to construct and operate the MOX facility. DOE does not believe that the involvement of other members of the nuclear industry is needed to implement the proposed surplus plutonium disposition program.

As discussed in response FR014–7, this SPD EIS addresses the disposition of 50 t (55 tons) of surplus plutonium. Disposal of waste generated by other government agencies, or generated as a result of any activity other than disposition of this surplus plutonium, is not within the scope of this SPD EIS.

FR014–12 **General SPD EIS and NEPA Process**

GAO trips to review nuclear technologies unrelated to the surplus plutonium disposition program are beyond the scope of this SPD EIS. Information on these trips can be obtained from the GAO Web site at www.gao.gov.

FR014–13 **General SPD EIS and NEPA Process**

The British waste program is unrelated to the surplus plutonium disposition program and is beyond the scope of this SPD EIS.

FR014–14 **General SPD EIS and NEPA Process**

DOE is unaware of the workshop referred to by the commentor.

FR014–15 **Other**

DOE acknowledges the commentor's suggestion of selling technology to the Japanese for safe disposal of their HLW.

DOE will continue to discourage Russia from reprocessing its spent nuclear fuel and starting a plutonium cycle but this issue, and the issue of Japan building a reprocessing facility are beyond the scope of this SPD EIS. U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

For the record nobody at the North Augusta Scoping meeting explained fully why we were going to send plutonium to Britain for reprocessing because we didn't plan for our own facility. 16

One comment stated that mixed oxide fuel is dirty. It involves four technologies used in Western Europe, some countries have been doing it for 30 years. What does dirty mean? Does it mean impurities as opposed to a higher grade of material? 17

Surely with so much money involved, we would try to develop some technologies to better manage the negative impacts of this process rather than importing somebody else's known problems. Why doesn't the French government put up some of the money? What is the procurement process for this deal? 18

SRS has a cooling tower(billions of dollars) that nobody knows what to do with and can it be incorporated in any of the plans? 19

Why are we telling a French oil company all about our weapons? The French government is apparently not discussing their weapons plutonium with our group. 5

Is this process a once through fuel cycle, with no reprocessing and subsequent reuse of the spent fuel? Can the fuel be blended again? Will this reduce waste from the spent MOX fuel? Would several cycles reduce the weapons grade of the material? 20

If Russia is already reprocessing material, then how does that fit in those stockpile reduction agreements. I read where the DOE couldn't even get a set of fire suits for the nuclear plants in Russia without them being stolen. How do we know if they are blending up or down? 21

Will Cogema be asking for amendments to the NPDES permit and other permits for SRS? Does France have the same regulatory reviews? I thought Bechtel was the construction contractor? What is BNFL doing with the MOX process? Who is the MOX process boss? Which one of the 81 outfalls, and 41 stormwater outfalls will be addressed by the new facilities? What is the water usage rate for the new facilities at SRS and where will the withdrawal be located? 22

FR014

FR014–16 **MOX Approach**

DOE does not have any plans to send surplus plutonium to Britain for reprocessing. There are no plans to reprocess MOX spent fuel if that is what the commentor is referring to.

FR014–17 **MOX Approach**

DOE is not aware of a comment referring to MOX fuel as dirty. It could be that the comment refers to the fact that reprocessed spent fuel is used in the production of European MOX fuel, and so has more impurities than the surplus plutonium that would be used in U.S. reactors under the MOX approach. DOE is not "importing" problems, but rather taking advantage of the recent European expertise.

FR014–18 **MOX RFP**

The surplus plutonium belongs to the U.S. Government. There is no need for the French government to contribute financially to this domestic, U.S. Government activity. France and the other G–8 nations (Group of Eight industrialized nations: Canada, France, Germany, Great Britain, Italy, Japan, Russia, and United States) are, however, contributing to Russia's surplus plutonium disposition activities.

The procurement process for U.S. MOX fuel fabrication activities was a competitive process. DOE issued a *Request for Proposals for MOX Fuel Fabrication and Reactor Irradiation Services* in May 1998. Responses were submitted in August 1998, after which a DOE source selection board reviewed the submitted proposals and awarded DCS the contract.

FR014–19 **Alternatives**

None of the proposed surplus plutonium disposition processes or facilities generates enough heat to require a cooling tower like the one referred to at SRS.

FR014–20 **MOX Approach**

MOX fuel, similar to traditional LEU fuel in the United States, would be used once. Technically, the fuel could be reprocessed and reused, but the United

States has a policy against reprocessing its spent fuel, and therefore does not reuse any of its spent fuel. MOX fuel is proposed for only two cycles versus three reactor cycles for some of the LEU fuel in the reactor. Two cycles would allow sufficient time for the MOX fuel containing the weapons-origin plutonium to be irradiated to a point that the plutonium cannot readily be extracted from the spent fuel and returned to weapons use.

FR014–21 **Nonproliferation**

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials. DOE will continue to discourage Russia from reprocessing its spent nuclear fuel and starting a plutonium cycle but this issue is beyond the scope of this SPD EIS.

FR014–22 **Water Resources**

If the proposed surplus plutonium disposition facilities necessitate modifications to the SRS NPDES Permit, the DOE SRS Office, working with the SRS environmental personnel and DCS, would request the modifications. At this time, the potentially affected outfalls have not been identified. None of the MOX activities, or any other surplus plutonium disposition activities, including construction, would be subject to French regulatory reviews. Bechtel is the SRS site construction support contractor, but construction of large, new structures are contracted for competitively. Major capital projects are not within the scope of the Bechtel contract. BNFL is not involved in this surplus plutonium disposition effort. As discussed in Section 4.26.4.2, the maximum amount of water used during construction of the proposed facilities is estimated to be 126 million l/yr (33.3 million gal/yr); during operations, the maximum water usage is estimated to be 216 million l/yr (57.1 million gal/yr). As discussed in Section 3.5.11.2.3, the source of this water is groundwater. If the proposed facilities are built at SRS, they would be located in F-Area. Sanitary water at SRS is supplied through the central domestic water system, and process and service water is supplied through deep-well systems within individual site areas.

The EIS indicates that Hanford has Pu residues with less than 50 percent Pu. That information was not technically explained as the text was deleted. If the percentage is not very great, then why it is listed for no further action? What is the difference in percentage of that and the MOX spent fuel? Many sites had Pu waste that was said to insignificant in quantity. Is quantity the criteria for risk? 23

How will Duke Power be protected, if Cogema's government orders them home? Will Duke Power get all the patents? We hope that Duke Power and North Carolina get the technology rights rather than the French. We are cheering for our team. We hope our country retains some technology and people in case of an emergency situation. I don't think other governments or oil companies will be working on any clean-up problems. The GAO/RCED-99-173 report stated that the Department of Energy receives much of its royalty incomes from inventions created in its laboratories by contractors, even though the inventions themselves are not government-owned. Where is the list of payers to the Department of Energy? Who got the MOX technology of 1969? Did SRS give the land for the MOX plant and other projects? The original withdrawal of land maps do not match the present maps given out at the public meetings. 24

Will Duke Power be given the same modification money as apparently was going to be given to those Canadian groups in the technical material?

Why does SRS import so much energy? I thought the national policy was to export. We have all these nuclear power companies in our area and we import. This policy does not go along with NEPA at all. We are terminating nuclear persons. Are we going to train them to be coal mine workers or work at oil terminals? 25

Certain regional nuclear facilities seem to have an excess capacity to bid on DOE projects but failed to participate with this project. I assume they want the disposal benefits but do not want to help with figuring out other processes. Apparently they do not even help with the disposal facility. Have they ever visited the disposal site that the American people are building for them? Do they do anything besides go to court? In other countries the operators have responsibility for the repository programs. Where are the proposals or preferred 11

FR014

FR014–23 **Alternatives**

Section 2.2 describes the materials that have been declared surplus and are being analyzed in this SPD EIS. In general, if the plutonium residues are greater than 50 percent they are considered part of the surplus plutonium disposition program. In some cases, residues with less than 50 percent plutonium are of concern because the plutonium could be easily concentrated to higher percentages. MOX spent fuel would have a relatively low percentage of plutonium; less than 10 percent. Other plutonium-bearing materials are beyond the scope of this EIS, but are addressed in other NEPA documents such as the *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site* (DOE/EIS-0277F, August 1998).

FR014–24 **MOX RFP**

MOX fuel fabrication technology is being transferred from the MELOX plant in France to the United States. Because the MOX approach would be relying on the French technology, a clause was added to the special considerations of the contract to ensure that the U.S. Government, or anyone the Government hires to replace COGEMA, should a termination occur, has the right to use all proprietary data and restricted computer software necessary for the design, construction, operation and use of the MOX facility and provision of the MOX fuel irradiation as specified in the contract. Duke Power would negotiate a subcontract with DCS, the prime contractor to the Government. That subcontract would contain the rights Duke Power would have to retain patents developed under their subcontract with DCS. Although the GAO report is beyond the scope of this SPD EIS, in general, royalties are not paid to DOE for contractor-owned inventions and hence, there is not a central DOE list of such "payers."

The land identified for the proposed surplus plutonium disposition facilities at SRS is currently owned by DOE and will remain within the ownership of DOE.

McCracken, Patricia
Page 10 of 10

alternatives of the nuclear industry? Has anybody seen any scientific proposals from the Department of Defense outlining their preferences for their waste? How about NASA proposals? 11

The GAO report *Nuclear Waste Foreign countries' Approaches to High-Level Waste Storage and Disposal states* on page 30 that because France has adequate capacity for storing its wastes, developing a repository is not urgent. You may want to discuss this issue further with Cogema.

This report further states that Japan plans to increase its reliance on nuclear power over the next few decades in a continuing attempt to improve the country's energy dependence. " As part of their move toward energy independence, the Japanese plan to build a facility for reprocessing spent fuel from their nuclear power plants so that the recovered uranium and plutonium can be used as fresh reactor fuel." 15

We also heard from the DOE panel meeting with Mr. Nulton that Russia is now reprocessing nuclear fuel.

Will the MOX plant be based on the NRC's move to an approach-termed risk-informed regulation-that considers relative risk in conjunction with engineering analyses and operating experience to ensure that plants operate safely. We reference the GAO/RECED-99-95. 26

Let recap this picture. Our government has imported British and French technology for our nuclear needs. We also are importers of energy for the projects. That policy should make our country totally depend on others. And didn't I read in the news that we sold off all our oil reserves. What are the education institutions doing that have contracts with DOE? Just to make things even better, the contractors we hire and pay can take all the technology and patent the science and sell it to others. 5

Please someone explain this picture to me.

Thank you for the opportunity to comment.

FR014

FR014–25 **Infrastructure**

As discussed in Sections 3.5.11.1.2 and 3.5.11.1.3, SRS purchases its electricity locally, and generates process and heating steam at onsite coal- and oil-fired steam plants. U.S. policy on oil and energy production, and the nuclear industry and its workers are beyond the scope of this SPD EIS.

FR014–26 **MOX Approach**

The MOX facility would be licensed by NRC under 10 CFR 70. The application would be accompanied by detailed engineering information and safety analyses that would have to demonstrate that the MOX facility could operate safely and not pose a significant health and safety risk to the workers, the general public, or the environment.

SIPP, PETER FOX
PAGE 1 OF 2

June 14, 1999

To Whom this concerns:

I live in Richmond County, Georgia. Plant Votgle in 30 miles South and East of me. Due east is infamous SRS.

On February 24, 1999 at a MOX meeting sponsored by Nuclear Information & Resource Service in Augusta, GA I heard Mr. David Lochbaum tell us about his 17 years experience with commercial reactors. Mr. Lochbaum is now employed by Union of Concerned Scientists. Mr. Lochbaum says Plant Votgle nor any of the other reactors in our still beautiful country are not designed to burn plutonium. Mr. Lochbaum says plutonium would damage the reactors. Also he says plutonium is 10 times more expensive than uranium. 1

My light bill is already high enough. And y'all want it to go up!?!

No. Just No.

I want you all to know, I am highly insulted. A critical issue as this and no meeting hosted by you here in the Southeast? Humph!

This is the last straw. Only through a dear friend am I getting a chance to write.

There are many of us here in the Southeast who are going to unite. We are not going to just sit idly by any more. 2

Just as sure as gravity of the Sun is holding the planets in orbit, you will feel our presence.

Yours Renewably

Peter Fox Sipp

DCR004

DCR004–1 **MOX Approach**

Although no U.S. commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core. These commercial reactors are capable of safely using MOX fuel. Section 4.28 was revised to discuss the environmental impacts of operating the reactors that would use MOX fuel.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to generate electricity. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. DCS, the team contracted to fabricate and irradiate the MOX fuel, would not have to continue to use MOX fuel to support the surplus plutonium disposition program if it determined that it was uneconomical to operate the reactors. This would ensure that the taxpayers were not underwriting otherwise uneconomical electricity-generating assets.

DCR004–2 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for a hearing in the Southeast to discuss the use of MOX fuel in reactors. It should be noted that meetings were held in North Augusta, South Carolina on the SPD Draft EIS. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina. Moreover, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be selected.

SIPP, PETER FOX
PAGE 2 OF 2

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD.

WILCOX, ROBERT H.
PAGE 1 OF 1

Thank you for sending me this document. I have no substantive comments on it. As a taxpayer, I object to the need to devote the government's money to documents of this nature. It really serves little useful purpose. The DOE and CEQ should find a simpler way of fulfilling NEPA and/or should suggest that Congress amend that Act. 1

WR004

WR004–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's suggestion that the NEPA process be improved. DOE works carefully to strike a balance between keeping the public informed about potential impacts from its proposed actions and controlling cost of the NEPA process.

WOMEN'S ACTION FOR NEW DIRECTIONS
JOAN O. KING
PAGE 1 OF 2

STATEMENT FOR THE DOE HEARING ON MOX NUCLEAR FUEL

June 15, 1999

I am Joan O. King. I am a member of WAND, Women's Action for New Directions. I work on nuclear issues for WAND and with other organizations in the Southeast. There is a wide network of individuals and NGOs in our area who are deeply disturbed by the DOE's plan to turn weapons-grade plutonium into nuclear fuel and burn it in commercial reactors.

There a number of reasons for our concern. We are not reactionary. We have studied the issue in some depth, but there is little point in going over the details. You are aware of the facts. The problem is, you don't appear to be paying much attention to them.

Everything we read indicates that some form of immobilization is a cheaper, faster way to handle the plutonium disposition problem. The excuse we hear from the DOE is that the Russians don't trust immobilization.....that they want a MOX solution. But we talk to the Russians too.

Their activists have been in Atlanta and the Southeast, and they tell us the Russian people don't want any more nuclear problems, the kind of problems that come with government nuclear programs and the ever increasing accumulation of polluting radioactive waste. 1

In the U.S. not one out of a thousand people has any idea what MOX stands for, but when they find out, they don't like it either. One indication of this is what happened at a recent Duke Energy Stockholders meeting when a stockholders initiative was introduced opposing the utility's plan to use MOX fuel in Duke reactors.

The initiative got close to eight percent of the vote, more than twice that needed to keep it on the ballot in the coming year. Since very few people even look at stockholder's petitions when they sign their proxy, and even fewer oppose the boards

DCR010

DCR010–1 **MOX Approach**

DOE acknowledges the commentor's concern regarding the use of weapons-grade plutonium in MOX fuel and irradiating it in commercial reactors. DOE has identified as its preferred alternative the hybrid approach which includes both immobilization and MOX fuel. As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach would be more expensive than the immobilization-only approach. However, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

Although the people of Russia may oppose any further nuclear programs, this issue is beyond the scope of this SPD EIS. Since the inception of the U.S. fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations at various locations around the country, not just near the potentially involved DOE sites, to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. Additionally, various

2

recommendations, the Duke vote is very significant. I can just about guarantee you stockholder opposition will grow. 1

For forty years nuclear engineers have tried to close the nuclear fuel cycle. It is an article of faith with them that eventually the problem of radioactive waste will be solved and somehow nuclear power can be made economically sustainable. MOX is just one more attempt. It is another step by the nuclear industry toward a plutonium economy, but the public isn't buying. That should be obvious by now.

Nuclear technology has NOT produced "....energy too cheap to meter." Instead it has produced energy too expensive to use, and NO solution to radioactive waste. The DOE doesn't have a very good track record, and the public doesn't want to see them expand into a new and very expensive nuclear program, one that will produce even more radioactive waste. 2

MOX is just one more subsidy to a failed industry. Our government owes the public something better than this.

DCR010

means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue.

DCR010–2 **DOE Policy**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

CITIZENS ADVISORY BOARD, INEEL
CHARLES M. RICE
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Citizens Advisory Board

Idaho National Engineering and Environmental Laboratory

99-CAB-008

January 27, 1999

William B. Richardson
Secretary of Energy
U.S. Department of Energy, Headquarters
1000 Independence Avenue, S.W., MS 7E-079
Washington, DC 20585

Dear Secretary Richardson:

The Idaho National Engineering and Environmental Laboratory (INEEL) Citizens Advisory Board (CAB) understands that consideration is being given to alternative strategies for meeting the requirements of the Idaho Settlement Agreement. In particular, we have been told that one option would involve shipping transuranic (TRU) waste from INEEL to a location other than the Waste Isolation Pilot Plant (WIPP). As I am sure you are aware, the legally binding Idaho Settlement Agreement requires the U.S. Department of Energy to make a shipment of TRU waste out of Idaho by April 30, 1999.

The uncertainty of WIPP opening in time to receive Idaho's initial shipment gives rise to concerns that DOE's Idaho Operations Office (DOE-ID) will not be able to meet that critical compliance deadline. Such a failure to meet the commitments in the Idaho Settlement Agreement will not sit lightly with the Idaho citizens. The INEEL CAB recognizes the magnitude of the dilemma DOE faces should WIPP disallow or delay the INEEL shipment past the April 30, 1999 deadline.

We are also alert to DOE's plans for receipt of foreign research reactor spent nuclear fuel (FRR SNF) from Savannah River Site to the INEEL in the Summer of 1999 and the fact that non-compliance with the April 30, 1999 milestone will preclude receipt of that shipment at the INEEL.

The INEEL CAB recognizes the additional and perhaps significant leverage that prohibiting receipt of the FRR SNF would add to existing pressures to open WIPP. Indeed, we contemplated making a CAB recommendation to preclude consideration of any alternatives to WIPP in order to keep the pressure on DOE to do everything possible to get WIPP open. In light of the INEEL CAB's numerous expressions of strong support for the Idaho Settlement Agreement, however, we found ourselves in a dilemma. We concluded that it would be irresponsible for the CAB to condone or advocate non-compliance with the legally binding Idaho Settlement Agreement. Doubtless such a position would severely jeopardize our integrity as a citizen advisory board.

The INEEL CAB has ardently supported the opening of WIPP based on considerable deliberation, and we want to do what we can to support efforts to open the facility. We recognize that the Idaho Settlement Agreement does not require shipment to WIPP, but allows shipping to an "other such facility." Despite a presentation by DOE-ID at our January 1999 Board meeting (which we believe conveyed as much information as DOE-ID staff felt was appropriate), we find that we know too little about any alternative strategies for complying with the Idaho Settlement Agreement. We believe that any shipment of nuclear materials to any location should not increase risks to human health or the environment during transportation and/or subsequent interim storage. Said another way, we believe that shipment and storage risks at an alternative site should provide advantages to continued in-place temporary storage at the INEEL.

The INEEL CAB has yet to achieve consensus that any alternative to WIPP is acceptable. We will not even attempt trying to achieve consensus on an alternative site again until such

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Attachment 10

FR001

time as we have received additional information about viable alternative site(s) and assurances that the site(s) would present no more risk to human health and the environment than the risk posed by leaving the material where it is presently temporarily stored. In addition, some of our members note that the remaining roadblocks to acceptance of waste at WIPP allow a conclusion that it might never open. At least some of our members feel that it would be negligent for the INEEL CAB to accept shipment to a storage facility that might become a de facto disposal facility in time, especially if that facility is not appropriate for long term stewardship.

In sum, we are not yet able to support a strategy that would involve shipping even a small quantity of TRU to an alternative site. Until such time as we can reach consensus in support of an alternative to WIPP, we will therefore continue to urge DOE to make every effort to accelerate WIPP opening and to make every effort to comply with the Idaho Settlement Agreement. In light of the expected sequence of events, we are frustrated and disappointed that we cannot provide advice to DOE on this issue. Very few challenges faced by DOE are of this magnitude, and we would be negligent to ignore the situation.

We therefore respectfully request a presentation at our March meeting to provide us with an enhanced understanding of the options that DOE might consider for complying with the Idaho Settlement Agreement, assuming that WIPP will not open in the near term. We need such a presentation to meet our members needs for additional information before we can try to reach consensus on what we think DOE should do to resolve this apparent dilemma. We are directing this request to DOE-Headquarters as we believe we have already received as much information from DOE-ID as we will be able to get.

We interpret our commitment to consensus as requiring active consideration of the information available to support a rational conclusion. As a rule, we do not support DOE decisions in the absence of information that would allow us to conclude that DOE has, in fact, selected the best option. As a result, we would like sufficient information about a full range of options to allow our entire membership to determine how comfortable they are with each option.

We understand that DOE might not really want our advice on this pending decision. We recognize that a multitude of political and social pressures will come to bear and that the decision may fall outside the Department's purview. We urge you to embrace this request in its sincerity and allow us to serve you as originally intended—as an independent body of citizens that provide advice on issues of relevance and importance.

We await your reply and stand ready to accommodate the needs of the presenter of your choosing.

Sincerely,

Charles M. Rice
Chair, INEEL CAB

cc: John Wilcynski, DOE-ID
James Owendoff, DOE-HQ
Stan Hobson, INEEL CAB Transuranic Waste Committee
Martha Crosland, DOE-HQ
Fred Butterfield, DOE-HQ
Jerry Bowman, DOE-ID
Woody Russell, DOE-ID
Patty Natoni, DOE-ID
Wendy Green Lowe, INEEL CAB Facilitator

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FR001

CITIZENS ADVISORY BOARD, INEEL
CHARLES M. RICE
PAGE 1 OF 5

Citizens Advisory Board

Idaho National Engineering and Environmental Laboratory

99-CAB-081

July 20, 1999

Laura S. H. Holgate
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

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Charles M. Rice

Vice Chair:
Stanley Hobson

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Wayne Pierre
Gerald C. Bowman

Jason Staff:
Carol Cole
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Kathy Grebstad
Wendy Green Lowe
Kevin Harris
Lori DeLuca

Dear Ms. Holgate:

Note: The Site-Specific Advisory Board (SSAB) for the Idaho National Engineering and Environmental Laboratory (INEEL), also known as the INEEL Citizens Advisory Board (CAB), is a local advisory committee chartered under the Department of Energy's (DOE) Environmental Management SSAB Federal Advisory Committee Act Charter.

Attached please find a recommendation from INEEL CAB to the U.S. Department of Energy regarding the Supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement. The recommendation was achieved through consensus on July 20, 1999 at a meeting of the full INEEL CAB held in Idaho Falls, Idaho.

In a letter dated June 11, 1999, the INEEL CAB requested an extension in the comment period for this document. We have received no response to that request. We have been told by Patty Natoni (DOE-ID's Assistant Coordinator for the INEEL CAB), however, that no extension was granted. We nonetheless preferred to attempt consensus on this recommendation before submitting it, and note that we are aware it will be received past the end of the public comment period. 1

We await your response to this recommendation.

Sincerely,

Charles M. Rice
Chair, INEEL CAB

cc: Stanley Hobson, INEEL CAB Transuranic Waste Committee Chair
Beverly Cook, DOE-ID

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FR019

FR019–1 **General SPD EIS and NEPA Process**

Although it did not extend the comment period, DOE did consider all comments received after the close of that period for the *Supplement to the SPD Draft EIS*. All comments were given equal consideration and responded to as presented in Volume III, Chapter 4.

Carolyn Huntoon, DOE-HQ
Martha Crosland, DOE-HQ
Fred Butterfield, DOE-HQ
Larry Craig, U.S. Senate
Mike Crapo, U.S. Senate
Mike Simpson, U.S. House of Representatives
Helen Chenowith, U.S. House of Representatives
Laird Noh, Chair, Idaho Senate Resources and Environment Committee
Golden C. Linford, Chair, Idaho House of Representatives Resources and Conservation Committee
Jack Barraclough, Idaho House of Representatives Environmental Affairs Committee
Gerald Bowman, DOE-ID
Kathleen Trever, State of Idaho INEEL Oversight
Wayne Pierre, U.S. Environmental Protection Agency Region X

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FR019

CITIZENS ADVISORY BOARD, INEEL
CHARLES M. RICE
PAGE 3 OF 5

Citizens Advisory Board
Idaho National Engineering and Environmental Laboratory

Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement

The Surplus Plutonium Disposition (SPD) Environmental Impact Statement (EIS) is being prepared to support the U.S. Department of Energy's (DOE) decisions related to the management and disposition of surplus plutonium. The Idaho National Engineering and Environmental Laboratory (INEEL) Citizens Advisory Board (CAB) has persistently requested copies of the SPD EIS and related documentation, including the Supplement to the draft EIS that was released for public comment on May 14, 1999. In addition, the CAB has submitted two consensus recommendations to date on the EIS.

DOE's reluctance to provide adequate numbers and timely distribution of the Supplement leads this Board to conclude that the DOE is disinterested in comments generated by citizen groups. Additionally, it is this Board's distinct impression that the Office of Fissile Materials Disposition is, at best, nonchalant about the concerns of a Site Specific Advisory Board chartered and funded under the U.S. Department of Energy's (DOE) Environmental Management program. The INEEL is considered as an alternative for two of the three facilities evaluated in the EIS, including a facility to disassemble pits and another to fabricate plutonium dioxide. INEEL is not considered a preferred site for either facility at this point in time. We are nonetheless interested in this important decision. 2

We understand that our prior recommendations on the EIS may be reflected in the comment response document that will be included with the final EIS. We are disappointed, however, to find no evidence in the Supplement that our prior recommendations are being considered. We had recommended that the EIS provide vigorous analysis (equivalent to that provided for the other alternatives) of a "full immobilization alternative" involving immobilization of the entire inventory (50 tons) of weapons-usable plutonium. Our specific comment on the Draft EIS was "The INEEL CAB recommends that the total immobilization option be given full consideration and rigorous discussion in this EIS." 3

The Supplement offers further evidence that DOE prefers the "hybrid" alternatives (those involving fabrication of some inventory as mixed oxide fuel [MOX]), despite the fact that the Draft EIS did not include analysis of the full immobilization alternative. DOE's awarding of a $130 million contact to "further develop the MOX options" (involving actions that would be completely unnecessary under the full immobilization alternative) provides further evidence that a decision has already been made. In addition, the contractor has suggested modifications of processes within the alternatives and DOE has made those modifications. 4

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FR019

FR019–2 **General SPD EIS and NEPA Process**

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. Approximately 1,300 copies of the *Supplement* were mailed, and Notice of Availability postcards were mailed to an additional 5,800 members of the public. Various means of communication—public hearing, mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—were provided to facilitate the public dialogue. The channels of communication were open to all interested individuals and organizations.

FR019–3 **Alternatives**

The purpose of the *Supplement* was to give the public the opportunity to comment on the reactor-specific information that was not available at the time the SPD Draft EIS was published. The *Supplement* included the Environmental Synopsis (prepared on the basis of the Environmental Critique which DOE also prepared for the source selection board to consider prior to the award of the MOX fuel fabrication and irradiation services contract), a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Appendix P and Sections 3.7 and 4.28 of this SPD EIS, respectively). Comments on the SPD Draft EIS and their responses are presented in Volume III, Chapter 3.

Both the draft and final SPD EIS analyze "full immobilization alternatives" where all 50 t (55 tons) of surplus plutonium would be immobilized at either Hanford or SRS, with pit disassembly and conversion taking place at either Pantex or SRS. In this SPD EIS, a total of four "full immobilization alternatives" (Alternatives 11A, 11B, 12A, and 12B) are analyzed, all of which have been given full consideration.

FR019–4 **General SPD EIS and NEPA Process**

DOE has prepared this SPD EIS in accordance with the provisions of NEPA (42 U.S.C. 4321 et seq.) and the related CEQ and DOE implementation regulations (40 CFR 1500 through 1508 and 10 CFR 1021, respectively). The primary objective of the EIS is a comprehensive description of proposed surplus plutonium disposition actions and alternatives and their potential

The INEEL CAB understood that the National Environmental Policy Act (NEPA) requires federal agencies to (1) evaluate the impacts of a full range of reasonable alternatives and (2) provide the public an opportunity to review and comment on the results of that analysis **before** making a decision that might have significant environmental impacts. It appears that DOE chose its preferred course of action behind closed doors, prior to completing its analysis of a full range of alternatives and without the benefit of public participation. Hence, the INEEL CAB suggests that DOE's strategy for compliance with NEPA is flawed. 4

The Supplement states that the facilities and associated work forces will be much larger than had been indicated in the draft EIS. Such adjustments may be proper and appropriate. We question, however, how a doubling of floor space and a significant increase in the work force would have no effect on the rate of treatment or on the rate of total output. **The INEEL CAB recommends that the Final EIS provide additional explanation as to why DOE believes the increases are necessary. The CAB also recommends the addition of an explanation as to why the increases would not result in any increase in the rate of treatment nor the rate of total output of treatment.** 5

The INEEL CAB recommends that the final EIS include a thorough presentation of all costs associated with making the MOX fuel (that would be fabricated under the hybrid alternatives) viable for use by the private power industry. Such costs could include 1) retrofitting of reactors (if needed), 2) relicensing of reactors (when necessary), and 3) providing financial incentives to encourage the power industry to burn MOX fuel instead of other, less expensive fuels. Such information is needed to allow the public to compare among the alternatives considered and evaluated. 6

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FR019

environmental impacts. DOE has analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for the proposed surplus plutonium disposition facilities. As discussed in Section 2.1, the disposition facility alternatives, immobilization technology alternatives, and MOX fuel fabrication alternatives evaluated are consistent with the decisions given in the ROD for the *Storage and Disposition PEIS*. Impacts for both technologies and all alternatives are summarized in Section 2.18 and Chapter 4 of Volume I, and complete analyses are provided in the appendixes. Alternatives 11 and 12, the 50-t (55-tons) immobilization cases, are fully analyzed.

DOE conducted a procurement process in accordance with DOE NEPA regulations 10 CFR 1021.216. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. As stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are made and announced in the SPD EIS ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before the ROD is issued, and options that would allow construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach.

FR019–5 **Immobilization**

As discussed in Section 1.7.4, increased space requirements were incorporated into this SPD EIS to accommodate several refinements to the immobilization and MOX facilities designs analyzed in the SPD Draft EIS. Changes to the immobilization facility design include lengthening the process gloveboxes; doubling the material conveyor length; changing to a vertical ceramification stack; increasing the heating, ventilation, and air conditioning systems and electrical support to correspond with the increased process space; enlarging

the space required for maintenance activities; and increasing the size of the canister loading facility. These design changes correspond with increased operating workforce requirements of approximately 24 to 33 percent, on average, at Hanford and SRS.

The increased space requirements associated with the revised MOX facility design reflect additional space proposed by DCS; incorporation of a plutonium-polishing capability; and incorporation of administrative space that had been proposed within separate support facilities in the SPD Draft EIS. Although the size of the MOX facility has increased, DCS proposes to operate the facility with approximately 11 percent fewer workers.

None of these modifications are associated with increasing (or decreasing) the total capacity or throughput of either facility; rather, they simply reflect refinements to each facility's proposed dimensions, process design, and associated workforce. As stated in Section 2.4, the immobilization facility would still disposition up to 5 t (5.5 tons) per year over a ten-year period to accommodate alternatives for immobilizing all 50 t (55 tons) of plutonium. The same facility would immobilize an average of 1.7 t (1.9 tons) per year over a ten-year period under the hybrid alternatives. Similarly, the MOX facility would still process an average of 3.3 t (3.6 tons) per year over a ten-year period under all hybrid alternatives.

FR019–6 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

COALITION 21
GEORGE A. FREUND
PAGE 1 OF 1

Coalition 21 has previously whole heartedly supported the MOX strategy for disposing of surplus-weapons-useable plutonium. Nothing in the Supplement to the DEIS causes us to waver in that support. MOX not a bomb project but a true example of the Atoms for Peace concept visualized by President Eisenhower. Of all forms of plutonium, surplus weapons-useable plutonium presents a threat to proliferation of nuclear weapons second only to theft of existing nuclear weapons by terrorists. The nuclear fuel produced by the MOX process would be used "once-through" in commercial nuclear power reactors. This step would eliminate much of the plutonium. The remainder would achieve the standard recommended by the National Academy of Science to make plutonium unattractive for use in weapons. The end product from this use would merely replace an equivalent amount of spent nuclear fuel that meets the same standard. The argument by MOX opponents that this strategy furthers a "plutonium economy" is at the least overblown. Russian scientists argue that immobilization (the alternative preferred by MOX opponents) leaves the plutonium in a weapons-useable form that can be chemically retrieved. Simply put, immobilization might deter terrorists from attempting to retrieve the plutonium but it would not discourage a government (including our own in Russia's eye) from doing so. We see merit in that argument. 1

WR008

WR008–1 **Alternatives**

DOE acknowledges the commentor's full support of the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

NAS is currently conducting studies to confirm the ability of the ceramic can-in-canister immobilization approach to meet the Spent Fuel Standard. DOE is confident that immobilization remains a viable alternative for meeting the nonproliferation goals of the surplus plutonium disposition program.

HUEBNER, MARTIN
PAGE 1 OF 2

Subject: Plutonium disposition via electric power reactor
Comments: In over thirty years of environmental activism as a private citizen (in probably a hundred formal public hearings in the Western U.S.) I have learned several almost immutable facts. Bear in mind these hearings were primarily on natural resource issues regarding dams, timber cuts, mining, fish and game issues, etc. but a small percentage were also DOE hearings.

1) There are those whose call themselves "environmentalists," and assume this fasle identity when attending DOE hearings. They apparently cloak themselves in this assumed identity to provide a false a false mantle of respectability and responsibility. The rest of the time they refer to themselves in such terms as "nuclear watchdogs" or "peace and ….." advocates. 1

2) In these hundred or so hearings, NOT ONCE did I hear even one representative of these ad hoc "environmental" groups appear, and provide a statement when natural resource issues were the subject of the hearing. These ad hoc "environmentalists" only seem to "come out of the wood works" to belabor the DOE whenever the Department has proposals to accomplish something.

3) Although some representatives of these groups are expert at pointing picayune details and minor flaws in DOE plans (which some might consider a useful service) I have yet to hear them provide even ONE significant constructive comment that would help resolve the issue being discussed.

WR005

WR005–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's support for the MOX approach.

It is DOE policy to encourage public input into these matters of national and international importance. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

4) There are a few of these groups that apparently have any people with credentials in the issues being discussed; the representatives are long on rhetoric and pitifully meager in specifics or in related facts. I have been a representative of a venerable (since 1932) environmental organization at recent regional and national "stakeholder" meetings on nuclear waste sponsored by the League of Women Voters. Although the LOWV meetings were well organized, I found few attendees of the "environmentalists/nuclear watchdog" variety who wanted to even hear facts about nuclear wastes, much less discuss them.

5) I understand that a coalition of some 100 international non-government groups have gone on record opposing the plans to convert former weapons-grade plutonium into nuclear reactor fuel for commercial nuclear nuclear power plants. When viewed objectively, as well as from a realistic environmental perspective, the opposition to such plans that directly support international peace objectives is mystifying. I do not understand why such construction plans are opposed by any rational person or group. 1

In view of the above facts and observations, I recommend that the DOE respectfully review the statements of those opposed to ridding the world of weapons grade plutonium in nuclear reactors, then dismiss them for the demagoguery and untruths that they truly are.

WR005

KENNEY, RICHARD A.
PAGE 1 OF 1

Subject: Solve the Problem

Comments: The use of surplus weapons grade PU in the production of MOX and the burning of that MOX fuel in commercial reactors is the only proposed alternative that rids the earth of weapons grade PU. Vitrified weapons grade PU can safely be converted back to a weapons usable PU in a bath tub. Thus, the non MOX alternatives require storage and heavy security protection for thousands of years. I and all my family, associates, and friends strongly support the MOX alternative. 1

WR009

WR009–1 **MOX Approach**

DOE acknowledges the commentor's full support of the MOX approach. NAS is currently conducting studies to confirm the ability of the ceramic can-in-canister immobilization approach to meet the Spent Fuel Standard. DOE is confident that immobilization remains a viable alternative for meeting the nonproliferation goals of the surplus plutonium disposition program.

- LEAVE NUCLEAR WASTE ON SITE
- AVOID THE RISKS OF HAULING TOXIC WASTE 1
- FORGET MOX, ITS MORE TOXIC THAN PLUTONIUM 2
- COMMUNITIES NEAR CHOSEN REACTOR SITES HAVE ARIGHT TO EXPRESS THEIR WISHES. 3

STOP THIS NUCLEAR
MADNESS
NOW

- **MOX is dangerous.** The use of MOX in the U.S. sends the wrong signal to Russia and the rest of the world: that Americans regard plutonium as a valuable energy source rather than a dangerous waste. ***It encourages other nations to embrace a plutonium fuel economy,*** leading to increased worldwide trade of plutonium and greater risks to international security, public health and the environment. Plutonium, among the most dangerous of substances, is so lethal that just a speck can cause cancer in humans. A recently-released study by the Nuclear Control Institute finds that ***a severe accident at a reactor fueled with MOX could cause twice as many fatal cancers as an identical accident at a uranium-fueled reactor.*** 2
- **MOX is slower and more expensive.** Immobilization is estimated to cost less than MOX and complete the job years sooner. Utilities will only use MOX fuel when it is heavily subsidized by the US government; taxpayers would be paying utilities to use MOX.
- **MOX is not needed.** Immobilization is now successfully underway at the Savannah River Plant in South Carolina and at the West Valley Demonstration Project in New York. Immobilization can handle a wider variety of surplus plutonium forms (residues, oxides, metals, etc.) as compared to MOX. Furthermore, the use of MOX fuel made from weapons-grade plutonium has not been proven to work in U.S. commercial reactors. 4
- **MOX is not wanted.** In March 1998 more than 200 non-governmental organizations worldwide called upon Presidents Clinton and Yeltsin to halt the MOX development program and protested the use of plutonium as an energy source. Hundreds of international organizations have signed on to a similar statement this year. Both the Oregon State Legislature and the Texas Farm Bureau have passed resolutions opposing the use of MOX. Newspapers including the Denver Post, located near the Rocky Flats Plant which stores 14 of the 50 tons of surplus plutonium, and newspapers throughout the Southeast U.S. where the first stage of MOX use is set to begin, have editorialized against MOX. 3

FR011

FR011–1 **Alternatives**

DOE acknowledges the commentor's preference for the No Action Alternative and concern about the shipment of nuclear material and waste. Continued onsite storage would only defer a decision regarding the disposition of surplus plutonium, and therefore would only defer the impacts of plutonium disposition activities. Eventually, these materials would have to be disposed of. In addition, continued storage of surplus plutonium at the sites where it is currently located could delay site cleanup and closure.

Section 2.18 and Table L–6 summarizes the transportation impacts associated with all the alternatives. These estimates show that additional fatalities are unlikely. As stated in Appendix L.3.2, DOE has accumulated more than 151 million km (94 million mi) of over-the-road experience transporting DOE-owned cargo, including plutonium, with no accidents that resulted in a fatality or release of radioactive material. The transportation of routine shipments of wastes are discussed in Appendix L.6.4.

FR011–2 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Use of MOX fuel in domestic, commercial reactors is not proposed in order to advocate a plutonium economy. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

Chapter 4 of Volume I provide the results of detailed impact analyses of the proposed surplus plutonium disposition facilities and reactors. Risks and consequences are addressed. The impacts on workers and the general population associated with normal operations and postulated accidents are included in these analyses, as well as the potential impacts on the environment. The impacts associated with each alternative are summarized in Section 2.18.

FR011–3 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's view that communities near the proposed reactor sites that would use the MOX fuel have the right to express their wishes. During the 45-day public comment period on the *Supplement to the SPD Draft EIS*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. For those interested parties who could not attend the hearing on the *Supplement*, DOE provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina. Moreover, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be pursued per the SPD EIS ROD.

Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD.

FR011–4 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach which includes both immobilization and MOX fuel. As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach would be more expensive than the immobilization-only approach. However, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

Although no U.S. commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core. These commercial reactors are capable of safely using MOX fuel. Section 4.28 was revised to discuss the environmental impacts of operating the reactors that would use MOX fuel.

Comments of Lisa Ledwidge, Institute for Energy and Environmental Research, at the U.S. Department of Energy public hearing on the supplement to the draft Surplus Plutonium Disposition Environmental Impact Statement, June 15, 1999

My name is Lisa Ledwidge. I am the Outreach Coordinator at the Institute for Energy and Environmental Research, a non-profit organization in Takoma Park, Maryland. I coordinate a project that provides technical assistance to grassroots groups around the country on nuclear issues.

I have three questions and a comment for the Department of Energy (DOE) regarding the supplement to the draft Surplus Plutonium Disposition Environmental Impact Statement.

1. When will the DOE grant the public access to the home-country environmental and public and worker health record of Cogema (the French company that is a member of the consortium that DOE contracted for mixed-oxide [MOX] fuel fabrication and irradiation)? The American people have a right to access this information on the same basis that DOE documents would be available to the public here in the U.S. 1

2. Who holds the liability for potential accidents with or failures of the MOX program in Russia? This question has not been addressed in any DOE public document as far as I am aware. However, it is a very important one, given the economic situation in Russia, the questionable safety status of Russian reactors, and the current or potential role of the US in financing or otherwise promoting the joint U.S.-Russian MOX disposition plan. This is an especially important question in light of the fact that the Russian MOX program will use light water reactors, a plan the Russian government is adopting at the urging of the U.S. Minatom (DOE's Russian counterpart) would actually prefer to use breeder reactors. 2

3. How does the DOE justify the militarization of civilian nuclear power plants in which it proposes to irradiate MOX fuel? (By militarization, I refer to the transportation and storage of MOX fuel, made with military plutonium, to and at commercial nuclear power plants. Some may think this too strong a term, but in reality what DOE is proposing to do is locate fuel made with military plutonium at civilian sites.) In addition, what provisions are planned for the significant change in status of civilian nuclear power plants to military or quasi-military sites, since they will at least temporarily be storing unirradiated MOX fuel which can, relatively readily, be converted to weapons-usable material? 3

One final comment. It is beyond my understanding why the DOE would deny, after repeated requests, public hearings in the communities around the North Anna, Catawba and McGuire reactors. The DOE has responded to this with something like, More than 80 hearings have been held on this EIS, and people can comment in other ways. If DOE has held 80 hearings, then why were not a few of them held in reactor communities? Alternatively, if DOE has held 80 hearings, how much trouble could have been three more? 4

I look forward to answers to these questions in the near future. Thank you very much for this opportunity to comment.

DCR016

DCR016–1 **MOX RFP**

DOE considered past environmental performance of COGEMA in awarding the contract for MOX fuel fabrication and irradiation services. The operating experience at MELOX is being factored into the MOX facility design and was used to update information in this SPD EIS as discussed in Appendix P. More information on COGEMA's environmental record can be found on their Web site at http://www.cogema.com or by contacting Ms. Christi A. Byerly. Her address is: 7401 Wisconsin Avenue; Bethesda, MD 20814. She may also be contacted by telephone at (301) 941-8367. Her fax number is (301) 652-5690, and her email address is cbyerly@cogema-inc.com.

DCR016–2 **Nonproliferation**

DOE acknowledges the commentor's concerns regarding the liability for potential accidents or failures of the MOX program in Russia, although programmatic and policy issues such as U.S. policies toward plutonium disposition in Russia are beyond the scope of this SPD EIS. The scope of this SPD EIS is focused on analysis of alternatives on whether and how much U.S. surplus plutonium should be used as MOX fuel, which technology should be used for immobilization, where to construct the proposed surplus plutonium disposition facilities that are needed, and where to perform lead assembly fabrication and testing.

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding

would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

Breeder reactors are designed to create plutonium as they burn MOX fuel. The plutonium in the spent fuel is then separated for reuse (reprocessed) as new MOX fuel. Since using MOX fuel in breeder reactors would produce plutonium, DOE believes there are significant nonproliferation concerns regarding the use of breeder reactors for the disposition of surplus weapons-usable plutonium.

DCR016–3 **DOE Policy**

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

In order to address security against terrorist-related incidents, all intersite shipments of weapons-usable plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications equipment and additional couriers. Further, DOE does not anticipate the need for any additional security measures at reactor sites, other than for the additional security applied for the receipt of fresh fuel. Commercial reactors currently have armed security forces, primarily to protect against perimeter intrusion. There would be increased security for the receipt and storage of fresh MOX fuel, as compared with that for fresh LEU fuel, for additional vigilance inside the perimeter. However, the increased security surveillance would be a small increment to the plant's existing security

plan. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a geologic repository built in accordance with the NWPA.

DCR016–4 General SPD EIS and NEPA Process

DOE acknowledges the commentor's concern that DOE has denied repeated requests for public hearings near the proposed reactor sites that would use the MOX fuel. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

INSTITUTE FOR ENERGY AND ENVIRONMENTAL RESEARCH
LISA LEDWIDGE
PAGE 1 OF 1

This is Lisa Ledwidge with the Institute for Energy and Environmental Research. My telephone number is (301) 270-5500. I would like to register for the hearing on June 15th. I'm not sure if you need me to say whether I will go to the earlier or the later one. I'll probably go to the 9:00 AM one. Also on a second point, I'd like to leave is a request for more hearings in the areas affected by the Supplemental, including the reactor communities and the transportation corridors. Thank you. 1

PR001

PR001–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for additional public hearings in areas affected by the use of MOX fuel, including the reactor and transportation corridor communities. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE felt there were sufficient other means provided for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

ieer

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Comments of the Institute for Energy and Environmental Research (IEER) on the on Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement (DOE/EIS-0283-DS, April 1999)
by
Arjun Makhijani
28 June 1998

The Final EIS should include the features described in the comments below.

1. According to various statements of the Department of Energy (DOE) and its contractors, the proposed use of mixed oxide fuel to disposition surplus plutonium from the US nuclear weapons program is based on the experience of the use of MOX in European light water reactors (LWRs). The DOE should explicitly analyze reactor control, cost, and accident-probability and consequence issues with this in mind. It has not done so in the Draft Supplemental EIS. DOE should specify exactly what European experience it is relying on for making its decision on its MOX program, what reactors use MOX in Europe and how they correspond to the proposed reactors in the United States in terms of safety features, control rods, etc. DOE should make this European data public as part of its Final EIS. The DOE should provide a detailed comparison of the reactors of the proposed vendors Duke Power and Virginia Power with the French reactors in which MOX fuel is used in terms of their (i) safety features, (ii) control rod design and quantity as well as other reactor control features; (iii) design aspects related to emergency core cooling and containment of an accident. For instance, unlike some US reactors, the reactors in France's MOX program do not rely on ice condensers as a safety feature. 1

2. If DOE believes that the safety features of US and French and/or other European reactors are materially the same it should so state, and provide the justification for it. If the DOE is relying on French or European reactor safety experience and design features, it should justify this. In that case the DOE should make an explicit commitment that whatever safety issues come up in the in the future in the French or European MOX programs (respectively) would also be addressed in the US disposition program. The DOE should make a commitment to seek approval from the NRC about its assumptions regarding the similarities and differences in the safety and control features of the French reactors relative to the six reactors now proposed to be included in the MOX program as well as any reactors that might be added in the future.

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FR004

FR004–1 **MOX RFP**

The proposed reactor utilities will use existing accident-probability and consequence analysis tools, techniques, and data in the development of their NRC license application amendments. These tools include approved PRA models and modeling techniques. Techniques include the assessment of various failure modes, root cause analysis, site-specific conditions and plant equipment, systems, and components. Data will include appropriate national and international information.

The plant and site-specific information will include the analysis of the "defense in depth" methodologies which provide specific boundaries for the radionuclides. The first boundary is the fuel rod itself. The second is the reactor and steam supply system. The third is the reactor containment vessel. There are several fuel designs, reactor types, and containment types. The "ice condenser" containment is only one type.

European reactors of various designs use MOX fuel. French and Belgian reactors are based on a Westinghouse design, and are similar to the McGuire, Catawba, and North Anna reactors. European nuclear regulatory authorities in France, Germany, Belgium, the Netherlands, and Switzerland have reviewed MOX fuel use in reactors of varying designs.

Before any MOX fuel is used in U.S. reactors, NRC must perform a comprehensive and public safety review and issue a revision to the reactor operating licenses. Under NRC regulations, the utilities would have to provide information in their licensing submittals, which would prove their ability to operate within existing specifications.

INSTITUTE FOR ENERGY AND ENVIRONMENTAL RESEARCH
ARJUN MAKHIJANI
PAGE 2 OF 3

3. The Final Supplemental EIS should state that the percentage of plutonium-239 in the core of the reactors proposed to be used in the disposition program will not exceed the typical conditions that have prevailed in the European MOX program and for which there is substantial experience. These levels are about 5 percent total plutonium content (all isotopes), using reactor grade plutonium, which has about 60 percent plutonium-239, a far lower fraction than weapons grade plutonium (about 94 percent). This restriction is necessary for safety reasons, since the proportion of delayed neutrons upon which reactor control depends is much lower for plutonium-239 fission that for uranium-235 fission. The table below shows two examples of how the restriction of equivalent plutonium-239 content in the core reduces the percentage of weapons-grade plutonium that can be used in the MOX fuel of the disposition program. 2

	MOX Core loading fraction, %	Pu-total in MOX, %	Pu-239 core loading, %
Reactor grade MOX, France, typical	30	5.3	1.0
Weapons-grade MOX	30	3.4	1.0
Weapons-grade MOX	40	2.5	1.0

Note: Calculations are based on a plutonium-239 content of 60 percent for reactor-grade plutonium and 94 percent for weapons grade plutonium.

In the first example, for a 30 percent MOX fuel core loading in the disposition program, the weapons-grade plutonium content in MOX fuel would be restricted to 3.4 percent. For forty- percent core loading, it would be restricted to 2.5 percent plutonium. DOE should make these restrictions explicit in its Supplemental EIS. We note that although Electricite de France has asked for authorization to increase the total plutonium enrichment of reactor grade plutonium in MOX to about 7 percent, there is no substantial experience with this. This should not be used as the basis of the US disposition program. It would be contrary to repeated assurances that the US disposition program is based on extensive European experience.

4. The DOE should calculate the schedule and cost implications of the restrictions in the MOX loading and plutonium content as described above. It should specifically analyze at least the two examples in the table above. 3

5. The DOE should provide detailed safety justification for any increase in plutonium-239 content above one percent in the core (see table above). If the DOE's Record of Decision is to proceed with MOX (which IEER opposes), the DOE should require 4

FR004

FR004–2 **MOX RFP**

There is no NRC restriction or limit concerning the amount of plutonium 239 in the reactor core at this time. The DCS Team is proposing to accomplish DOE's plutonium disposition effort using a partial MOX core with approximately 4 percent plutonium 239. DOE recognizes that European MOX programs use different enrichment levels and reactor–grade plutonium. If any specific safety limits or restrictions on the proposed enrichment level are required, they would be identified by NRC during the license amendment process.

FR004–3 **MOX RFP**

DCS has proposed a partial MOX core with approximately 40 percent MOX fuel. As discussed in response FR004–2, there is no NRC restriction on plutonium 239 levels at this time. Since DOE does not anticipate NRC restrictions which would significantly affect the proposed plutonium 239 levels or proposed MOX loading, DOE has not evaluated the cost and schedule implications of the commentor's suggestion. Should significant changes in the proposed plutonium 239 content be required by NRC, DOE would conduct additional NEPA, cost, and schedule analysis, as appropriate.

FR004–4 **Facility Accidents**

This comment is addressed in response FR004–2.

reactor operators to seek explicit license approval on this specific issue, besides other licensing issues. The DOE should factor in increased risks of reactor accidents for increases in plutonium-239 content beyond the typical European experience. The DOE should also provide a detailed analysis of the various scenarios it is proposing for the plutonium-239 content in reactor cores in the US disposition program relative to the European experience. This analysis should include details on what steps the DOE and its contractors plan to take to address safety issues if the plutonium-239 content of the MOX cores in the disposition programs is greater than has been the case in typical European experience. 4

6. Getting a disposition program in place in Russia is a central reason that has repeatedly been put forward to justify the MOX program in the United States. The use of MOX in Russian light water reactors is likely to have some US funding, since Russia insists that it will not carry out such a program without external funding, MOX use in Russia will also have non-proliferation consequences for the United States, especially given that, unlike the United States, Russia plans at some time in the future to reprocess MOX spent fuel. Further, some of the radioactive fallout from a severe accident in a Russian reactor using MOX, should one occur, may affect the Untied States, as did the fallout from the Chernobyl. Therefore, the Supplemental EIS should analyze the environmental consequences of MOX use in Russia. 5

FR004

FR004–5 **Nonproliferation**

DOE acknowledges the commentor's concerns regarding the disposition of surplus Russian plutonium as MOX fuel, although programmatic and policy issues such as U.S. policies toward plutonium disposition in Russia are beyond the scope of this SPD EIS. The scope of this SPD EIS is focused on analysis of alternatives on whether and how much U.S. surplus plutonium should be used as MOX fuel, which technology should be used for immobilization, where to construct the proposed surplus plutonium disposition facilities that are needed, and where to perform lead assembly fabrication and testing.

Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. For fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

MARYLAND OFFICE OF PLANNING
LINDA C. JANEY
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MARYLAND *Office of Planning*

Parris N. Glendening
Governor

Ronald M. Kreitner
Director

May 10, 1999

Ms. Laura S. H. Holgate
Director
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

STATE CLEARINGHOUSE REVIEW - SPECIAL

State Application Identifier: MD990505-0416
Project Description: Draft Environmental Impact Statement - Supplement to the Surplus Plutonium Disposition (See MD980727-0797): an analysis of commercial reactor sites in 10 states that are proposed to irradiate mixed oxide fuel
State Clearinghouse Contact: Bob Rosenbush

Dear Ms. Holgate:

This is to acknowledge receipt of the referenced project. By copy of this letter, we are providing copies of the project to appropriate agencies, and requesting that they contact your agency directly with any comments or concerns by June 01,1999, and that they forward a completed response form and any comments to the Clearinghouse. 1

Please complete the attached form and return it to the State Clearinghouse upon receipt of notification that the project has been approved or not approved.

The State Application Identifier Number must be placed on all documents and correspondence regarding this project.

Please be assured that after June 01,1999 all intergovernmental review requirements will have been met in accordance with the Maryland Intergovernmental Review and Coordination Process (COMAR 14.24.04).

Sincerely,

Linda C. Janey

Linda C. Janey, J.D.
Manager, Clearinghouse & Plan Review Unit

LCJ:BR:mds
Enclosure
(* indicates with attachments)
cc: *MDE - Steve Bieber
*DHCD - Lucinder Jones
*MDSP - Carl Banaszewski
*DNR - Ray Dintaman
*MDOT - Ronald Spalding
*MEMA - Ruth Mascari
*OPC - Mary Abrams
*OPM - Bob Rosenbush

301 West Preston Street • Baltimore, Maryland 21201-2365
State Clearinghouse: (410) 767-4490 Fax: 767-4480

MR001

MR001–1 General SPD EIS and NEPA Process

The *Supplement to the SPD Draft EIS* describes the potential environmental impacts of using MOX fuel in the six reactors selected in three States: Catawba Nuclear Station Units 1 and 2 in South Carolina, McGuire Nuclear Station Units 1 and 2 in North Carolina, and North Anna Power Station Units 1 and 2 in Virginia. The *Supplement* also describes other program changes made since the SPD Draft EIS was published.

DOE acknowledges the State's receipt of the *Supplement* and entry into the Maryland Intergovernmental Review and Coordination Process. DOE will submit the form provided upon publication of the ROD.

MARYLAND OFFICE OF PLANNING
LINDA C. JANEY
PAGE 2 OF 2

MARYLAND *Office of Planning*

Parris N. Glendening
Governor

Ronald M. Kreitner
Director

MEMORANDUM

Please complete this form and return it to the State Clearinghouse upon receipt of notification that the project has been approved or not approved by the approving authority.

TO: **Maryland State Clearinghouse**
Maryland Office of Planning
301 West Preston Street
Room 1104
Baltimore, MD 21201-2365

DATE: _____
(Please fill in the date form completed)

FROM: _____
(Name of person completing this form.)

PHONE: (____)_____
(Area Code & Phone number)

RE: **State Application Identifier:** MD990505-0416
Project Description: Draft Environmental Impact Statement - Supplement to the Surplus Plutonium Disposition (See MD980727-0797): an analysis of commercial reactor sites in 10 states that are proposed to irradiate mixed oxide fuel

PROJECT APPROVAL	
This project/plan was: ☐ Approved ☐ Approved with Modification ☐ Disapproved	
Name of Approving Authority:	Date Approved:

FUNDING APPROVAL			
The funding (if applicable) has been approved for the period of _____, 199____ to _____, 199____ as follows:			
Federal: $	Local: $	State: $	Other: $

OTHER
☐ Further comment or explanation is attached

OPC24-1F

301 West Preston Street • Baltimore, Maryland 21201-2365
State Clearinghouse: (410) 767-4490 Fax: 767-4480

MR001

MARYLAND SAFE ENERGY COALITION
ROBIN MILLS
PAGE 1 OF 12

Comment on Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement (DOE/EIS-0283-DS)

From: Robin Mills, Director of the Maryland Safe Energy Coalition
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E-mail: rmills4@bcpl.net

To: Department of Energy, Office of Fissile Materials Disposition
c/o Supplement to the SPD EIS
P.O. Box 23786, Washington DC, 20026
Phone: 1-800-820-5156
Fax: 1-800-820-5156
E-mail: http://www.doe-md.com

Date: 28 June 1999

Dear Bureaucrats,

I request that the Supplement (DOE/EIS 0283-DS) be withdrawn and rewritten due to errors and omissions in the document which prevent the public from accurately assessing environmental risk. Details of those errors and omissions follow.

1. Earthquakes

The environmental synopsis section of the report, page 7, says "The frequency of an earthquake of this magnitude is estimated to be between 1 in 100,000 and 1 in 10,000,000 per year." No reference or supporting material is supplied to support this false claim. In fact, Charleston has suffered two devastating earthquakes since the city was founded in 1670. Charleston is approximately one hundred miles from the Svannah River site (SRS). Because both earthquakes occurred before modern methods for measurement were developed in 1903 or the Modified Mercalli Intensity Scale was developed (1931), the exact magnitude of these quakes is unknown. 1

(1)

MR012

MR012–1 **Facility Accidents**

The earthquake that damaged or destroyed the majority of structures in Charleston, South Carolina occurred on August 31, 1886, and measured 6.6 on the Richter scale. Sixty people lost their lives and property damage was estimated at 5 to 6 million dollars. Effects in the epicentral region included about 80 km (50 mi) of severely damaged railroad tracks and more than 1,300 km^2 (502 mi^2) of extensive cratering and fissuring. Structural damage was reported several hundred kilometers from Charleston (including central Alabama, central Ohio, eastern Kentucky, southern Virginia, and western West Virginia).

DOE Standards 1020-94, *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities* (April 1994), and 1022-94, *Natural Phenomena Hazards Characterization Criteria* (Change 1, January 1996), discuss the need to assess construction design requirements against maximum historical earthquakes in a given region or in tectonically analogous regions. The proposed surplus plutonium disposition facilities would be designed against seismic loading associated with a return period of 2,000 years (Performance Category PC–3).

The commentor is incorrect in presuming an equivalence between earthquake magnitudes that may be considered historically significant and those that would collapse the proposed MOX facility. As discussed in Appendix K.1.5.1, Accident Scenario Consistency, the frequency of seismic-induced total building collapse is developed as a margin below the frequency of seismic event against which the facility would be designed and constructed. The design-basis performance goal is that occupant safety, continued operation, and hazard confinement is assured for earthquakes with an annual probability exceeding approximately 1.0×10^{-4} per year. The transition from this criteria to a condition of total facility collapse has been qualitatively estimated using expert judgement to span at least an order of magnitude in frequency, resulting in an upper-bound estimate of 1.0×10^{-5} per year for total facility collapse. Given the large uncertainties in seismic behavior at such high magnitudes, accommodation has been made for the reasonable possibility that the frequency of total collapse may be significantly lower, hence the 1.0×10^{-7} per year lower bound.

I offer two references. "Earthquakes" by George A. Eiby, 1980, LCCCN # 80-10786, by Publisher Van Nostrand Reinhold Co., New York City, page 166,

"Another part of the United States not usually considered liable to earthquakes is South Carolina, but Charleston was badly damaged in 1886. This shock was one of the first to be the subject of an extended geological report, and there are some excellent photographs." I add that on page 189 this book lists the earthquake as having occurred on August 31, 1886.

"Historic Charleston" by Shirley Abbott, 1988 published by Oxmoor House Inc., Birmingham, AL 35201, on page 17, says,

"Earthquakes have come with terrible regularity, the worst perhaps in 1812 and 1886;..." On page 9 this book lists the founding of Charleston as 1670.

Two major earthquakes in 329 years of recorded history in the area. This evidence seems to indicate what the risk of future earthquakes might be, an average of one major quake every 165 years. If the MOX facility is to operate for 25 years, then the risk should be 25 in 165 or about one chance in seven. The supplement states, "an earthquake of sufficient magnitude to collapse the MOX facility." No data or refence is supplied to support the contention that the risk is as stated, but the historical record indicates the frequency might be much higher than the supplement admits. 1

The supplements stated risk of 1/100,000 to 1/10 million per year should be stated in terms the public can understand, by multiplying by the estimated facility lifetime, 25 years (?). Thus, the risk stated could be as low as one in four thousand that the MOX facility will collapse from an earthquake.

The whole treatment of the risk from earthquakes in the supplement is inadequate, obscures the risk to the public, does not supply proof or refences for its ascertations, and must, in my opinion; be withdrawn and rewritten.

(2)

MR012

The commentor is correct in stating that, for an assumed 25-year facility lifetime, the risk could be as high as 1 in 4,000 using the above factors. However, the MOX facility is projected to operate between 10 and 15 years. Therefore, the lifetime risk would be between 1in 6,666 and 1 in 1 million. Per DOE NEPA guidance, frequencies are reported on a per year basis because the duration of one year is the basis most commonly used for comparing accident frequencies.

MARYLAND SAFE ENERGY COALITION
ROBIN MILLS
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2. Omissions in Core Inventory Isotopic Ratios

The table K-2, on page K-3 in the Facility Accidents Appendix contains errors or omissions which do not allow the public to correctly assess the risk the proposed action requests.

The table lists Curium 244 ratio at .94, which is incorrect. The table correctly lists higher core inventories for all the transuranic elements, Pu 239, 240, 241, Am 241, and Curium 242. This makes sense as MOX, starting at 4 atomic mass units larger than uranium 235 fuel, and having a larger capture cross section (Pu 239 capture cross section = 269 barns where Uranium 235 capture cross section = 99 barns) would tend to form more large transuranic isotopes in the core inventory. For Curium 244 to be less abundant in MOX fuel as compared to uranium fuel would defy the laws of probability. I add, that the supplement supplies no reference for where this table K-2 came from or how it was determined, thus adding to the illegitamacy of its information.

This table is very important to understanding the safety of MOX fuel, and omissions in this table do not allow a correct assessment. The quantity of delayed neutrons produced by plutonium is much lower than the quantity produced by uranium fuel. This dearth of delayed neutrons would be apparent to the public if the core inventory ratios were made available for delayed neutron precursors (those isotopes that produce delayed neutrons). The primary sources of delayed neutrons are the isotopes of Bromine 87, 88, 89, 90 and 91 and Iodine 137, 138, 139, 140 and 141. None of these isotopes is included in table K-21. The DOE can not argue that the omission is due to the short half lives of these isotopes, because they list other isotopes of short half life, <u>and</u> these particular isotopes are crutial to reactor safety. Their omission invalidates the whole report in my opinion.

I even suggest that failure to include the Bromine isotopes might have been done on purpose because the results might throw the whole safety of the MOX program into jeopardy.

2

3

MR012

MR012–2 **Facility Accidents**

The curium 244 inventories shown in Appendix K were extracted from the output for the ORNL Isotope Generation and Depletion Code (ORIGEN) cases. Because the rate of curium 244 production is strongly dependent on burnup, it has a higher inventory level in LEU assemblies that are left in the reactor for three cycles than MOX assemblies that are left in the reactor for a maximum of two cycles. As a result, at the end of a cycle the ratio of curium 244 in a 40 percent MOX core would be about 6 percent lower than the ratio of curium 244 in a LEU core because more of the LEU core would be made up of assemblies that have been used for three cycles (33 percent of the core versus 20 percent of the core for the proposed MOX core).

It is true that burnups of 40 GWD/t or more result in higher fission gas production than LEU fuel at the same burnup. However, this does not automatically result in higher doses from reactors operating with MOX fuel. MOX fuel assemblies are engineered to accommodate this additional gas. In the event of a leaker, the gas is released into the reactor coolant and scrubbed through a series of filters that capture nearly all of the radionuclides so that any impact on dose would be expected to be small. Appropriate MOX fuel burnup limits will be established in concert with the NRC following a thorough safety review. It should be noted that reactors in Belgium and Germany typically use MOX fuel to burnups between 45 and 50 GWD/t and that while current French burnup limits are lower than that, French burnup limits for LEU fuel are also lower than those for U.S. reactors.

This SPD EIS analyzes offsite consequences and risks in terms of LCFs and/or prompt fatalities. Previous studies have determined that certain radioisotopes are primary contributors to offsite consequences due to their effects on humans and the environment. These radioisotopes are included in Table K–27. Radioisotopes bromine 87 through bromine 91 and iodine 137 through iodine 141 are not included in Table K–27 because they are not significant contributors to offsite consequences. Bromine 87 through bromine 91 and iodine 137 through iodine 141 are delayed neutron precursors with half-lives of less than 1 minute. They were included along with the hundreds of other isotopes in the ORIGEN analysis done to support this SPD EIS.

I reference Chart of the Isotopes by Knolls Atomic Power Laboratory, 13th edition July 1983. This chart shows the relative abundance of isotopes of particular atomic weight resulting from both the fission of uranium 235 and plutonium 239. From that chart,

	U-235 fission prod.	Pu-239 fission prod.	ratio
Percent w 87 amu	2.56%	.99%	.38
Percent w 88 amu	3.63%	1.36%	.37
Percent w 89 amu	4.88%	1.71%	.35

Because the plutonium 239 atom is 4 atomic mass units (amu) larger than uranium 235, the average fission products are also larger. In fact, that smaller of the two usual fission products from plutonium 239 is on average 5 amu larger than the smaller of the two fission products from uranium 235 fission. This results in a much smaller production of bromine isotopes which produce delayed neutrons.

The Knolls Atomic Power Lab chart referenced above does not give the amount of Bromine delayed neutron precursors, but only gives the abundance of all isotopes of that particular weight. The failure of table K-2 is that a more accurate assessment of the reduction of delayed neutrons is made impossible by the exclusion of crutial information from the table. 2

Another omission from the table is of even more significance. Tritium production is excluded. And any assessment of total fission product gas production is also totally absent from the supplement. Page 11 of the Environmental Synopsis provided by the reactor owner and MOX vendors states that the annual dose to the public would be the same with LEU fuel and MOX fuel. I dispute that.

I reference Irradiation Behavior of UO_2/PuO_2 Fuel in Light Water Reactors by W. Goll, H.P. Fuchs, R. Manzel and F. Schlemmer appearing in Nuclear Technology, April 1993, page 29 and MOX Fuel Experience in French Power Plants by P. Blanpain, X. Thibault and M. Trotabas appearing in Proceedings of the

(4)

MR012

Tritium is a significant contributor to offsite consequences. The MOX/LEU ratio for tritium was calculated to be 0.95. Since this value is lower for the MOX core than an LEU core, the current analysis is conservative with respect to tritium.

Xenon 135, the most important reactor poison, with a thermal absorption cross-section 60 times greater than samarium 149, is included in Table K–27. Samarium 149, a stable (nonradioactive) isotope, is not included because it is not a significant contributor to offsite consequences.

The assertion that “the radiation dose from normal operations to the surrounding population at the reactors is not expected to change” is supported by doses at the Electricité de France plants in France where the dose to the public has not increased since these plants started to use MOX fuel. While it is conventionally accepted that there are differences in fission product inventories and activation products between an LEU and MOX core during a fuel cycle, these differences would be small enough that essentially no dose differential could be observed to members of the public. It is necessary to recognize that even though the concentration of plutonium would be different in the two reactor cores during a given fuel cycle, the quantities of “key” radionuclides (i.e., radionuclides that typically account for the majority of public dose) released to the environment are expected to remain essentially the same; such radionuclides are: iodine 131, cobalt 60, cesium 137, and tritium.

NRC Regulatory Dose Limits to the Public (as established per 10 CFR 50, Appendix I) are based on derived annual values (e.g., 3 mrem/yr from liquid effluent); to show compliance with these values, the calculated reactor doses are presented in a parallel (i.e., annual) format. In support of this approach, site environmental effluent reports are also published on an annual basis and accordingly provide annual dose values associated with reactor operations.

MARYLAND SAFE ENERGY COALITION
ROBIN MILLS
PAGE 5 OF 12

1994 International Topic Meeting, Light Water Reactor Fuel Performance, page 718, both references which clearly point to a vastly greater fission product gas production from MOX fuel as compared to LEU fuel. If gas production is higher with MOX fuel, then the release of gas to the environment would also be higher, and thus the statement on page 11 of the vendor supplied information is incorrect and must be withdrawn and reassessed.

During the Chernobyl accident, the operators allowed reactor power to fall which increased the accumulation of reactor poisons. It was attempting to bring power back up, and overcome the poisons that caused the operators to withdraw control rods beyond design specifications, causing the accident. As such, it is of interest, with reguard to reactor safety and accidents, to know the production of reactor poisons produced by MOX fuel as compared to uranium fuel. The table K-2 again fails to inform the public of the true situation, especially by excluding Samarium production. The public is unable to assess the risk, or to even coment on the differences, because of this omission. 2

In summary to objection #2, the supplement fails to include:
Delayed neutron precursors production omitted
Fission product gas production, especially omitting Tritium
Fission product poison production omitted
Curium 244 production incorrectly stated
Source for the Core Inventory Isotopic Ratios info not stated.

3. MOX Accident Frequency Data

On page 33 of the supplement the statement is made that, "Although it has been suggested that the frequency of these accidents would be higher with MOX fuel present, no empirical data is available to support this." It is my contention that there is emirical data which DOE is overlooking, presenting a clear case of bias by the DOE officials. 3

I here list 12 specific aspects where MOX fuel lowers safety.

5

MR012

MR012–3 **Facility Accidents**

The commentor makes a series of 12 statements that he uses to deduce that MOX fuel is less safe than LEU fuel. The specific comments are addressed as follows:

The commentor's first through fourth and seventh through tenth statements discuss physical parameters that are different between LEU and MOX fuels and/or plutonium 239 and uranium 235 nuclei. The stated differences are correct: MOX fuel melts at a slightly lower temperature than LEU; plutonium does not conduct heat as well as uranium; fission gas release from pellets to the plenum is greater for MOX than LEU, at least for higher burnups (beyond 35,000 MW-day/MTHM); control rod worths are reduced with MOX fuel; the moderator coefficients are different; the neutron spectra are different and the lifetimes differ; and MOX fuel decay power is greater than LEU fuel in the long term (i.e., well after reactor shutdown). All of these facts are known and are incorporated in nuclear design packages that have been used to design fuel for reactors that are operating in Europe.

The fifth statement relates to power peaking. Power peaking can be an issue in partial MOX cores because of the neutron flux gradient between LEU and MOX assemblies. As noted by the commentor, the peaking issues in partial MOX cores are resolved by increasing the enrichment of uranium 235 at the edge of LEU assemblies that are adjacent to MOX assemblies and by decreasing the plutonium concentration at the edge of MOX fuel assemblies that are adjacent to LEU assemblies. These changes mitigate the flux gradient that would otherwise exist between adjacent LEU and MOX assemblies. DCS has proposed using graded enrichment fuel for the MOX assemblies only. The enrichment will vary by fuel rod within an assembly, not within individual fuel rods. DOE does not agree that this solution introduces opportunity for errors that would lead to an increase in accident risk.

The sixth statement relates to the degree of mixing of plutonium and uranium in MOX fuel. Whereas LEU fuel is inherently homogeneous on a microscopic scale, MOX fuel is not. However, the degree of mixing that is required need only ensure that plutonium islands in the MOX fuel are sufficiently small that adequate heat rejection to the rest of the pellet may ensue. The Micronized

1.) Lower melting point.

The Plutonium Handbook, by O.J. Wick, editor, 1980 by the American Nuclear Society states on page 263, section (c)(1), "Melting Behavior. The melting point of UO_2 has been reported many times in the literature and values ranging from less than 2700 C to about 2825 C can be found. At Hanford a value of 2730 $\pm$ 30 C has been consistently observed for UO_2. Only four melting points have been reported for PuO_2 - 2240 C, 2295 C, 2280 C, and 2400 C."

This is empirical data showing plutonium oxide has a lower melting point as compared to uranium oxide. This lower melting point does have an effect on safety, as a meltdown will occur at lower temperatures with fuel containing plutonium. When mixed with UO_2, the melting point of the mixture should exhibit a melting point somewhere between the two elements, which means, the melting point of MOX fuel will always be lower than the melting point of LEU fuel. This is a reduction in safety margin, and there is adequate empirical data available to prove this point.

Furthermore, this lower melting point is impacted by other adverse safety features of MOX fuel, such as corrosion attack on the cladding by plutonium at high temperatures, increased fission product gas production and power peaking at the MOX fuel boundaries, which taken together greatly increase the risk of release of plutonium and fission products into the coolant.

2.) Lower heat conductivity.

The Reactor Handbook, section Plutonium and Its Alloys C.R. Tipton editor, Volume 1, 2nd edition by Interscience Pub., 1960, New York, pages 280-1 found that the thermal conductivity of plutonium-uranium alloys was somewhat lower than that found for pure uranium. If so, and there is other evidence available to support this ascertation, then the temperature inside the MOX fuel rods will be higher than in the LEU fuel rods, as the transfer of heat will be slower. In concert with the increase

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MR012

Master (MIMAS) fuel fabrication process assures a well-mixed inventory of plutonium and uranium on a scale that precludes islands of plutonium particles in the uranium matrix from exceeding established size limits. The mixing operations in the MIMAS process ensure adequate mixing of the oxides; in fact, the MIMAS process was developed commercially in Europe with exactly this issue in mind.

In relation to the eleventh statement, worker exposure will increase marginally as reported in this SPD EIS. The increased dose, which is small and still well within NRC requirements, would result from handling and inspecting the fresh MOX fuel assemblies which are inherently more radioactive than fresh LEU fuel assemblies.

As to the commentor's concern about reactor vessel embrittlement, analyses performed for DOE indicated that the core average fast flux in a partial MOX fuel core is comparable to (within 3 percent of) the core average fast flux for a uranium fuel core. All of the mission reactors have a comprehensive program of reactor vessel analysis and surveillance in place to ensure that NRC reactor vessel safety limits are not exceeded.

The twelfth statement is an attempt to roll the previous statements together and conclude MOX fuel is not safe. The commentor mistakes design constraints and challenges for using MOX fuel as indicators of inherent decrements in safety. All of the differences between the two fuel types can be accommodated by proper engineering without any significant decrement in safety. Rigorous safety analyses and operational parameter assessments would be conducted, and a license amendment approved by NRC, prior to the use of MOX fuel in any U.S. reactor.

in fission product gas production, the creation of a gas gap between the fuel and cladding combined with lower heat conductivity leads to a much larger risk for localized fuel failure and melting.

3.) Higher fission gas production

Increased gas production threatens safety in at least three separate ways. The gas threatens the creation of a heat insulating gas gap between the fuel and cladding causing localized fuel melting, the gas creates pressure inside the fuel rods threatening cladding failure from bursting, and the gas threatens increased radioactive gas releases to the environment leading to an increase in local population exposures. The failure of DOE to admit to a doubling of Tritium production in MOX fuel, increased production of other gasses especially at higher burnups, and the threat this situation poses, should be a scandle.

The Plutonium Handbook (ibid) section on the Irradiation Behavior of UO_2-PuO_2 (section 20-3.2, pages 664-665) part (b) last sentence states, "All the irradiation specimens with the exception of two had a fission gas plenum to prevent excessive internal gas pressures at the high burnups." I quote this to point out that nuclear engineers have known about the fission gas production problem of plutonium fuels for a long time. 3

4.) Control Rods and Boron Worth Reduction

Both uranium and plutonium can either fission or absorb neutrons. The likelyhood that either will occur is expressed by the unit barns, which technically is 10^{-28} meters squared, or also 10^{-24} centimeters squared, or a cross sectional area measuring a trillionth of a centimeter squared. Both uranium and plutonium have cross sections for both fission and for capture. It turns out that plutonium is much more likely to absorb neutrons in the thermal energy region than uranium, or more precisely, the cross section for capture is 99 barns for uranium 235 and 269 barns for plutonium 239.

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MR012

Because plutonium absorbs so many thermal neutrons, the average energy (speed) of the remaining neutrons is higher (faster). The control rods are not as effective with faster neutrons, thus there is reduced control rod worth. There is also reduced boron worth. Boron is often added to the reactor water to help control the reactor. (called a shim) As a result, it has been decided to add additional control rods to reactors using MOX fuel.

A reduction in control rod effectivenems is empirically proveable and it definitely has an effect on reactor safety. This aspect is so important that it has already been decided to increase the number of control rods in MOX fueled reactors. The supplement should state that there is indeed a safety problem, and should state what exactly the DOE plans to do to reduce this safety hazard. It is my contention that even with additional control rods, the reduction of control rod and boron worth will make MOX fueled reactors inherently less safe.

5.) Power Peaking Problems

Due to intense absorbtion of thermal neutrons by plutonium, there is a tendency that an irregular power distribution results inside the core, producing a large power peak at the water-MOX fuel interface. This effect of Fick's Law can be stated that the rate of flow of the solute is proportional to the negative gradient of the solute concentration. In simply terms, because plutonium absorbs so many neutrons, there is a flow from uranium elements towards MOX elements (of neutrons) creating higher power levels around the MOX fuel elements. 3

I do not argue that this problem is unsolvable, but rather that solving this problem introduces a factor into the MOX fuel calculation which increases the risk of an accident. The solution is to create zones within each fuel rods which have differing grades of plutonium concentration to offset the power peaking problem. The complexity of this solution introduces the possibility of errors in fuel construction, labeling, shipping and loading.

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MR012

MARYLAND SAFE ENERGY COALITION
ROBIN MILLS
PAGE 9 OF 12

6.) Stoichiometry of MOX Fuel

The Plutonium Handbook (ibid) in the section on UO_2-PuO_2 fuels states on page 665, "Uniform solid solution assures a short heat transfer time constant so that the negative Doppler effect of U-238 can offset the positive effect of Pu-239." This is evidence that Pu-239 has a positive Doppler effect. The Doppler effect is the fuel temperature coefficient of reactivity, and is also sometimes called the prompt temperature coefficient. The Nuclear Regulatory Commission requires that the overall temperature coefficient be negative. The consequences of a positive coefficient are dire. If a coefficient is positive, then an increase in temperature causes an increase in reactivity which in turn increases temperature, producing a positive feedback loop that could cause rapid reactor dissassembly. By NRC requirements the combined temperature coefficients must be negative so that an increase in temperature causes a decrease in power thus limiting potentially dangerous transients.

The above evidence quoted is that Plutonium 239 has a positive Doppler coefficient. This can be compensated for by properly mixing the plutonium oxide with uranium 238 oxide. According to the literature, grains of plutonium larger than about ten microns will cause Doppler coefficient problems. The problem is, an increase in temperature leading to an increase in reactivity. This is a safety problem.

The problem is stated, the evidence is clear, there is a solution, but there is an increased risk that a batch of MOX fuel won't be properly mixed. The word stoichiometry refers to whether a solution is completely uniform in mixture. MOX fuel must be.

7.) Moderator Coefficient

Nuclear Reactor Engineering by S. Glasstone and A. Sesonske, 1994 Pub. by Chapman & Hall, says on page 280, section 5.103, "Hence, there will be a tendency for the initial negative contribution to df/dT (from uranium-235) to become positive (from plutonium-239)." In english that means trouble.

8.) Decay Heat

3

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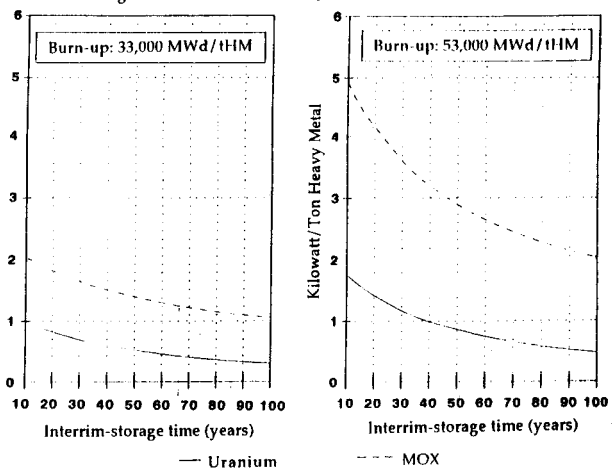
MR012

I reference the International MOX Assessment report entitled the Comprehensive Social Impact Assessment of MOX Use In Light Water Reactors by J. Takagi et.al., 1997 by Pub. Citizens Nuclear Information Center, Tokyo, Japan, page 190 shows the following table for decay heat generation is presented:

Fig. 5-2 Heat Generation of Spent UO_2 and MOX Fuel



190

Higher heat generation means MOX fuel must be stored in the cooling ponds longer and will generate more heat in a repository. I add that higher fissile material concentrations in spent MOX fuel will also be higher creating a greater criticality danger.

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MR012

MARYLAND SAFE ENERGY COALITION
ROBIN MILLS
PAGE 11 OF 12

9.) Delayed Neutrons

Nuclear Reactor Engineering (ibid) page 110 puts the fraction delayed at Uranium 235 = .0065% versus plutonium 239 = .0020%. Uranium fission produces over three times as many delayed neutrons. Delayed neutrons control the reactor period, the speed with which changes in power can be made. A reactor with only prompt neutrons could not be controlled the reactor period would be too short, a matter of milliseconds. The reduction from MOX fuel causes the DOE and other countries to rely on only one third MOX reactor cores. Thus, there has already been some concession that this is a problem.

The reduction of delayed neutrons means that one third MOX cores will always have fewer delayed neutrons, by several percent. This difference is not explored in any way in the supplement and this difference would tend to make the distance to an accident closer.

10.) Prompt Neutron Lifetime

The faster neutrons in MOX fuel already explained in #4.) have another effect. The average time it takes for a neutron to be emitted until it is absorbed or causes fission is the prompt neutron lifetime, typically about 24 millionths of a second for uranium fuel. The omission of the reduced safety margin from a shorter neutron lifetime should be included in the supplement. I say the increase in generations per second will be from about 41,000 generations per second of prompt neutrons to 49,000 generations per second for MOX fuel, an estimated 18% increase in generations per second. This will decrease reaction times slightly during transients, thereby decreasing the safety margin to an accident.

11.) Embrittlement and Exposures

Faster neutrons travel through more shielding. The supplement fails to account for the increased exposure to workers and increases in neutron embrittlement to reactor components.

12.) The Synergy Effect

Just one of the preceeding problems might not cause an accident, or significantly increase "the frequency of these accidents", but together:

3

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MR012

Summary of the ways MOX fuel is less safe in reactors

1. Plutonium has a lower melting point.
2. Plutonium does not conduct heat as well.
3. Fission product gas production is higher.
4. Control rod and boron worth is reduced.
5. Power peaking is more difficult to control.
6. Mixture of the fuel must be perfect.
7. The much different moderator coefficient is troublesome.
8. Decay heat production complicates shutdowns and disposal.
9. Delayed neutron reduction reduces safety margin.
10. More prompt neutron lifetimes reduces the safety margin.
11. Worker exposure increases and reactor embrittlement increase.
12. Taken together there is a preponderance of evidence that MOX fuel might not be as safe as uranium fuel.

I therefore challenge the catagorical statement made on page 33 of the supplement that, "there is no empirical data available to support this." I have presented several expert sources of the subject to show that there are concerns about these problems among experts. One aspect of the plutonium disposition process that can not be brought before experts is superstition, the thirteenth reason MOX is less safe. Plutonium is named after the god of the underworld Pluto, an object of fear and death. I fear that the greed of the nuclear industry will cause a huge catastrophe if they proceed. Mixing profit motive with plutonium is unlucky. I'm not afraid to use any arguement that happens to favor my position.

To summarize my main points about the supplement, the risk of earthquakes is lacking, the table of fission product ratios is lacking, and the catagorical statement about accident frequency needs to be reexamined.

Robin Mills

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(12)

MR012

MILLS, ROBIN
PAGE 1 OF 1

Question/ Information Request Card

Name: ROBIN MILLS
Address: 1443 GORSUCH AVE.
B-MORE, MD 21218
Phone: (410) 662-8483 Fax: (410) 235-5325
E-mail: rmills4@bcpl.net
Question/ Request: Charleston, S.C. was destroyed by earthquake in 18??. Please provide info. on date, strength, damage and est. frequency of S.C. earthquakes.

1

For further information contact:
U.S. Department of Energy, Office of Fissile Materials Disposition, MD-4
Forrestal Building, 1000 Independence Ave., SW, Washington, D.C. 20585
1-800-820-5156

DCR002

DCR002–1 **Geology and Soils**

The earthquake that damaged or destroyed the majority of structures in Charleston, South Carolina occurred on August 31, 1886, and measured 6.6 on the Richter scale. Sixty people lost their lives and property damage was estimated at 5 to 6 million dollars. Effects in the epicentral region included about 80 km (50 mi) of severely damaged railroad tracks and more than 1,300 km^2 (502 mi^2) of extensive cratering and fissuring. Structural damage was reported several hundred kilometers from Charleston (including central Alabama, central Ohio, eastern Kentucky, southern Virginia, and western West Virginia).

DOE Standards 1020-94, *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities* (April 1994), and 1022-94, *Natural Phenomena Hazards Characterization Criteria* (Change 1, January 1996), discuss the need to assess construction design requirements against maximum historical earthquakes in a given region or in tectonically analogous regions. The proposed surplus plutonium disposition facilities would be designed against seismic loading associated with a return period of 2,000 years (Performance Category PC–3). In addition, there is a deterministic element to the process which also requires evaluation against maximum historical events. Other new facilities at SRS have been assessed against the Charleston earthquake for design adequacy and the proposed facilities at SRS would undergo the same assessment.

MILLS, ROBIN
PAGE 1 OF 1

Question/ Information Request Card

Name: ROBIN MILLS
Address: 1443 GORSUCH AVE
BALTIMORE, MD. 21218
Phone: (410)662-8483 Fax: (410)235-5325
E-mail: rmills4@hcpl.net
Question/ Request: Fuel temperature coefficient of reactivity response curve for Pu 239 versus U-235 fuels. This is my 2nd request for this info. 1

For further information contact:
U.S. Department of Energy, Office of Fissile Materials Disposition, MD-4
Forrestal Building, 1000 Independence Ave., SW, Washington, D.C. 20585
1-800-820-5156

DCR001

DCR001–1 **MOX Approach**

Initial evaluations indicate that partial MOX fuel cores have a more negative fuel Doppler coefficient at hot zero power and hot full power, relative to LEU fuel cores for all times during the full cycle. These evaluations also indicate that partial MOX cores have a more negative moderator coefficient at hot zero power and hot full power, relative to LEU fuel cores for all times during the full cycle. These more negative temperature coefficients would act to shut the reactor down more rapidly during a heatup transient.

STEVENS, BARBARA
PAGE 1 OF 3

Public Statement:) Barbara Stevens + P.O. Box 35
46 Aldridge Rd Chimayo, NM
Greenbelt MD 20770 87522

(1) One of the reactors that would use MOX is close to Washington DC area
I am concerned that this is a complete experiment. Bomb plutonium has never been used for reactor fuel before.
I am not willing to take the risk. 1

Not ~~MOX use~~ making MOX fuel would result in more process waste that would likely go to WIPP, immobilization could make less process waste than MOX.
I live part of the year in New Mexico where I am a property owner. I oppose WIPP + I oppose all new plutonium waste generation. 2

page 1 of 2 Barbara Stevens
June 15, 1999

DCR006

DCR006–1 **MOX Approach**

The fabrication of MOX fuel and its use in commercial reactors has been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium. The environmental, safety and health consequences of the MOX approach at the proposed reactors are addressed in Section 4.28. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and domestic, commercial reactors selected to use MOX fuel, to ensure adequate margins of safety.

DCR006–2 **Waste Management**

DOE acknowledges the commentor's opposition to WIPP and all generation of new plutonium waste. Only TRU wastes generated by the proposed surplus plutonium disposition facilities would be shipped to WIPP. DOE alternatives for TRU waste management are evaluated in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997) and the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). As described in Appendix F.8.1, and the Waste Management sections of Chapter 4, it is conservatively assumed that TRU waste would be stored at the candidate sites until 2016, at which time it would be shipped to WIPP in accordance with DOE's plans.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being

(2)

AN OBSERVATION — that touches on MOX spent fuel waste — The Impact statement is a obvious and perhaps deadly flaw

Just when WIPP was opened (last month) — Sychronized with its opening —

A LARGE AD campaign blossomed for the Nuclear Power Industry.

AT the time WIPP opened (illegally — some think) there was a NM State Permit — Hearing to open WIPP — was underway AND has not yet been completed — GAO is still reviewing — has yet to — it AS we speak.

AT THAT Hearing — THE INFORMATION undisputed THAT the Radioactivity going into WIPP — will AT some point surface in the Pecos Rive, Rio GRANDE + Gulf of Mexico.

THEREFORE: TO take the MOX solution ~~than necessary~~ produce more radiative waste IN ORDER to disposse of the surplus Plutonium THAN absolutely necessary — (SINCE the waste can NOT actually be contained) — and to do this to ~~further~~ give a boon to the Nuclear power Industry — and further mask its True cost — makes MOX IS UNACCEPTABLE to anyone concerned with the ENVIRONMENT.

Thank You: Barbara Stevens June 15, 1999

3

DCR006

characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. The immobilized plutonium and MOX spent fuel are included in the inventory analyzed in that draft EIS.

DCR006–3 **Waste Management**

DOE acknowledges the commentor's concern regarding contamination of water resources in the vicinity of WIPP, although this issue is beyond the scope of this SPD EIS.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

The remainder of this comment is addressed in response DCR006–2.

STEVENS, BARBARA
PAGE 3 OF 3

Thank you for considering
my comments & the questions
they raise ~~[illegible]~~
Barbara Stevens
June 15, 199

DCR006

ACTION SITE TO STOP CASSINI EARTH FLYBY
JONATHAN MARK
PAGE 1 OF 1

1. MOX is a bad idea 1
2. DOE should hold hearings in all affected communities – especially those near the chosen sites.
PSR, along with many environmental and non-proliferation groups, supports the immobilization option and oppose the MOX option. For more see PSR's web site at: http://www.psr.org/cleanuppage.htm 2

WR002

WR002–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

WR002–2 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for public hearings in all communities affected by the use of MOX fuel, especially those near the proposed reactor sites. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina. Moreover, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be pursued per the SPD EIS ROD.

DOE acknowledges the commentor's support of the immobilization-only approach. As discussed in response WR002–1, DOE has identified as its preferred alternative the hybrid approach.

CHINA
LINDA J. SCHWEIHOFER
PAGE 1 OF 1

CHARTER TOWNSHIP OF CHINA

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Linda J. Schweihofer
Supervisor

Julie Ann Wallace
Clerk

Leona Markel
Treasurer

Robert R. Allen
Trustee

Edward Neiman
Trustee

Daniel Linsday
Trustee

Mary C. Green
Trustee

June 28, 1999

United States Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

RE: SURPLUS PLUTONIUM DISPOSITION ENVIRONMENTAL IMPACT STATEMENT

Dear Sirs:

Let me first introduce myself. I am Supervisor of China Charter Township, St. Clair County, China, MI. Representative David Bonior has been on the forefront of this very pressing issue as it could impact our Great Lakes area. Our fresh water lakes are a God-given gift, something to be protected and preserved.

There is no way we ever want to see plutonium coming through this area, passing over the Blue Water Bridge into Canada, or any other route, be it railway tunnel, etc. The danger is too great to take a chance that some disaster might occur. I ask, on behalf of my constituents, as well as all those living in our great state, but even more far reaching than that; I ask, for all those people across our great nation who visit our state to see all of its natural beauty, but more importantly, for those who rely on this fresh-water source. 1

Hear my plea and act accordingly. For this I shall be truly grateful.

Sincerely,

Linda J. Schweihofer
China Charter Township Supervisor

cc/ Representative David Bonior
Troy Feltman, St. Clair County Administrator
Lauren Hager, Representative

FR007

FR007–1 **Parallex EA**

Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. Because the Blue Water Bridge in Port Huron, Michigan, will be under renovation during the time of the proposed shipment, the route using that bridge was removed from consideration. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

CITIZENS FOR ALTERNATIVES TO CHEMICAL CONTAMINATION
KAY CUMBOW
PAGE 1 OF 2

Comments on the Suppement to the Surplus Plutonium Disposition Draft Enviornmental EImpact Statement (DOE/EIS-0283-DS)

To the DOE,

At the very least, the EIS should not be finalized UNTIL hearings are held in the communities close to the reactors that will be using MOX in the U.S.. It is unbelievable that the DOE would refuse to hold hearings in the communities that would be most affected. 1

I am strongly opposed to the use of MOX in reactors, as it does nothing to stop the production of plutonium. It will be used as fuel to PRODUCE MORE plutonium. It also will end any pretense the U.S. has had for stopping the global proliferation of bomb-grade materials. It is also being done without the knowlege of most taxpayers in this country. We after all are the ones who will pay for clean-up, for additional cancers and leukemias, for an increased arms race, for the heightened spread of nuclear power throughout an ecologically fragile world. We are the ones who will be left with poisoned groundwater, and soils, as well as having to dedicate not only our time and money but that of forseeable future generations to guarding the end "products" and endlessly repackacking them, when they leak (if that is indeed possible) lest all of the Earth's waters and soils and air become a toxic ruin.

The International Joint Commission of the Great Lakes has stated that there are some substances that are so toxic they should not be produced in the Great Lakes. They call those substances persistant toxins. Plutonium easily meets the criteria - toxic substances with a half-life of 8 weeks in water, that bioaccumulate. Plutonium also becomes 1,500 times more soluble to the human body if mixed with chlorine, according to Water Fit to Drink, a book found in most libraries in the state of Michigan. The International Joint Commission stated that the U.S. and Canadian governements should begin phase-out of radioactive substances that fit this criteria, and they add that plutonium is indeed a radionuclide of concern. The U.S. DOE should heed these words from the International Joint Commission. It is one world. Toxins move by air, by water, through the soil. We should not use plutonium to make more plutonium, when there is no safe way to dispose of it, and when using it subjects workers to its possible toxicity. What a legacy we leave for the generations to come! 2

What is worse is that this is done without taxpayers knowlege of the true costs, and with making a sham of democratic process. To deny hearings to residents around the three nuclear plants that would use MOX in the U.S. is a travesty of justice. To award contracts for production of MOX and irradiation of MOX fuel before the EIS is finalized and a record of decision is made, shows clearly that the DOE has rendered the NEPA process meaningless - that they are just going through the motions, and they do not even respect the taxpayers enough to go through all of them. 1

---- Kay Cumbow
Board Member, Citizens For Alternatives to Chemical Contamination
Co-Founder, Citizens For a Healthy Planet

My address is 15184 Dudley Road, Brown City MI, 48416

I will send a written copy, signed in the mail.

WR010

WR010–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's view that DOE has refused to hold public hearings in the communities of the potential reactor sites that would use the MOX fuel. During the 45-day public comment period on the *Supplement to the SPD Draft EIS*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement*. DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina. Moreover, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be pursued per the SPD EIS ROD.

As stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are made and announced in the SPD EIS ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before the ROD is issued, and options that would allow construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach.

WR010–2 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. To this end, surplus plutonium would be subject to stringent control, and the MOX facility

would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

The environmental, safety and health consequences of the MOX approach in the proposed reactors are addressed in Section 4.28. Analyses in Chapter 4 of Volume I for construction and normal operation of the proposed surplus plutonium disposition facilities at the DOE candidate sites indicate there would be no discernible contamination to drinking water, either from the deposition of minute quantities of airborne contaminants into small water bodies or from potential wastewater releases. Therefore, it is estimated that no measurable component of the public dose would be attributable to liquid pathways. Further, because the candidate sites are located in Idaho, South Carolina, Texas, and Washington, the chances of the Great Lakes being affected are remote.

NUCLEAR-FREE GREAT LAKES ACTION CAMP
KEVIN KAMPS
PAGE 1 OF 2

Monday, June 14, 1999

Dear U.S. D.O.E. officials,

People in the Great Lakes region – in the U.S. and Canada – are very opposed to the use of weapons plutonium in commercial reactors. For years, citizens on both sides of the border have rallied together to stop even the Los Alamos to Chalk River test shipment of MOX from passing through our region. This should have served loud notice of our strong opposition to the entire proposed MOX program. Such citizen pressure has moved politicians at all levels of government – from county commissions to a U.S. Senator – and from different parties (from Democratic U.S. Representatives to Republican Governors) to take stands against the test shipment as well.

From this international, grassroots network-building has sprung the Nuclear-Free Great Lakes Action Camp, taking place this August on the Lake Michigan shoreline in southwest Michigan. Concerned citizens groups from Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, and Ontario have joined forces to organize this week-long event. Hundreds from throughout the region and across the country will attend, representing the environmental, peace, justice, human rights, and indigenous peoples movements, scientists, and government officials who recognize that MOX is a significant concern to their constituencies. People who have struggled for abolition of nuclear weapons will join with opponents of nuclear power to present a unified front against the proposed MOX program.

Preventing MOX fuel from being transported through or used anywhere in the Great Lakes basin – such as at the Bruce reactors in Ontario on northern Lake Huron – is a top goal of the Action Camp. Representatives from the Institute for Energy and Environmental Research and Nuclear Information and Resource Service in the U.S., and from the Canadian Coalition for Nuclear Responsibility and the Nuclear Awareness Project in Canada, will lead the discussion among the concerned citizens gathered from both countries. Out of that democratic process, a strong opposition to MOX will emerge. Participants will return home to their communities in the U.S. and Canada educated about the many dangers of MOX, and equipped with training to launch campaigns against MOX in their own areas. 1

The Great Lakes resistance to MOX is networked with resistance in other regions of the U.S. and Canada, as well as with Russia and other countries overseas. This grassroots movement is building.

Our network will reunite in September, 1999, at the International Joint Commission biannual meeting in Milwaukee, Wisconsin. Our international coalition will commend the IJC for listing radionuclides as persistent toxins for which ***zero discharge*** into the Great Lakes should be allowed. MOX could lead to a higher risk of a catastrophic nuclear disaster, for the reactors are aged and were never designed for its use. Such a catastrophe would be significantly worse than before, for the MOX would contain so much plutonium. Then there are the dangers of transporting MOX to reactors, and storage at or transport away from the reactors of the high-level wastes containing larger quantities of plutonium. For these reasons and others, we will urge the IJC to oppose MOX, for MOX threatens the Great Lakes, which the IJC is mandated to protect.

So aptly named for the God of the Dead, plutonium is one of the most carcinogenic poisons known, and can of course yield the ultimate weapons of mass destruction. Thus, it must be isolated from the biosphere and safeguarded from reuse in weapons, not unleashed in vast quantities onto the roads and rails, and scattered across the continent in reactors and processing plants. To save time, to save money – and, so much more importantly – to protect the environment and public health, and to genuinely safeguard against nuclear weapons proliferation, immobilization of surplus weapons plutonium and isolation from the living environment is the way to go, not the misdirected MOX proposal. The Great Lakes are a precious source of life to tens of millions of people and countless other forms of life. Concerned citizens organizations in the U.S. and Canada stand ready to protect the Great Lakes basin from the grave threats posed by MOX.

Sincerely, Kevin Kamps

Kevin Kamps
Southwest Michigan organizer
Nuclear-Free Great Lakes Action Camp
P.O. Box 50814
Kalamazoo, MI 49005

P.S. Why are you not holding hearings in our region, where we are so concerned and would be so significantly impacted by the use of MOX at the Bruce Reactors on Lake Huron? Plutonium decisions should not be plutocratic! 2

DCR015

DCR015–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The transportation of weapons-usable fissile materials through Michigan is beyond the scope of the proposed action analyzed in this SPD EIS. Shipments of a small quantity of MOX fuel from LANL to Canada were part of a separate proposed action. DOE has prepared an *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999, on fabrication of the MOX fuel and its transportation to Canada. This EA and FONSI can be viewed on the MD Web site at http://www.doe-md.com.

The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. Furthermore, although no U.S. commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core.

The environmental, safety and health consequences of the MOX approach at the proposed reactors are addressed in Section 4.28. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and domestic, commercial reactors selected to use MOX fuel, to ensure adequate margins of safety.

DCR015–2 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request regarding public hearings in the Michigan region. The irradiation of MOX fuel as discussed in the *Supplement to the SPD Draft EIS* involves proposed reactors located in

North Carolina, South Carolina, and Virginia, and not the use of the Canadian Bruce reactors. DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement*. DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site.

In the *Storage and Disposition PEIS* ROD, DOE retained the option to use some of the surplus plutonium as MOX fuel in reactors (e.g., the Bruce reactors), which would have only been undertaken in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the SPD Draft EIS was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is not actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. This action is addressed in the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999. If Russia and Canada agree to disposition Russian surplus plutonium in CANDU reactors in order to augment Russia's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

PORT HURON
HONORABLE STEVEN G. MILLER
PAGE 1 OF 2

OFFICE OF THE MAYOR
CITY OF PORT HURON
100 MCMORRAN BOULEVARD, PORT HURON, MICHIGAN 48060
PHONE: 810-984-9740; FAX: 810-982-0282

1999-006595 MAY 3P 4:12

April 29, 1999

Fredrico Pena, Secretary
Department of Energy
1000 Independence Avenue SW
Washington, D.C. 20585

Dear Mr. Pena:

I have enclosed Resolution #9 adopted by the City Council of the City of Port Huron, in opposition to the transportation and use of warhead plutonium throughout the Great Lakes Basin.

Please ensure this resolution of forwarded to the appropriate department so that our objection is officially noted.

Sincerely,

Steven G. Miller
Mayor

SGM/rch

MR002

Resolution #9
April 26, 1999

Councilmember Sample-Wynn offered and moved the adoption of the following resolution:

WHEREAS, the United States Department of Energy has developed a plan to "dispose" of a large portion of the Soviet and U. S. stockpile of fissile materials (weapons-grade plutonium and highly enriched uranium) and, in particular, by producing MOX which is weapons grade plutonium mixed with uranium oxide; and

WHEREAS, the Department of Energy, along with Russia, plans to transport and test MOX at Chalk River, Canada, with the eventual plan to transport much larger amounts for many years for use in CANDU reactors, including the Bruce reactors on Lake Huron; and

WHEREAS, the Great Lakes Basin contains one-fifth of the world's fresh water and 95% of the United States' fresh water, provides drinking water to 40 million residents, provides a safe place to live, work and recreate, and provides a home to diverse and unique wildlife and plants; and

WHEREAS, the unplanned release of plutonium as a result of a traffic or shipping accident or terrorist attack could have considerable consequences to the Great Lakes Basin; and 1

WHEREAS, due to a public outcry in 1998, the Blue Water Bridge was successfully removed from the proposed MOX test routes;

NOW, THEREFORE, BE IT RESOLVED that the Port Huron City Council opposes any and all tests in the Great Lakes Basin of Russian and U. S. warhead plutonium converted to MOX that are planned by the United States Department of Energy; and

BE IT FURTHER RESOLVED that the Port Huron City Council opposes the transportation and use of warhead plutonium converted to MOX throughout the Great Lakes Basin; and

BE IT FURTHER RESOLVED that a copy of this resolution be forwarded to the United States Department of Energy Office of Fissile Materials Disposition and each of our appropriate federal and state elected officials.

ADOPTED/~~REJECTED~~ UNANIMOUSLY

I hereby certify that the above is a true and correct copy of a resolution adopted by the Port Huron City Council at its regular meeting of April 26, 1999.

Pauline M. Repp, CMC/AAE
City Clerk

MR002

MR002–1 **MOX Approach**

DOE acknowledges the commentors' opposition to the transportation and use of weapons-usable plutonium in MOX fuel. In the *Storage and Disposition PEIS* ROD, DOE retained the option to use some of the surplus plutonium as MOX fuel in CANDU reactors, which would have only been undertaken in the event that a multilateral agreement were negotiated among Russia, Canada, and the United States. Since the SPD Draft EIS was issued, DOE determined that adequate reactor capacity is available in the United States to disposition the portion of the U.S. surplus plutonium that is suitable for MOX fuel and, therefore, while still reserving the CANDU option, DOE is not actively pursuing it. However, DOE, in cooperation with Canada and Russia, proposes to participate in a test and demonstration program using U.S. and Russian MOX fuel in a Canadian test reactor. This action is addressed in the *Environmental Assessment for the Parallex Project Fuel Manufacture and Shipment* (DOE/EA-1216, January 1999) and FONSI, signed August 13, 1999. If Russia and Canada agree to disposition Russian surplus plutonium in CANDU reactors in order to augment Russia's disposition capability, shipments of the Russian MOX fuel would take place directly between Russia and Canada.

LINDHOLM, SARAH J.
PAGE 1 OF 5

I am alarmed at the idea of using surplus weapons plutonium in fuel for nuclear reactors (known as mixed-oxide or MOX fuel). A better method of disposition would be to immobilize the plutonium – that is, to mix it with ceramic or glass and to provide a radioactive barrier to further prevent theft and diversion. This would solve some problems without as many safety risks. 1

It is not demonstrably safe to use MOX fuel in existing reactors, almost none of which are designed to run on plutonium fuel. According to a study released by the Nuclear Control Institute in January, the use of a one-third core of warhead plutonium fuel in U.S. nuclear reactors could result in up to a 37% increase in cancer risk to the public in the event of a severe accident. That is irresponsible and unacceptable, and furthermore, no citizen especially wants the government to give him cancer. 2

In addition, it is unconscionable to implement such a program without involving the public on more than the present superficial level. 3

Minatom officials claim that plutonium is a valuable energy resource. Yet by their own estimates, plutonium-based nuclear energy will be more expensive than uranium-based nuclear energy for at least several decades. US officials say that MOX is not being pursued for its energy value but rather that it has been chosen to facilitate quick disposition of plutonium in Russia. However, immobilization is likely to be a much faster and cheaper method of plutonium disposition than MOX. 4

WR007

WR007–1 **Alternatives**

DOE acknowledges the commentor's opposition to the use of surplus weapons-grade plutonium in MOX fuel and irradiating it in nuclear reactors. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

DOE does not agree that the MOX approach is inherently more dangerous than the immobilization approach. DOE and NAS have conducted studies to compare risks, including the nuclear material security and proliferation risks of alternatives analyzed in this SPD EIS. These studies include the *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), *Proliferation Vulnerability Red Team Report* (SAND97-8203, October 1996), *Management and Disposition of Excess Weapons Plutonium* (NAS, 1994), and *Management and Disposition of Excess Weapons Plutonium, Reactor-Related Options* (NAS, 1995). As discussed in Section 4.28.2.5, studies by NAS have led it to the following conclusion: "no important overall adverse impact of MOX use on the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities will involve factors not related to fuel composition and hence unaffected by the use of MOX rather than LEU fuel."

The environmental, safety and health consequences of the MOX approach at the proposed reactors are addressed in Section 4.28. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and domestic, commercial reactors selected to use MOX fuel, to ensure adequate margins of safety.

WR007–2 **Facility Accidents**

While it is understood that there are differences from the use of MOX fuel versus LEU fuel, these differences are not expected to result in substantial changes in the frequency of severe accidents in MOX-fueled reactors. Because differences between MOX fuel and uranium fuel are well characterized, they can be accommodated through fuel and core design. The fabrication of MOX fuel and its use in commercial reactors has been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium. Before any MOX fuel is used in the United States, NRC would have to perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications.

This SPD EIS analyzed several reactor accidents, including both design basis and beyond-design-basis accidents. For MOX fuel, as compared to LEU fuel, there is an increase in risk, about 3 percent, for the large-break loss-of-coolant accident (the bounding design basis accident). The largest increase in risk for beyond-design-basis accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. In the unlikely event this beyond-design-basis accident were to occur, the expected number of LCFs would increase from 2,980 to 3,390 with a partial MOX core and prompt fatalities would increase from 54 to 60. Both of these accidents have an extremely low probability of occurrence. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48 thousand per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

WR007–3 **General SPD EIS and NEPA Process**

The SPD Final EIS was not issued until specific reactors had been identified and the public had an opportunity to comment on the reactor-specific information. As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on

the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. For those interested parties who could not attend the hearing, DOE provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be pursued per the SPD EIS ROD.

WR007–4 **Cost**

Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com. These documents, as well as data reports and documents used in the preparation of this EIS, are available in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

Operation of the proposed surplus plutonium disposition facilities is expected to take approximately the same amount of time for either the immobilization-only approach or the hybrid approach. The difference in timing for the hybrid approach is associated with the amount of time that MOX fuel would be irradiated in domestic, commercial reactors.

As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach, which includes both immobilization and MOX fuel, would be more expensive than the immobilization-only approach. However, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing either approach by itself as discussed in response WR007–1.

LINDHOLM, SARAH J.
PAGE 4 OF 5

Fresh MOX fuel in commerce presents a proliferation threat as the plutonium in it can be removed and used for weapons purposes. A 1997 DOE non-proliferation assessment of plutonium disposition found "that fresh MOX fuel remains a material in the most sensitive safeguards category, because plutonium suitable for use in weapons could be separated from it relatively quickly and easily." 5

Instead of solving the problem of placing plutonium into safe and secure forms, a MOX program is likely to promote further plutonium processing and use, something that is undesirable on environmental, safety, economic, and non-proliferation grounds. 6

Plutonium disposition programs must include significant and meaningful public input, including access to all information, including costs and operating records of the various actors involved in a disposition program. The public in the communities most directly affected should have ample opportunity for meaningful input into the decision-making process. 7 All US funding of Russian programs should be contingent on compliance with the appropriate environmental and public process laws. 8

Sarah J. Lindholm

WR007

WR007–5 **Nonproliferation**

In order to address security against terrorist-related incidents, all intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications equipment and additional couriers. Further, DOE does not anticipate the need for any additional security measures at reactor sites, other than for the additional security applied for the receipt of fresh fuel. Commercial reactors currently have armed security forces, primarily to protect against perimeter intrusion. There would be increased security for the receipt and storage of fresh MOX fuel, as compared with that for fresh LEU fuel, for additional vigilance inside the perimeter. However, the increased security surveillance would be a small increment to the plant's existing security plan. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a potential geologic repository built in accordance with the NWPA.

WR007–6 **Nonproliferation**

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

WR007–7 **General SPD EIS and NEPA Process**

This comment is addressed in response WR007–3.

WR007–8 **DOE Policy**

For fiscal year 1999 (starting October 1998), the U.S. Congress appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement.

In July 1998, Vice President Gore and former Russian Prime Minister Sergei Kiriyenko negotiated the *Agreement on Scientific and Technical Cooperation in the Management of Plutonium* that enables the two countries to explore mutually acceptable strategies for disposing of surplus weapons-usable plutonium. The U.S. and Russian governments are currently working on their respective plutonium disposition programs under a *Joint Statement of Principles* which was signed by Presidents Clinton and Yeltsin on September 2, 1998, in Moscow. The two presidents agreed on principles to guide implementation of this program by building industrial-scale facilities in both countries. In 1999, negotiations are proceeding for a *Bilateral Plutonium Disposition Agreement* to enable the United States and Russia to work together to ensure that the disposition facilities are technically viable and that progress is made on implementing the selected approaches. Through these agreements and others that may be negotiated, the United States is attempting to work with Russia to safely disposition its surplus plutonium.

Nuclear Regulatory Commission Plant Performance Reviews of Proposed MOX Reactors
Shortcomings, problems, errors, and poor engineering performance

McGuire NRC Plant Performance Review, March 25, 1999
These Duke Power plants in North Carolina began operation in 1981 and 1983. From the NRC's PPR:

"...shortcomings in oversight of diesel generator vendors were noted."

"Several human performance errors during routine plant evolutions were identified..."

"Minor program and procedure problems still indicate room for improvement. In addition to core inspections, a regional initiative inspection is planned for ice condenser inspections during the Unit 2 refueling..."

"An area for improvement was engineering programs and processes such as ... procedures and work instructions for maintenance and calibration of instrumentation...."

"... some fire protection system maintenance material conditions weaknesses have been noted..."

"Self-identified problems with fire barrier penetration seals were reported to the NRC and improvements are being made."

Catawba NRC Plant Performance Review, March 25, 1999
These Duke Power reactors began operation in 1985 and 1986. The following excerpts are from the NRC's PPR:

"Unit 1 experienced a forced outage of approximately three weeks in duration due to blocked flow channels in portions of the ice condenser."

"Engineering performance continued to be acceptable but declined since the last assessment as a result of emergent issues rooted in shortcomings in engineering's performance."

"Examples of poorly supported or non-conservative operability or root cause determinations were noted."

"Problems in maintenance programs and processes included examples of surveillance deficiencies for ventilation systems and ice condensers."

"The engineering performance decline was the result of deficiencies in auxiliary building ventilation system testing, an overheating event of the upper surge tank, and degraded conditions in the Unit 1 ice condenser. While the issues were ultimately resolved properly, each had roots in poor engineering performance."

North Anna NRC Plant Performance Review, March 24, 1999
Virginia Electric and Power Company's North Anna reactors started up in 1978 and 1980. From the NRC's PPR:

"...several examples of inadequate or untimely problem resolution were noted."

"A number of human performance problems, especially during refueling outages, indicates a decline in operations performance during infrequently performed evolutions."

"...poor material conditions of the auxiliary feedwater pipe tunnels and continued problems with microbiological induced corrosion in the service water system...."

"...however a negative trend was noted in the area of problem resolution. There were performance-based examples of inadequate corrective actions where equipment problems were not aggressively pursued and corrected. The initial proposed corrective action for a violation involving pipe supports not installed in accordance with the drawings was inadequate. Only after NRC involvement was adequate corrective action initiated. Corrective actions to resolve corrosion of the auxiliary feedwater tunnel pipe supports which had been identified in September 1996 were also inadequate. An AFW safety system engineering inspection (SSEI) conducted in July 1998 concluded that the system met the design basis requirements, however, mechanical calculations had numerous discrepancies."

6

FR005

Esse quam videre

FR005–9 General SPD EIS and NEPA Process

DOE acknowledges the commentor's request for additional public hearings in the communities surrounding the proposed reactor sites that would use the MOX fuel. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public meeting held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

KARPEN, LEAH R.
PAGE 1 OF 3

Leah R. Karpen

400 Charlotte St #803
Asheville NC
28801

Phone: 828-254-5489
FAX: 828-254-5489
email:

Friday, June 18, 1999

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

Dear Decision-Makers:

Use of Mixed-Oxide Fuel

Since I was unable to attend the June 15th hearing in Washington, DC, I wish to comment on the proposed plans for disposition of weapons-grade plutoniun

I strongly oppose the use of weapons-grade plutonium in commercial nuclear power reactors, that called mixed-oxide fuel or MOX for short. 1

The Department of Energy should hold hearings near the potential reactor sites that would use MOX fuel. Sites were chosen in South Carolina, North Carolina and Virginia. People living in those areas should have a chance to express their opinion on the proposals; and you would have a chance to hear from them. 2

The use of MOX in the United States could encourage other nations to embrace a plutonium fuel economy. Also, a severe accident at a reactor fueled with MOX could cause many cancers. 3

Immobilization of plutonium in glass costs less than MOX and is successfully underway already. When utilities use MOX they will be heavily subsidized by the government; in other words, taxpayers would be paying utilities to use MOX. 1

Any number of organizations have protested the use of plutonium as an energy source. Is it not time for the government to listen to its people? 4

Sincerely yours,

(Mrs.) Leah R. Karpen
Concerned Citizen

MR008

MR008–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach, which includes both immobilization and MOX fuel, would be more expensive than the immobilization-only approach. However, pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

MR008–2 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for additional public hearings in the communities surrounding the proposed reactor sites that would use the MOX fuel. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public meeting held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the

proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

MR008–3 **Nonproliferation**

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials. DOE will continue to discourage Russia from reprocessing its spent nuclear fuel and starting a plutonium cycle but this issue is beyond the scope of this SPD EIS.

There are differences in the expected risk of reactor accidents from the use of MOX fuel. Some accidents would be expected to result in lower consequences to the surrounding population, and thus, lower risks, while others would be expected to result in higher consequences and higher risks. There is an increase in risk, about 3 percent, for the large-break loss-of-coolant accident (the bounding design basis accident). The largest increase in risk for beyond-design-basis accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. In the unlikely event this beyond-design-basis accident were to occur, the expected number

of LCFs would increase from 2,980 to 3,390 with a partial MOX core and prompt fatalities would increase from 54 to 60. Both of these accidents have an extremely low probability of occurrence. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48 thousand per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

MR008–4 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to produce energy. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

June 9,1999
104 Stuyvesant Rd.
Asheville, N.C. 28803

Mr. Bert Stevenson
NEPA Compliance Officer
U. S. Dept. of Energy
P.O. Box 23786
Washington, D.C. 20026

Dear Mr. Stevenson:

After reading and hearing about the plans forthe production of Mixed-Oxide Fuel (MOX) I am writing to say that I am opposed to this. It is not the way to safely dispose of the plutonium from dismantled nuclear weapons . It would add to rather than lessen the immense radioactive waste burden. The plutonium shoule be immobilized with the utmost vigilance in glass. This lethal material should not be used and should be rendered as safe as possible . 1

I do not want my tax money used to bolster up nuclear sources of electricity. 2

Sincerely,

Llewellyn Perry

cc: The President ofthe United States
Mr. Frederic Pena, Secretary of Energy
Senator Charles Carter, N.C. Assembly
Senator Steve Metcalf, " "
N.C. Publice Utilities Commission
Duke Power

MR005

MR005–1 **Alternatives**

DOE acknowledges the commentor's support of alternatives that consider only immobilization. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

MR005–2 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

PHYSICIANS FOR SOCIAL RESPONSIBILITY
LEWIS E. PATRIE
PAGE 1 OF 2

STATEMENT BY LEWIS PATRIE, M.D., M.P.H, PRESIDENT OF WESTERN NORTH CAROLINA OF PHYSICIANS FOR SOCIAL RESPONSIBILITY

DOE SUPPLEMENTAL EIS HEARING ON PLUTONIUM DISPOSITION

14 JUNE 1999, WASHINGTON, D.C.
presented by Curt Wozniak, Physicians for Social Responsibility

The U.S. Department of Energy's current strategy in developing its Environmental Impact Statement is inadequate in that DOE has never held a hearing near the potential reactor sites where MOX fuel would be utilized. DOE proposes that most of the 50 tons of plutonium declared surplus by the military would be converted into MOX for use in civilian nuclear power reactors. Already DOE has signed an $130 million contract for the irradiation of plutonium MOX fuel with DCS, a consortium of contractors including: COGEMA, Inc., Duke Engineering and Services, and Stone and Webster. The six reactor sites that have already been chosen for MOX use are located in South Carolina, North Carolina, and Virginia. 1

The one remaining public hearing announced by the DOE is scheduled in Washington, DC on June 15. This is not a satisfactory alternative to holding hearings in Charlotte and Charlottesville with adequate notice and publicity so that an optimum amount of dialogue and testimony could be aired by citizens who would live closest to where the plutonium fuel would be used .

Furthermore, the characteristics of MOX fuel, as compared with existing nuclear fuel, with its increase in energy output, increasing the radioactive bombardment of the reactor chambers, its characteristic of more rapid increase of energy output and the potential for greater release of carcinogenic nuclides in the event of a significant accident all suggest that it is not as desirable an alternative as the immobilization option. 2

For these latter reasons I oppose the MOX option, but if DOE continues to move forward with this ill advised plan, it would seem that consistent with our democracy, DOE is obligated to holds hearings as I described above.

Lewis E. Patrie, M.D., M.P.H.
99 Eastmoor Drive
Asheville, N.C. 28805

(828) 299-1242 (R)
(828) 258-3500 (o)

DCR014

DCR014–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for additional public hearings in Charlotte and Charlottesville so citizens living closest to the proposed reactor sites could provide dialogue and testimony. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public meeting held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

DOE conducted a procurement process in accordance with DOE NEPA regulations 10 CFR 1021.216. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. As stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are made and announced in the SPD EIS ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before

the ROD is issued, and options that would allow construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach.

DCR014–2 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. Differences between MOX fuel and uranium fuel are well characterized and can be accommodated through fuel and core design. For example, MOX fuel assemblies can be placed away from reactor vessel walls to decrease the possibility of premature embrittlement. Before any MOX fuel is used in the United States, NRC would have to perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications. NRC would also consider the plants' ability to use MOX fuel safely taking into account the material condition of the proposed reactors.

There are differences in the expected risk of reactor accidents from the use of MOX fuel. Some accidents would be expected to result in lower consequences to the surrounding population, and thus, lower risks, while others would be expected to result in higher consequences and higher risks. There is an increase in risk, about 3 percent, for the large-break loss-of-coolant accident (the bounding design basis accident). The largest increase in risk for beyond-design-basis accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. In the unlikely event this beyond-design-basis accident were to occur, the expected number of LCFs would increase from 2,980 to 3,390 with a partial MOX core and prompt fatalities would increase from 54 to 60. Both of these accidents have an extremely low probability of occurrence. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48 thousand per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

The remainder of this comment is addressed in response DCR014–1.

UNITARIAN UNIVERSALIST CHURCH OF ASHEVILLE
JEANNETTE O. PATRIE ET AL.
PAGE 1 OF 1

UNITARIAN UNIVERSALIST CHURCH OF ASHEVILLE
SOCIAL ACTION COMMITTEE
ONE EDWIN PLACE
ASHEVILLE, N.C. 28801

May 16, 1999

Secretary of Energy Bill Richardson
1000 Independence Ave. SW
Washington, DC 20585

Dear Secretary Richardson

We are concerned about proposed the plutonium fuel use in civilian nuclear reactors and ask for formal public hearings on MOX to be held in cities near the nuclear reactors selected for MOX: Charlotte, NC and Charlottesville VA. 1

Sincerely yours,

Jeannette O. Patrie
Louis E. Patrie, MD
Ruth Beard
Al Mijovic
Nancy Palmberg
[illegible]
[illegible]
Robert M. MacPherson, M.S., Ed.
[illegible]
Timothy Pakaro, M.D.

MR003

MR003–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentors' request for additional public hearings in Charlotte, North Carolina, and Charlottesville, Virginia. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public meeting held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

36 Bust-O'-Dawn Drive
Waynesville, NC 28786
June 22, 1999

U.S. Department of Energy
Office of Fissile Materials Disposition
PO Box 23786
Washington, DC 20026-3786

Dear Friends:

I write to urge you not to use weapons-grade plutonium in commercial nuclear power reactions, called mixed-oxide fuel, or MOX. Instead, I urge you to employ the option of immobilizing the plutonium in glass. 1

I believe MOX is a bad idea because it is dangerous, is slower and more expensive, is not needed, and is not wanted.

I also urge you--before implementing any policy for disposing of weapons-grade plutonium--to hold hearings in all affected communties--especially those near the chosen reactor sites. It is only fair that the people who would be affected by this dangerous material should have an opportunity to be heard. 2

Sincerely,

Dr. Douglas E. Wingeier

MR010

MR010–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach, which includes both immobilization and MOX fuel, would be more expensive than the immobilization-only approach. However, pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

MR010–2 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for public hearings in all communities affected by the use of MOX fuel, especially those near the proposed reactor sites. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public meeting held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

CAHALL, DIANA I.
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U.S. Department of Energy
Office of Fissile Materials
c/o SUPPLEMENT to the SPD EIS
P.O. Box 23786
Washington, D.C. 20026-3786
Attention: Office of NEPA Compliance
facsimile: 1-800-820-5156

June 28, 1999

Dear Administrator:

Please consider this correspondence part of the official record of proceedings on the SUPPLEMENT TO THE SURPLUS DISPOSITION DRAFT ENVIRONMENTAL IMPACT STATEMENT, DOE/EIS-0283-DS submitted during public comment period.

Although I was unable to attend the June 15, 1999 public hearing on the above-referenced agency proceedings, I appreciate notification in advance of hearing as I have been an interested party in agency decision-making process.
Due to demands from other matters, these comments will address major issues and concerns rather than specifically reference the entire document presented for public review. Areas of concern include:

I. THE AGENCY'S PROCEDURE FOR DECLARING SOME 50 METRIC TONS OF PLUTONIUM EXCESS TO AGENCY NEEDS. (See Attachment 1.) Furthermore, the agency has considerable vested financial program-wide interest in the considerable funds generated by the "sale" and/or "transfer" of the Pu to private, commercial interests for MOX nuclear power plant fuel. "Hybrid Alternative" (disposal as waste of some of the Pu declared excess to program needs along with "recycling" of some allows for multitudes of options by both commercial interests in the property and the agency. 1

II. The agency and the electricity utility industry have considerable options by identifying "hybrid alternative" in the process. Due to some uncertainty in the legality of passing "stranded costs" (particularly the investments in nuclear power) on the electric utility consumers, the hybrid option appears to offer considerable advantage to the nuclear utility investors as final decisions on such stranded utility costs are being made. The agency is mandated to consider the financial impacts of decisions made in regard to such monetarily valuable "excess" property.

III. DOE has identified three facilities required for "hybrid alternative" implementation: 1) pit disassembly and conversion, 2) immobilization, and 3) MOX fuel fabrication. DOE has, should final decision as it appears from Draft EIS Supplement, determined to construct and operate BOTH AN IMMOBILIZATION FACILITY which requires disposal site(s) AND A MOX FUEL FABRICATION FACILITY which can be predicted to result in considerable environmental impact during both operational and shutdown phases. Obviously, a MOX fuel fabrication facility requires considerable investment (presumably of public funds by DOE) for construction, operation, shutdown, as well as, disposal of radioactive waste generated by the operations. DOE is respectfully requested to consider the amounts of hazardous, toxic, and radioactive wastes to be generated by the processes in its "recycling" decision. MOX fuel fabrication, in total, adds considerable expenditure of public funds directly and indirectly with considerable benefit to the nuclear/electric utility industry. 2 3 2

FR013

FR013–1 **MOX Approach**

To demonstrate the United States' commitment to the objectives of the *Joint Statement by the President of the Russian Federation and the President of the United States of America on Non-proliferation of Weapons of Mass Destruction and the Means of Their Delivery*, President Clinton, in January 1994, declared fissile materials, including 50 t (55 tons) of plutonium, to be surplus to U.S. nuclear defense needs. The way in which DOE determined the specific plutonium to be declared surplus is different from the way in which DOE determines how buildings, facilities and equipment are surplus. DOE's methods for determining excess or surplus property is not within the scope of this SPD EIS.

The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel fabrication cost exceeds the cost of the LEU fuel that it displaced, the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. Financial considerations are part of the decisionmaking process; however, this EIS does not address cost issues. Rather, it evaluates the potential health, safety and environmental impacts of the proposed activities. Cost considerations are discussed in *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998). This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

FR013–2 **Cost**

As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach, which includes both immobilization and MOX fuel, would be more expensive than the immobilization-only approach. However, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing

CAHALL, DIANA I.
PAGE 2 OF 13

IV. DOE decision-making process has identified six (6) site specific reactors for the use of MOX fuel. DOE contention that "no construction on the proposed MOX fuel facility would begin before an SPD EIS ROD is issued"
(COVER SHEET: DOE/EIS-0283-DS) apparently means that site-specific construction public notice only remains in the implementation process. DOE has already made and announced decisions which require construction with considerable lack of public review and oversight in the process. DOE should be integrating the environmental impacts of siting any such facility into the process rather than make decisions which REQUIRE THE FACILITY! DOE is herein requested to do so in final EIS. 4

V. The agency has essentially passed the "safety" to workers and general public within 50 mile radius of the proposed six MOX reactor sites to the Nuclear Regulatory Commission. DOE should not narrow its review and consideration of safety issues based upon NRC's authority to license nuclear reactors. NRC has determined that "public participation" in NRC nuclear power plant licensing be limited to ONLY parties living within a 50 mile radius of each facility. NRC has no authority to limit public participation by citizens, taxpayers, and interested parties in the process, although the commission already appears to have granted itself the authority. DOE cannot "tailgate" on NRC licensing of these six (or some of the six) nuclear generating facilities to implement NEPA when DOE has cause to know in advance that fully informed public participation has already been removed from NRC process. 5

VI. DOE has presented "risk factors" to nuclear power plant workers and the general public from normal operations which suggest simultaneously that environmental releases and radiological exposures will increase from normal plant operations if MOX fuel is used, and no "significant" risks to workers and/or the general population will result. How many increases in fatal cancers and/or other related diseases does DOE intend to permit as "insignificant impacts" from MOX fuel plant operations? 6

Furthermore, DOE acknowledges that fatalities among the general population will increase should nuclear accident occur at these facilities should the MOX fuel proposal be implemented. Increase or likely increase in fatalities among the general population resulting from accident (particularly worst case scenario, as DOE is mandated to consider) are not easily reconciled with "insignificant" impacts to human health and the environment. Any probability of increase in fatalities must be considered by DOE as "significant" in final EIS, otherwise DOE actions result in "lowering" the standard for public health and safety by the failure to do so in NEPA process. 7

VII. DOE is responsible for implementing decisions protective of national security in policy-making decisions on Surplus Plutonium. It seems rather obvious that "hybrid alternatives" (some disposal as waste/some recycling) creates considerable vulnerability in accounting for the total 50 metric tons of Pu currently under program disposition consideration. 8

VIII. DOE (and its predecessor agencies) has historic pattern of under estimating and/or ignoring health risks to citizens when matters of national security appeared to conflict with implementation of other agendas. (See Attachment II.) Furthermore, in practice, such assignment of low value to citizens frequently was done on populations considered to be "low-use." Environmental justice requires that rural and minority members of the general population receive the same degree of consideration and protection from operational and accidental radiological and toxic exposures as other segments of the U.S. citizenry. DOE six candidate sites appear to avoid metropolitan centers in the Northern states, and propose risk at sites within 50 mile radius of rural, Southern populations. 9

-2- FR013

either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The remainder of this comment is addressed in response FR013–1.

FR013–3 **Waste Management**

DOE has evaluated waste management in this SPD EIS. As shown in Appendix H and Chapter 4 of Volume I, some additional waste would be generated if DOE decides to convert 33 t (36 tons) of the surplus plutonium to MOX fuel versus immobilizing all of the plutonium. This can be seen by comparing Alternative 2 at Hanford (17 t [19 tons] immobilized and 33 t [36 tons] fabricated into MOX fuel) to Alternative 11A (all 50 t [55 tons] immobilized) or Alternative 3 at SRS to Alternative 12A in Section 2.18. These potential impacts will be considered in DOE's decision, along with other environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

FR013–4 **General SPD EIS and NEPA Process**

DOE has not made or announced decisions that would prejudice the outcome of the NEPA process. DOE has indicated its preference of implementing the hybrid approach to surplus plutonium disposition and locating the three proposed facilities at SRS. However, decisions will be announced in the ROD, and will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. As explained in Section 2.1.3, a contract was awarded to DCS to design, request a license, construct, operate and eventually deactivate the MOX facility, and provide the reactors to irradiate the MOX fuel based on a competitive procurement that included evaluation of environmental impacts. The contract stipulates that there would be no construction, fabrication, or irradiation of MOX fuel until the SPD EIS ROD is issued. Such site-specific activities would depend on decisions in the ROD, and according to the Request for Proposals, DOE's exercise of contract options to allow such activities would be contingent on the ROD.

FR013–5 **Human Health Risk**

DOE acknowledges the commentor's remarks concerning NRC policies. However, DOE has no authority in matters pertaining to NRC's policies and practices.

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. DOE has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of public dialogue on the program. With respect to the reactor sites, DOE prepared a *Supplement to the SPD Draft EIS* that included, among other topics, reactor-specific information that was not available when the SPD Draft EIS was distributed for public review. Efforts were made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. For those interested parties who could not attend the hearing on the *Supplement* that was held in Washington, D.C., on June 15, 1999, DOE provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. It is DOE policy to encourage public input into these matters of national and international importance.

FR013–6 **Human Health Risk**

As discussed in Section 4.28, the increase in risk to the general public and workers associated with the use of MOX fuel is expected to be small. No additional LCFs would be expected from the use of MOX fuel under normal operations at the proposed reactors. The dose to the general public from the continued safe operation of these reactors, regardless of whether MOX fuel is being used, is a very small fraction of natural background radiation and is not expected to result in any additional LCFs in the surrounding communities. In the case of reactor accidents analyzed in Section 4.28, there is a small

increase in risk, about 3 percent, for the large-break loss-of-coolant accident (the limiting design basis accident). The largest increase in risk for severe (beyond-design-basis) accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. Both of these accidents have an extremely low probability of occurrence. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48,000 per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

FR013–7 **Facility Accidents**

As discussed in response FR013–6, there is an increase in the risks associated with some of the severe reactor accidents analyzed in this SPD EIS. In the case of severe accidents at any of the reactors, the consequences of an accident would be high regardless of whether the reactors were using MOX fuel or LEU fuel. However, the probability of these accidents occurring is very low so the increase in risk to the communities surrounding these plants is not considered significant.

FR013–8 **Nonproliferation**

DOE does not believe that the hybrid approach creates vulnerability in accounting for the surplus plutonium. The proposed DOE surplus plutonium disposition facilities are all at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. In addition, intersite transportation of plutonium-bearing materials would be made in DOE's SST/SGT system. SST/SGTs are components of an 18-wheel tractor-trailer vehicle that are specially designed to protect against theft or diversion of nuclear materials cargo. The amount of plutonium that would be removed from each pit at the pit conversion facility would be documented, and that documentation carried forward throughout the disposition process, either immobilization or MOX fuel fabrication. None of the plutonium used in MOX fuel would be recycled or reprocessed. It would be used once in the reactor and then treated as any other spent fuel destined for burial in a potential geologic repository.

DOE is required under Presidential Executive Order to avoid conclusion that excess [redacted] 9

10

IX. DOE attention to matters of considerable national security issues has failed to include the probable potential for sale of fissile materials by its contractors. DOE Oakridge Operations has begun transfer of 3,800 metric tons of Low-Enriched Uranium and Uranium Metal in various forms from the Fernald, Ohio (FEMP) site to the Portsmouth Gaseous Diffusion Plant site for "interim" storage until the materials can be permanently housed or sold based upon an Environmental Assessment only! It would appear rather obvious that United States Enrichment Corporation has considerable likelihood of becoming the "excess fissile/nuclear materials" sales agent in the process.

DOE has more than ample reason to require stringent accounting for the total Plutonium presently in agency inventory at various sites nationwide from its contractors. It would appear that 50 metric tons of Pu declared as excess inventory is rather arbitrary considering the agency's discrepancies in identifying how much Pu is actually located at various sites nationwide. 11
(See Attachment IV.) DOE is mandated to consider non-proliferation issues as crucial to national security regardless of the "market value" of the fissile material to private interests (who may or may not consider national security as a high priority). (See Attachment V.)

It would appear to run contrary to logic as well as national interests to offer excess Pu (fissile material NOT REQUIRED by foreign powers for civilian nuclear power generation) to foreign powers interested in obtaining global superpower status! China, for example, is reported to have a track record of spreading missile technology to countries who have not at this time achieved nuclear superpower status, including, North Korea, Iran, Saudia Arabia, and Pakistan (Attachment V.). It would seem to run contrary to logic for the Department of Energy to tighten security at national labs, fund anti-missile delivery systems from hostile foreign powers, and, at the same time directly or indirectly allow the sale of nuclear weapons materials to those same powers! The DOE is respectfully requested to avoid any such considerable lapse in logic regardless of private, commercial interests who might potentially benefit.

IN CONCLUSION:

It is obvious that considerable financial interests would be best served by the 12

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FR013–9 **Environmental Justice**

Impacts of the proposed activities on minority and low-income populations in the areas surrounding all candidate DOE sites and proposed reactor sites were evaluated in this SPD EIS (see Appendix M and Section 4.28). As discussed in Chapter 4 of Volume I, none of the proposed activities is expected to disproportionately impact these populations.

FR013–10 **Facility Accidents**

Section 4.28 was revised to include reactor-specific information, including accident analyses. The accident frequencies used are based on the rigorous analyses that reactor licensees provided to NRC under oath of affirmation. NRC has reviewed and accepted these licensee analyses as the basis for continued operation of these plants. DOE believes, on that basis, that this information is acceptable for use in this SPD EIS to evaluate the potential impacts of using MOX fuel in the reactors. While it is understood that there are differences from the use of MOX fuel versus LEU fuel, these differences are not expected to result in substantial changes in the frequency of severe accidents in MOX-fueled reactors. Before any MOX fuel is used in the United States, NRC would have to perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications pursuant to 10 CFR 50.

The remainder of this comment is addressed in response FR013–4.

FR013–11 **Nonproliferation**

No plutonium is being, or will be sold to any entity, foreign or domestic. All the surplus plutonium, including the amount that would be made into MOX fuel, would have stringent accountability, safeguards and security requirements. The primary objective of the surplus plutonium disposition program is to ensure that these materials are never again used in nuclear weapons. The market value of this material is not an issue.

The remainder of this comment is addressed in response FR013–8.

FR013–12 **MOX Approach**

DOE acknowledges the commentor's opposition to the hybrid approach to surplus plutonium disposition. Use of MOX fuel in domestic, commercial

CAHALL, DIANA I.
PAGE 6 OF 13

the agency's highest priorities in decision-making and project(s) implementation. As such, the agency must conclude that "recycling" Pu as a valuable energy resource fails to provide long term good judgment in excess Pu management. The cost of waste disposal from a MOX fuel fabrication facility requires considerable further environmental degradation during construction, operation, and shut-down phases. A "one-time run through" requires disposal sites and facilities. The total plan may offer some interests profitable business returns in the short term, however, the agency is required to consider the long term costs financially, environmentally, to public and worker health, and risks from foreign powers to national security. MOX fuel use at 6 proposed nuclear power facilities has potential for disastrous long term costs and consequences. DOE must consider the long term interests of the nation and all its citizens in NEPA and all other decision-making processes over special interests. 12

One most obvious example of DOE in cooperation with private enterprise with considerable adverse (and on-going consequences) occurred at DOE and its contractor's site in West Valley, New York. The boundaries of the state of Ohio have, apparently, somehow been re-defined to include West Valley as part of federal facilities sites to be overseen by the Ohio Field Office. DOE is respectfully requested to consider past consequences of private/commercial vendor partnerships in current decision-making. The agency has ample reasons and causes to avoid rather than repeat past errors, and is respectfully requested to do so. 13

Thank you for opportunity to comment and participate on what I believe to be a most crucial agency decision-making process. Please provide a list of parties in attendance at the June 15, 1999 hearings and list of parties submitting comments to the agency on or before June 28, 1999 at your earliest convenience. Also, please continue to include my name and mailing address (provided below) on the agency's list of interested parties on Plutonium disposition.

Sincerely,

Diana I. Cahall

Diana I. Cahall (Note: restoration of maiden name 2/98, formerly known as Diana Salisbury)
7019 Ashridge Arnheim Road
Sardinia, Ohio 45171
(937) 446-2763 telephone and fax

Attachments (11 pages total) (202) 586-4078

VIA TELECOPIER TRANSMISSION TO ~~1-540-931-5154~~ ON JUNE 28, 1999 AT APPROXIMATELY 1:30 P.M.; and by the United States Postal Service, regular mail, postage prepaid on June 28, 1999.

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reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

FR013–13 **MOX RFP**

DOE is working hard to ensure that lessons learned from past experiences are being applied to all of its programs to ensure they are carried out safely and in an environmentally sound manner. West Valley reports to the Ohio Field Office, but there are DOE personnel on-site at West Valley who are in direct control of the activities there. DOE has entered into successful privatization arrangements, and has an initiative to use privatization in its contracting efforts when doing so is of benefit to the U.S. Government and does not compromise health, safety, the environment, or national security.

Attachment I

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-280873

November 4, 1998

The Honorable John R. Kasich
Chairman, Committee on the Budget
House of Representatives

Dear Mr. Chairman:

For fiscal year 1997, the Department of Energy reported that it had $20.8 billion in property, some of which is no longer needed to carry out the Department's missions now that the Cold War has ended. The Department reports, for example, that many of the buildings originally designed and constructed to support its defense mission no longer have any ongoing or planned mission. The Department acknowledges that it needs to reduce its inventories of property and equipment and estimates that, for its largest environmental management sites, it spends about 20 percent of its annual budget on maintaining the facilities and infrastructure.

You requested that we review the Department of Energy's efforts to identify and dispose of property that is excess to its needs. Specifically, you asked us to determine (1) the criteria the Department uses to guide the identification and disposal of excess property, (2) the extent to which the Department's property records reflect what is no longer needed to carry out its missions, and (3) the challenges the Department believes exist in identifying excess property and the innovative approaches being used to dispose of this property.

Results in Brief

Federal property management regulations include criteria to determine when real property[1] is excess to an agency's needs. However, neither federal property management regulations nor the Department of Energy's regulations and guidance include specific criteria to determine when personal property is no longer needed. When property has been identified as excess, guidelines for the disposal process are well defined for both real and personal property. For example, the Department's property management regulations include guidelines for the screening of excess personal property for reuse within the Department or other federal agencies; for the transferring of lab equipment and computers to schools; and for the sale of property to the public.

[1]Real property includes land, improvements, structures, and permanent fixtures. Personal property includes all other property except for real property and includes such things as government-owned equipment, computers, and motor vehicles.

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The Department of Energy's property records do not consistently provide information that would help identify property that is no longer needed. Recent changes to the Department's regulations require that property records identify property that has already been determined to be excess. In July 1998, the Department modified its real property records system to identify property that has been determined to be excess. This system also provides additional information, such as the percentage of a facility currently in use, that could be used to identify other property that is no longer needed. Similarly, in May 1998, the Department revised its personal property management regulations to require that contractors' records include information on current usage, such as categorizing property as active, in storage, or excess. However, these regulations do not provide criteria for determining when personal property should be placed in these categories.

The Department of Energy acknowledges problems with its identification and disposal of excess real and personal property. Department officials cited, for example, a lack of funding for the environmental cleanup of the current inventory of excess real property and a lack of incentives to identify property as excess. Because the costs associated with the maintenance and storage of unneeded property are generally not separately identified, little incentive exists to spend the resources necessary to dispose of it. Regardless of the problems, field and program offices have developed some innovative approaches to dispose of property, such as including a performance-based incentive in the site management contract to encourage the contractor operating the site to dispose of excess property during the fiscal year.

Background

Although most of the Department of Energy's (DOE) real and personal property is under the control of its contractors, several DOE offices have the responsibility for managing this property. Overall, the office of Field Management is responsible for real property management and field oversight, and the office of Procurement and Assistance Management is responsible for personal property. In addition, the Office of Worker and Community Transition directs various efforts regarding the sale or disposition of surplus assets and compiles reports for the Congress on unneeded real and personal property and pilot projects relative to its overall responsibilities. In addition, DOE's program offices, such as the office of Defense Programs, are responsible for declaring property excess to their missions' needs. One program office, Environmental Management, is responsible for the cleanup of contaminated excess property before its

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disposal. DOE's field offices oversee the contractors' efforts to manage the property and maintain the property records.

In its fiscal year 1997 financial statements, DOE reported that it held property, plant, and equipment valued at $20.8 billion[2]—$12.0 billion of real property and $5.2 billion of personal property, with construction work in progress, natural resources, and software accounting for the remaining $3.6 billion. The property amounts include only those items costing $25,000 or more. Items that cost less than $25,000 are expensed for financial statement purposes; DOE contractors held an additional $3.4 billion of such personal property at the end of fiscal year 1997.

In DOE's fiscal year 1997 Federal Managers' Financial Integrity Act report accompanying its financial statements, the Department indicated that it had extensive inventories of real and personal property that is no longer necessary and that disposal of this property could save future storage, security, and maintenance costs. In addition, DOE reported problems with the management of personal property. For example, the Rocky Flats Field Office in Colorado identified problems that included a contractor's inadequate property records systems, incomplete inventory records, and requests made for new work space while comparable space at the site was being designated as excess. (See the bibliography for a list of GAO and Inspector General reports on DOE property management issues.)

Federal Regulations Provide Guidelines for Real Property but DOE's Guidance Does Not Include Criteria for Determining When Personal Property Is Excess

Real Property

The federal property management regulations specify that executive agencies should dispose of real and personal property that is excess to their needs and include guidelines for determining when real property is unneeded or underutilized. However, neither the federal regulations nor DOE's guidance includes similar specific guidelines for determining when personal property is excess. In the absence of criteria in the federal regulations, it is left up to each agency to develop guidelines. DOE implements the overall federal regulations for its real property and has issued supplemental regulations for managing personal property. However, DOE's regulations for personal property include no criteria for determining when property is excess.

The federal property management regulations for the utilization and disposal of real property state that each executive agency should survey the real property under its control at least annually to identify property

[2]This represents the depreciated value of the property, plant, and equipment; the acquisition costs were $46.9 billion.

Attachment II

Part of: Radiation Experiments on Humans

A10 WEDNESDAY, MAY 12, 1999

Bioethics center opening in Tuskegee

Syphilis untreated in old study there

The Associated Press

TUSKEGEE, Ala. — A new bioethics center focusing on medical issues for minorities is opening in the town where black men with syphilis went untreated for 40 years as part of a notorious government study.

'We expect for the first time to be training and educating significant numbers of African-Americans as bioethicists — something we don't have now.'

— Benjamin Payton

The Tuskegee University National Center for Bioethics in Research and Health Care opens Saturday. Survivors of the experiments, ranging in age from 89 to 109, will be on hand.

"We expect for the first time to be training and educating significant numbers of African-Americans as bioethicists — something we don't have now," said Benjamin Payton, the university president.

The center was helped by a $200,000 grant President Clinton announced in 1997, when he apologized on behalf of the government for the syphilis study.

In the 1930s, the federal Public Health Service lured black subjects in Tuskegee with the promise of free health care. A total of 399 men were never told they had syphilis, and researchers monitored how the disease claimed its victims.

By the time the study was exposed in 1972, 28 men had died of syphilis, 100 others were dead of complications, at least 40 wives had been infected and 19 children had contracted the disease at birth.

Tuskegee University, a historically black college known then as Tuskegee Institute, was not involved.

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The Cincinnati Enquirer

Attachment III

THURSDAY, MAY 13, 1999 A3

Russia, Cuba may finish nuclear plant U.S. opposes

The Associated Press

MOSCOW — A Russian-Cuban commission is looking into the possibility of completing a partly built nuclear reactor in Cuba, a news report said Wednesday.

Construction of two Soviet-designed, light-water reactors began in the early 1980s, but financial problems in Cuba and the Soviet Union forced a halt to the project, and no more work has been done in recent years despite periodic discussions.

The possibility of setting up a joint venture to complete the Juragua nuclear plant was the main item on the agenda of the Intergovernmental Russo-Cuban Commission for Trade, Economic, Scientific and Technical Cooperation, Russia's ITAR-Tass news agency said.

Russia is proposing that two or three other countries be included in the venture, the report said.

The plant would cost $650 million to $700 million to complete, earlier news reports said.

The United States opposes the station and considers it a safety risk to Florida and other states along the Gulf of Mexico. Cuba is 90 miles south of Florida. *

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Attachment IV

SHORT TERM

FROM PAGE 18

neering and Environmental Laboratory alone —enough to make 200 or more nuclear bombs (see table below).

Conclusion

So long as the politically expedient Yucca Mountain and WIPP programs command the lion's share of resources available for long-term management, no sound solution can be developed for nuclear waste. Hence, it is essential that the US government step back from these repository programs and initiate a much broader effort (see "Considering the Alternatives" article). In the meantime, it is essential that an interim management strategy be implemented that addresses the issues of safe storage, the legitimate complaints of nuclear utilities regarding the federal government's obligations, and the research and development that will be essential for a long-term program. The investment in Yucca Mountain and WIPP need not be thrown away. These facilities could be used for research on repositories using non-radioactive materials, pending approval by the state of New Mexico for WIPP, and by the state of Nevada and the Western Shoshone people in the case of Yucca Mountain.

1 I am grateful to Rochelle Becker, Beatrice Brailsford, Lee Dazey, Yuri Dublyansky, Kay Drey, Harold Fieveson, Steve Frishman, Charles Hollister, David Lochbaum, Michael Marriotte, Mary Olson, Auke Piersma, John Winchester, and Ian Zabarte for their reviews of a draft of this article and the article on long-term approaches. They may or may not be in agreement with the contents of these articles for which I, as the author, am solely responsible.

2 Transuranic waste is defined by the DOE as containing more than 100 nanocuries per gram of transuranic radionuclides that emit alpha radiation and that have half-lives of more than 20 years. The term transuranic refers to all elements that have atomic numbers greater than that of uranium.

3 See for instance, Arjun Makhijani and Scott Saleska, *High-Level Dollars, Low-Level Sense* (New York: Apex Press, 1992). See also *Science for Democratic Action* (SDA), Vol. 4 No. 4, Vol. 6 No. 1, and Vol. 7 No. 2, as well as IEER's report *Containing the Cold War Mess* (for WIPP-related issues). For details regarding one geologic aspect of Yucca Mountain see Yuri Dublyansky, *Fluid Inclusion Studies of Samples from the Exploratory Study Facility, Yucca Mountain, Nevada*, IEER, December 1998.

4 See IEER's report *Containing the Cold War Mess*, 1997 by Marc Fioravanti and Arjun Makhijani for a detailed analysis. Also see "Transuranic Waste: TRU and Consequences," *SDA* Vol. 7 No. 2, p. 7.

5 At a nuclear waste meeting sponsored by the DOE, a utility executive, in a frank expression of the NIMBY syndrome, told the DOE that it had to take the waste from the utilities and "I don't care where you put it." The ground rules of the meeting prohibit disclosure of the identity of the speaker but not what was said. A statement by Scott Peterson of the Nuclear Energy Institute in the *New York Times* provides another illustration: "The industry foremost is looking for movement of fuel," he is quoted as saying. ("Energy Agency Plans Offer to Take Utilities' Nuclear Wastes," *New York Times*, February 25, 1999.)

6 For more information about the use of transmutation as a waste management strategy, see "Transmutation not a Repository Alternative," *SDA* Vol. 6 No. 1, p. 4.

7 For a discussion of waste classification issues, see *High-level Dollars, Low-level Sense*, pp. 22–28 and Chapter 4. Also *SDA* Vol. 6, No. 1, pp. 8–13.

8 In some instances, such as in severe earthquake zones or on riverine islands, storage near the site may be safer than on site. However, moving the waste would give rise to its own issues and is generally difficult to accomplish.

9 Among the many options that have been proposed are: an MRS at Yucca Mountain; a "private" MRS such as the proposed site on the Skull Valley Goshute reservation in Utah; and storage at a DOE nuclear weapons site. The last is sometimes combined with suggestions that the spent fuel be reprocessed, for instance at the Savannah River Site.

10 Matthew L. Wald, "Plan to Bury Nuclear Waste in Nevada Moves Forward," *New York Times*, Dec. 19, 1998.

PLUTONIUM IN BURIED WASTE AT SELECTED SITES

Site	Amount of plutonium in buried waste, kilograms	Number of bombs equivalent[a]	Comments
Idaho National Engineering and Environmental Laboratory	1,100[b]	220	The only site with an estimate that has a discoverable technical rationale
Los Alamos National Laboratory	Unknown	Unknown	Total quantity of plutonium-239 in all Los Alamos waste is possibly 610 or 1375 kilograms. Discrepancy is between two official estimates.
Savannah River Site	250 (unreliable estimate)[c]	50	Does not include plutonium in high-level waste tanks estimated at 382 or 774.6 kilograms. Discrepancy is between two official sources.

Sources: IEER's 1997 report *Containing the Cold War Mess*, Chapter 2. For discrepancies: Guimond, R.J. and E.H. Beckner, Memorandum on Plutonium in Waste Inventories, U.S. DOE, January 30, 1996.

a. We assume that 5 kilograms of plutonium are required for a nuclear bomb. Technologically sophistocated devices can be made with much less.

b. Plutonium-239 plus plutonium-240. Rounded to two significant figures.

c. Plutonium-239 only. Rounded to two significant figures.

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CAHALL, DIANA I.
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Attachment V

The Cincinnati Inquirer, 6/28/99, A/C

JAMES H. ANDERSON: Cox report shows need for SDI

Early alert for missile defense

The most disturbing — and overlooked — conclusion to be drawn from the Cox report on Chinese espionage is that China now has the technical information to build missiles capable of overwhelming the Clinton administration's proposed national missile defense.

The White House will not decide until June of next year whether to field such a program. But the deployment timetable is now largely irrelevant because the administration's ground-based missile interceptors would be vulnerable to Chinese countermeasures from Day 1.

Beijing currently has two dozen single-warhead, intercontinental-range weapons, 13 of which are believed to be targeted at U.S. cities. But China is expected to exploit the theft of sophisticated U.S. nuclear-warhead designs to enhance its submarine and mobile missile programs. China likely will develop missiles capable of delivering multiple independently targeted re-entry vehicles and penetration aids such as decoys. In other words, China has the potential to become a nuclear superpower.

China also has a record of spreading missile technology to the Third World, including states such as North Korea, Iran, Saudi Arabia and Pakistan. Last August, North Korea test-fired a three-stage rocket, the Taepo Dong-1, which struck deep in the Pacific Ocean. Now Pyongyang is preparing to test the Taepo Dong-2, which has the potential to reach Alaska, Hawaii and possibly Los Angeles.

The Clinton administration's missile defense plan will be inadequate to meet emerging missile threats, whether from China, North Korea or any other state. The effort to build one, possibly two, ground-based sites would be far more costly and less effective than sea- and space-based alternatives. A ground-based system would have a narrow window of time to intercept missiles tipped with multiple warheads and decoys that have separated from their rocket boosters. Even if the intercept were successful, deadly fallout from a nuclear, chemical or biological weapon would occur.

To counter this threat, the United States should develop defenses to identify, track and shoot down hostile missiles shortly after liftoff, when they are most vulnerable to interceptors and before they can release their payload. By developing this "boost-phase" intercept capability, the United States will offset the ability of China, or any other country, to endanger Americans with ballistic missiles.

Sea- and space-based defenses hold the greatest promise for achieving a "boost-phase" intercept capability. The United States should begin by upgrading the anti-missile capability of the Navy's Aegis defense system, first deployed over a decade ago to protect the U.S. fleet. Taking advantage of the inherent mobility of sea power, Aegis cruisers could patrol international waters off China and destroy missiles in their boost phase. Eventually, the United States could reinforce its sea-based defenses with space-based interceptors.

The United States could begin developing a robust defense along these lines. But despite the weekend agreement between President Clinton and Russian President Boris N. Yeltsin to take another look at the 1972 Anti-Ballistic Missile Treaty, it has been the White House's belief that the United States remains legally bound by the treaty, which limits missile defenses to one fixed site. Some legal scholars and strategists have long believed that the treaty is no longer binding because neither Russia nor any other combination of successor states can fulfill its original purposes.

Congress should ensure that efforts to develop sea- and space-based systems capable of protecting the United States from missile attacks are not constrained by the ABM Treaty. They should require the Defense Department to develop and test a more robust version of the Aegis-based Navy theater-wide anti-missile system. The target missile should have the flight characteristics of real-world intercontinental ballistic missiles, such as those being developed by China.

U.S. anti-missile technologies are improving. Now let's begin work on a national missile defense capable of protecting the United States from the threats the Cox report has disclosed.

Mr. Anderson is a defense policy analyst at The Heritage Foundation, a conservative think tank.

FR013

GEARY, B.
PAGE 1 OF 2

2545 S. Birmingham Pl. Tulsa, OK 74114

June 28, 1999

United States Department of Energy
Office of Fissile Materials Disposition
PO Box 23786
Washington, DC 20026-3786

Sirs:

I am writing to comment on the Supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement.

As an Oklahoma resident who remember only too well the carelessness with which plutonium was handled at the Kerr-McGee plant in Crescent, I view the whole MOX plan as unrealistic for human beings to use. 1

The MOX plan would cause plutonium to be considered as a business commodity to be transported across the country rather than the highly toxic substance which it is and which needs to be isolated from the human environment. 2

To claim that the MOX plan would result in a significant reduction in the amount of plutonium is patently ridiculous. There would be a very small net reduction if plutonium were used in a mixed fuel in nuclear power plants.

The MOX plan for dealing with "surplus plutonium" is a plan to play with the stuff rather than to immobilize it, and it is my understanding that MOX would be a very expensive toy. 3

How much would it cost to retrofit aging reactors so that they could utilize the MOX fuel? At what point would safety concerns take a back seat to economic considerations? Accidents would be more likely, I believe, at a retrofitted plant, and they would certainly be far more dangerous.

Any serious problems with nuclear power would only be exacerbated with the use of MOX. It is simply terrifying to think of such casual use of plutonium in the U.S., where control is imperfect. What about in Russia? MOX would be a bad choice for the U.S. public, for the nuclear power industry, and for the planet. Get real! 4

Yours truly,

B. Geary

B. Geary

MR020

MR020–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

MR020–2 **Transportation**

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in Chapter 4 of Volume I and Appendix L.

MR020–3 **MOX Approach**

It is true that in the MOX approach only a fraction of the plutonium would actually be consumed in the reactor; but the remainder would be an integral part of massive spent fuel assemblies. The spent fuel assemblies would be so large and radioactive that any attempted theft of the material would require a dedicated team willing to suffer large doses of radiation, along with substantial equipment for accessing and removing the spent fuel from the storage facility and carrying it away.

The purpose of fabricating MOX fuel and using it in domestic, commercial reactors is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and

modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. Furthermore, although no U.S. commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core.

The environmental, safety and health consequences of the MOX approach at the proposed reactors are addressed in Section 4.28. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and domestic, commercial reactors selected to use MOX fuel, to ensure adequate margins of safety.

MR020–4 **Nonproliferation**

DOE acknowledges the commentor's opposition to the use of plutonium in MOX fuel. The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

The remainder of this comment is addressed in response MR020–3.

SPERA, MARCELLA
PAGE 1 OF 1

I am writing because I am deeply concerned about the potential deleterious effects posed by the options you are considering concerning the disposal of plutonium. The MOX option would threaten the health of many. The immobilization option is much more sound. Please analyze both options carefully and come to a responsible decision. Thank you. 1

WR001

WR001–1 **Alternatives**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

DOE and NRC are committed to protecting the health and safety of the public. This includes designing, constructing, and operating DOE- and NRC-regulated facilities (e.g., domestic, commercial reactors) in such a way as to continually provide a level of safety and reliability that meets or exceeds established standards. DOE and commercial reactors also have plans and programs for the safe management and ultimate disposal of their nuclear waste.

The Human Health Risk sections presented in Chapter 4 of Volume I discuss the applicable human health risks associated with all alternatives considered. Decisions on the surplus plutonium disposition program will be based on environmental analyses (including analyses of human health risks), technical and cost reports, national policy and nonproliferation considerations, and public input.

ECONOMIC DEVELOPMENT PARTNERSHIP
ERNIE CHAPUT
PAGE 1 OF 2

ECONOMIC DEVELOPMENT PARTNERSHIP
Serving Aiken & Edgefield Counties

Fred E. Humes
Director

Statement for the Record
Supplement to the Surplus Plutonium Disposition
Draft Environmental Impact Statement
June 15, 1999

It is my pleasure to speak in support of the Department of Energy's important program to dispose of weapons grade plutonium which is excess to our nations defense needs. My name is Ernie Chaput, and I am with the Economic Development Partnership of Aiken, South Carolina.

As many of you know, the Department's Savannah River Site is located in Aiken County, South Carolina. For the past several years the Economic Development Partnership has evaluated DOE programs proposed for accomplishment at the SRS for consistency with local capabilities and community expectations.

Our community has a long history of supporting DOE national defense and environmental management programs. We are proud of the role our site played in winning the cold war, and we are equally anxious to play a role in reducing the new nuclear danger which has resulted from excess plutonium being released from military needs. As the prestigious National Academy of Sciences has stated, "The existence of this material constitutes a clear and present danger to national and international security." Disposing of surplus plutonium from the U.S. and Russian nuclear programs must be a top priority in the pursuit of world peace and stability.

If the U.S. does not dispose of its surplus plutonium, neither will Russia. Conversely, it is equally important that the U.S. and Russian programs proceed in parallel to prevent concerns about either country gaining a strategic advantage. Together the two countries have indicated that 100 metric tons of weapons-usable plutonium are surplus to current military needs and proposed for disposition. **The opportunity to dispose of enough plutonium to make over 20,000 modern nuclear weapons must been seized upon and aggressively pursued.** 1

We believe that DOE has wisely chosen a hybrid approach for disposition of surplus plutonium:

- Isotopically "denaturing" weapons-grade plutonium by irradiation in a nuclear reactor is the surest and most efficient means of destroying this material. By burning plutonium in mixed oxide fuel, it will undergo nuclear transformation into a product

Post Office Box 1708 Aiken, SC 29802 171 University Parkway USCA
(803) 648-3362 FAX (803) 641-3369 edpsc@aol.com http://www.edpsc.org

DCR013

DCR013–1 **Alternatives**

DOE acknowledges the commentor's support of the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

ECONOMIC DEVELOPMENT PARTNERSHIP
ERNIE CHAPUT
PAGE 2 OF 2

that is no longer capable for efficient use in nuclear weapons and will make theft and recovery of the degraded material extremely difficult.

- Immobilizing weapons-grade plutonium that contains impurities which make it unsuitable for burning in nuclear reactors by mixing with DOE high-level waste and creating solid ceramic and glass-like materials. While this process will not destroy the "weapons-grade" characteristics of the plutonium, it will make theft and recovery of the immobilized material very difficult.

We believe that DOE has properly analyzed safety issues and demonstrated that both options for surplus plutonium disposition can be safety conducted. Oversight by the Nuclear Regulatory Commission will serve to further assure the safe execution of this activity. 1

In summary, as DOE considers the proportion of materials for disposition by irradiation and immobilization, we recommend that the ultimate objective of this program be kept clearly in focus: **Which option provides the greatest surety that the surplus materials can never be used again in modern nuclear weapons.** The Economic Development Partnership believes that future generations will be significantly more secure if we act today to **destroy** our surplus weapons-grade plutonium materials, not just lock them away and make them difficult to recover. Therefore, we believe that burning weapons-grade plutonium in nuclear reactors should be the first option for disposition of surplus plutonium, with immobilization being used only when burning is not possible.

Thank you for the opportunity to comment on this important matter.

DCR013

ENVIRONMENTALISTS INC.
RUTH THOMAS
PAGE 1 OF 5

ENVIRONMENTALISTS INC.
FOUNDED 1972

June 28, 1999

Mr. G. Bert Stevenson, NEPA Compliance Officer
Office of Fissile Materials Disposition
U.S. Department of Energy (DOE)
P.O. Box 23786
Washington, D.C. 20026-3786

Dear Mr. Stevenson:

The purpose of this letter is to let you know that we will be submitting comments on the Supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement around the middle of July.

Notice regarding the availability of the Supplement arrived at our office on June 7th and the document itself several days later (See attached copies of notices showing they were all mailed on June 3rd).

We ask that our comments be fully considered; that the total text of our comments appear in the final document; and that our mailing address and E-mail address be included.

Thank you for phoning me on June 16th. The information you provided then together with the comment/question and response presentations at the June 24th meeting in Columbia have contributed to our having a better understanding of the DOE's proposals regarding weapons plutonium.

Please send us the transcript or minutes of the June 15th public meeting in Washington. A record of this meeting and a list of those attending will be helpful to us in preparing our comments as will the transcript of the June 24th meeting held by State Senator Phil Leventis. 1

Sincerely,

Ruth Thomas
President

cc - Senator Leventis
Interested Parties

1339 SINKLER ROAD • COLUMBIA, S. C. 29206 • 803-782-3000

PRINTED ON RECYCLED PAPER

MR023

MR023–1 **General SPD EIS and NEPA Process**

DOE gave equal consideration to all comments received on the SPD Draft EIS and *Supplement to the SPD Draft EIS*. The comments and their responses are presented in Volume III, Chapter 3 and Chapter 4, respectively. The public hearing comment summary report for the *Supplement* and hearing attendance list has been sent under separate cover. Transcripts of the June 24, 1999 meeting hosted by State Senator Phil Leventis are presented as Appendix A in Volume III.

ENVIRONMENTALISTS INC.
RUTH THOMAS
PAGE 2 OF 5

Now Available -The Department of Energy's Supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement

United States Department of Energy

Dear Stakeholder,

The Department of Energy has released a supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement which focuses on information leveloped as part of the MOX Procurement Process. The comment period for this document is from May 14 to June 28, 1999. You may request a copy of this document as follows:

MAIL
United States Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

FAX/PHONE
1-800-820-5156
Please leave your name and complete mailing address on the answering machine.

WORLD WIDE WEB
http://www.doe-md.com

Office of Fissile Materials Disposition

ANNOUNCING A PUBLIC MEETING ON THE SUPPLEMENT TO THE DRAFT SURPLUS PLUTONIUM ENVIRONMENTAL IMPACT STATEMENT

United States Department of Energy

This is to inform all interested parties that the Department of Energy's Office of Fissile Materials Disposition will hold a public meeting on the Supplement to the Draft Surplus Plutonium Environmental Statement. There will be two identical morning and afternoon sessions.

9:00
1:30

Tuesday, June 15, 1999
9:00am - 12:00pm
and
1:30pm - 4:30pm
Hotel Washington
515 15th St., NW
Washington, DC 20004

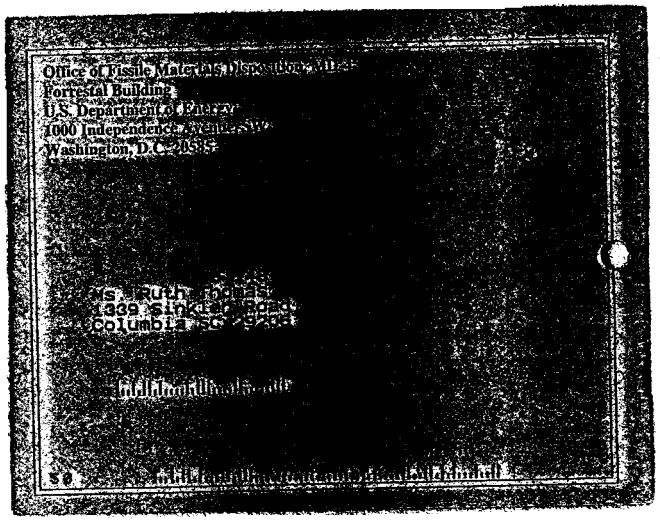
Preregistering for the meeting may be done at either:

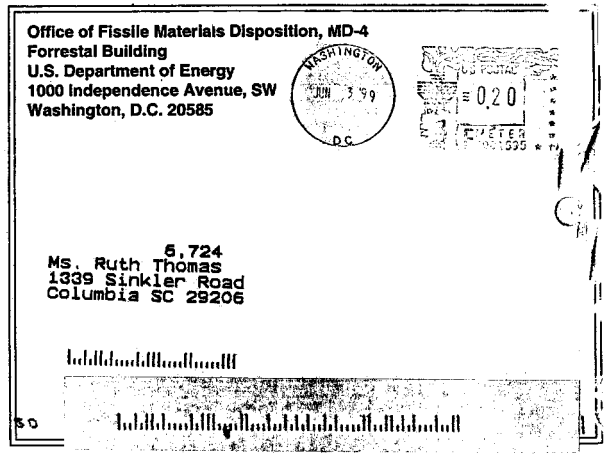
Website Registration: http://www.doe-md.com
Preregistration Telephone Number: 1-800-820-5134

Office of Fissile Materials Disposition

MR023

ENVIRONMENTALISTS INC.
RUTH THOMAS
PAGE 3 OF 5





MR023

ENVIRONMENTALISTS INC.
RUTH THOMAS
PAGE 4 OF 5

Supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement

United States Department of Energy

NOW AVAILABLE

The Department of Energy has released a supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement which focuses on information developed as part of the MOX Procurement Process. The comment period for this document is from May 14 to June 28, 1999. You may request a copy of this document as follows: Process

MAIL
United States Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

FAX/PHONE
1-800-820-5156
Please leave your name and complete mailing address on the answering machine.

WORLD WIDE WEB
http://www.doe-md.com

PUBLIC MEETING

The Department of Energy's Office of Fissile Materials Disposition will hold a public meeting on the Supplement to the Draft Surplus Plutonium Disposition Draft Environmental Impact Statement. There will be two identical morning and afternoon sessions.

1

Tuesday, June 15, 1999
9:00am - 12:00pm
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Hotel Washington
515 15th St., NW
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Website Registration: http://www.doe-md.com
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Office of Fissile Materials Disposition

MR023

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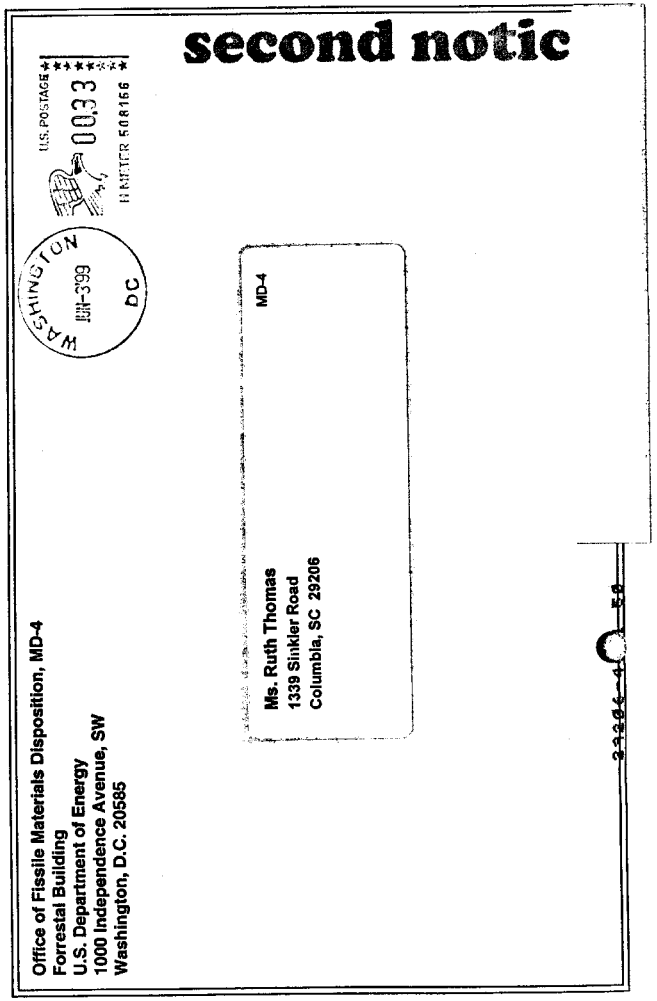
RUTH THOMAS
PAGE 5 OF 5



MR023

GILBERT, CLAUDE L., JR.
PAGE 1 OF 4

CLAUDE L. GILBERT, JR.
1104 CANDLEWOOD DRIVE
HOPKINS, SOUTH CAROLINA 29061

US Department of Energy
Office of Fissile Materials Disposition
PO Box 23786
Washington, DC 20026-3786

June 24, 1999

RE: Surplus Plutonium Disposition

Dear Sir:
As a native South Carolinian and US citizen, I have followed the events over the past 45 years that have turned my homeland into a nuclear dump. While the thought of ridding the world of surplus plutonium sounds good, I believe your decision to use MOX nuclear fuel in commercial reactors will cause more problems than it solves. 1

Why should I believe you when you state that this process is safe?

1) There are unexplained illnesses or "cancer clusters" around 14 of 14 DOE facilities in the US. Commercial nuclear reactors are nothing more than high level waste dumps for spent fuel rods. Yucca Mountain is nothing more than a pipe dream. 2

2) Westinghouse (aka CBS) after 16 years and $489 million have failed to deal with the waste problems already at SRS. (exploding benzine among many more problems) SC already has radioactive fish in the Savannah River, deformed wildlife and contaminated ground water. A MOX facility will just add to the problem. 3

3) Cogema has not only contaminated the sea bed off of the coast of France, but also the air is 90,000 times more radioactive than background readings. Reprocessing is such a polluting industry that Cogema has turned the air radioactive. Childhood leukemia has increased.

4) BNFL has contaminated the area around Sellafield, England as much as Chernobyl. A slow-motion accident played out over four decades. The seafood is radioactive as well. 4

5) After many years of misleading the public, Germany, the inventers of nuclear power have decided to phase out this technological failure because of economic, health, transportation and safety issues. Using MOX fuel and establishing a plutonium economy with a failed industry will only hurt the US taxpayer and endanger everyone on the planet.

6) Although MOX fuel has been used occasionally in Europe, it is not made with such a high percentage of plutonium-239 as is contemplated for the US. This form of plutonium is the material of choice for nuclear weapons precisely because it is easiest to explode. Obviously, this is not the goal in reactor operation. Compounding the concern about weapons material is the disclosure that the plutonium is not pure. In order to make the weapons, other ingredients were added to the plutonium. One of these is Gallium, which has not been put into a reactor core before, and which interacts with zirconium, one of the metals composing the fuel rod's cladding. Compromise of fuel cladding can cause a host of problems including greatly increased releases of radioactivity to air and water. 5

7) The plan to build a MOX plant at US taxpayer expense in Russia will only guarantee that weapons grade plutonium is spread across the globe under the guise of peaceful nuclear cooperation. Do you trust the Russians? How about their nuclear supply partners Iran and India? 6

As you know, these are just a few of the problems worldwide. I strongly object to the MOX plan. It would be far more prudent to pursue immobilization. 1

Thank you.

Claude L. Gilbert, Jr.

Claude L. Gilbert, Jr.

MR009

MR009–1 MOX Approach

DOE acknowledges the commentor's objection to the use of MOX fuel in commercial reactors. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The safety, health, and environmental consequences of the MOX approach at the proposed reactors are addressed in Section 4.28. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and domestic, commercial reactors selected to use MOX fuel, to ensure adequate margins of safety.

MR009–2 Human Health Risks

Epidemiological studies performed to determine if excess health effects have occurred, or are occurring, in the vicinity of the candidate sites for surplus plutonium disposition are summarized in the *Storage and Disposition PEIS.* Other DOE sites are beyond the scope of this SPD EIS. Over the past year, DOE and the Department of Health and Human Services (HHS) have produced draft plans to determine the future direction of public health activities at 18 DOE sites (including the sites evaluated in this EIS) and naval shipyards in three States. The plans contain background information on the site; information learned from previous studies and assessments; current public health activities conducted by HHS and DOE; gaps in knowledge and important issues that need to be addressed; and proposed new activities. These plans may be viewed on the DOE Web site at http://www.tis.eh.doe.gov/epi.

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and

MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. The potential MOX spent fuel and/or immobilized plutonium are included in the inventory analyzed in that draft EIS.

MR009–3 **Waste Management**

DOE appreciates the commentor's concern that surplus plutonium disposition activities not contaminate the environment. DOE and its contractors at SRS are working hard to remediate existing contamination. In recent years, seepage basins have been closed, pump and treat systems have been installed to remove contaminants from the groundwater, and new wastewater treatment facilities have been installed. Much is yet to be done, but as described in the report, *Accelerating Cleanup: Paths to Closure* (DOE/EM-0362, June 1998), DOE has an ambitious plan to accomplish the cleanup of SRS.

The SPD EIS analyzes the potential environmental impacts associated with implementing the proposed activities at the candidate sites. The results of these analyses, presented in Chapter 4 of Volume I and summarized in Section 2.18, indicate that implementation of any of the proposed activities would not have a major impact on any of the candidate sites. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed surplus plutonium disposition facilities in compliance with today's environmental, safety and health requirements.

MR009–4 **MOX Approach**

Recent reports prepared by the French Government have concluded that the radioactive releases from the La Hague Plant are not the cause of an excess of

childhood leukemia in the area of the plant between 1978 and 1996. The La Hague Plant is a spent fuel reprocessing plant. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle.

European reactors of various designs use MOX fuel. European nuclear regulatory authorities have reviewed MOX fuel use in reactors of varying designs and found it to be safe and acceptable.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to advocate a plutonium economy. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

MR009–5 **MOX Approach**

Reactor fuel in Europe is fabricated to similar enrichment levels (about 5 percent plutonium 239) to the levels being proposed for the U.S. reactors that would be used to irradiate MOX fuel.

On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal (including gallium) from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

MR009–6 **Nonproliferation**

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

Russia may choose to reprocess its spent fuel and reuse the plutonium. It will be the responsibility of IAEA to monitor this activity and ensure that the material remains committed to civilian use. Programmatic and policy issues such as U.S. policies toward plutonium disposition in Russia are beyond the scope of this SPD EIS.

POE, W. LEE, JR.
PAGE 1 OF 1

807 E. Rollingwood Rd.
Aiken, SC 29801
June 15, 1999

Mr. G. Bert Stevens
Department of Energy **FAX 1-800-820-5156**
Office of Fissile Materials Disposition, MD-4
Forrestal Building
1000 Independence Avenue, SW
Washington, DC 20585

CC: Mr. Greg Rudy, Manager **FAX 725-1910**
Savannah River Operations Office

Mr. Andrew Granger, SR NEPA Compliance Officer **FAX 725-4023**
Savannah River Operations Office

Ms. Mary Flora, WSRC Manager of Public Involvement **FAX 725-4023**
Westinghouse Savannah River Company

Re: Public Meeting on Supplement for Surplus Plutonium EIS

Dear Sir:

I have heard of no public meeting being scheduled on the supplementental EIS for surplus plutonium management in the Aiken Augusta area. I am disappointed that you do not consider the stakeholders in the Savannah River Site from South Carolina-Georgia important to this mission. I suggest that you reconsider and hold a meeting on this subject in this area.

I do not understand the intent of the meeting from your "Second Notice" announcement but Savannah River Site seems to be important to this mission so I expect your Office to keep the SRS stakeholders up to date on these issues. It is clear to me that we, stakeholders, are important to that mission. Keep us up to date on the Office of Fissile Materials plans. 1

If you are unable to hold a public meeting on these plans in the Aiken-Augusta area, what strategy do you have for informing the SRS stakeholders?

Sincerely
W. Lee Poe
W. Lee Poe, Jr.

FR002

FR002–1 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for a public hearing on the *Supplement to the SPD Draft EIS* be held in the Aiken-Augusta area. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

Since the inception of the U.S. fissile materials disposition program, DOE has supported a vigorous public participation policy. SRS stakeholders who are in the MD stakeholder database will be kept directly informed of the progress on the surplus plutonium disposition program through notices and announcements sent by mail. Indirectly, interested parties may get information from the MD Web at http://www.doe-md.com, the DOE reading rooms, and local and site media announcements.

SOUTH CAROLINA SENATE
HONORABLE PHIL P. LEVENTIS
PAGE 1 OF 1

SENATOR PHIL P. LEVENTIS
SUMTER COUNTY

OFFICES
404 GRESSETTE BUILDING
P. O. BOX 142
COLUMBIA, SOUTH CAROLINA 29202
PHONE: (803) 212-6230
FAX: (803) 212-6299

P. O. BOX 1592
SUMTER, SOUTH CAROLINA 29151-1592
(803) 773-0884

THE SENATE OF SOUTH CAROLINA

COMMITTEES:
AGRICULTURE AND NATURAL RESOURCES, CHAIRMAN
FINANCE
LABOR, COMMERCE & INDUSTRY
TRANSPORTATION
ETHICS
MEDICAL AFFAIRS

June 30, 1999

The Honorable Bill Richardson
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20582

Dear Secretary Richardson:

I want to say thank you again for your willingness to participate in the public hearing that I held on Thursday, June 24, 1999, in Columbia, South Carolina. The advertising that your Department sponsored on the radio and in the newspaper ensured that at least one hundred or more interested individuals had the opportunity to hear directly from the Department of Energy regarding the proposed Mixed Oxide Fuel Program. I was very appreciative of the number of DOE officials who participated and traveled from such distances as Argonne, Illinois, Washington, D.C., Charlotte, North Carolina, as well as Aiken, South Carolina. Flying Mr. Denis Hugelmann from France to discuss Cogema's expertise and role in the consortium was also most helpful and very important. This effort on your part has not gone unnoticed. I along with others who assisted in my organizing this public hearing were impressed with the Department's assistance in making the hearing a success. The Department demonstrated a true interest in trying to reach out to the public by candidly responding to the series of questions that I asked at the beginning of the hearing and by patiently listening to the questions and concerns raised by the public on the proposed MOX program. 1

I have spoken to your Principal Deputy Assistant Secretary, Ms. Linda Lingle, and have conveyed my thanks to her and all that she did to make the hearing a success. However, I want to be sure that you understand the depth of my appreciation. I look forward to continuing a dialogue with you and your Department on his matter.

Sincerely,

Phil P. Leventis

PPL:pap
cc: The Honorable James H. Hodges
SC Congressional Delegation
Ms. Linda Lingle, USDOE
Mr. Bert Stevenson, USDOE
Ms. Laura Holgate, USDOE
Mr. David Nulton, USDOE
Mr. Charlie Anderson, USDOE
Mr. Robert C. Selby, USDOE
Mr. R.H. Ihde, Duke, Cogema, Stone & Webster Consortium
Mr. Denis Hugelmann, Cogema
Dr. Arjun Makhijani, IEER
Mr. Ethan Brown, Carolina Peace Resource Center

\chair\richardsonthankyou63099.doc

MR025

MR025–1 General SPD EIS and NEPA Process

DOE acknowledges the Senator's appreciation of its efforts in supporting the public meeting held on June 24, 1999, in Columbia, South Carolina. Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
EARL C. LEMING
PAGE 1 OF 1

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

May 26, 1999

DOE, Office of Fissile Materials Disposition
c/o Supplement to the SPD EIS
PO Box 23786
Washington DC 2006-3786

Dear Sirs

DOCUMENT REVIEW: Supplemental to the Draft Environmental Impact Statement, *"Surplus Plutonium Disposition,"* DOE/EIS-0283-D, July 1998

The Tennessee Department of Environment and Conservation, DOE Oversight Division (TDEC/DOE-O) has reviewed the above Supplemental Draft Environmental Impact Statement (EIS) and has the following comment.

The Department wishes to again note that there are quantities of plutonium in the form of TRU waste, contaminated equipment, spent fuel, and working inventory still present on the Oak Ridge Reservation. Although not considered surplus, this plutonium will require final disposition and should to be addressed by DOE in the near future. In addition, project plans should ensure that post irradiation examination of MOX fuel at the Oak Ridge National Laboratory does not contribute to the Oak Ridge Reservation waste inventory. 1 2

Sincerely

Earl C. Leming
Director

xc: Justin Wilson – Governor's Policy Office
Jim Hall – DOE
Ed Cumesty - DOE
Dodd Galbreath – TDEC

EI460.99

MR006

MR006–1 **Other**

Most of the plutonium stored at ORR is in the form of waste. Approximately 600 g (21 oz) of plutonium 238 (not weapons-usable) has been declared excess and is being held in storage at ORNL awaiting transfer for use in the space program. Approximately 780 g (28 oz) of other plutonium isotopes have been repackaged and are awaiting transfer to LLNL. The scope of this SPD EIS includes alternatives for the disposition of weapons-usable plutonium declared surplus to U.S. defense needs. Other radioactive materials, wastes and spent nuclear fuel that contain plutonium are beyond the scope of this SPD EIS. Alternatives for management of radioactive and hazardous wastes were evaluated in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997). RODs for TRU, hazardous and high-level waste have been issued; RODs for low-level and mixed low-level waste are expected shortly. Alternatives for management of spent nuclear fuel were evaluated in the *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final EIS* (DOE/EIS-0203-F, April 1995). RODs for this EIS were issued in May 1995, and March 1996. Transportation and disposal of TRU waste are evaluated in the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997). A ROD for the WIPP EIS was issued in January 1998. Transportation and disposal of spent nuclear fuel are evaluated in the *Draft EIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999). A ROD has not been issued for the *Yucca Mountain EIS*.

MR006–2 **Waste Management**

As discussed in the revised Section 1.6, DOE prefers ORNL for postirradiation examination activities. ORNL has the existing facilities and staff expertise needed to perform postirradiation examination as a matter of its routine activities; no major modifications to facilities or processing capabilities would be required. In addition, ORNL is about 500 km (300 mi) from the reactor site that would irradiate the fuel. Section 4.27 was revised to include analyses of potential waste management impacts at ORNL.

STAND

June 24, 1999
STAND COMMENT # S-2

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

These are STAND's (Serious Texans Against Nuclear Dumping) second comments on the *Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement*, April 1999. Most of the supplemental analysis is based upon the proposal submitted by the Duke Cogema Stone and Webster consortium.

1. MOX fuel fabrication is more dangerous

When compared to the consortium's analysis, DOE's previous analyses underestimated hazards and overstated benefits from a MOX fuel fabrication plant. For example:

DOE's estimated annual volume of liquid radioactive waste at MOX plant	1 liter
Nuclear industry's estimated annual volume of liquid radwaste at MOX plant	800 liters
DOE's estimate of radionuclide emissions in MOX plant wastewater	None
Nuclear Industry's estimate	9,250 Bequerels
Percentage DOE underestimated the electrical requirements of a MOX plant	72%
Percentage DOE underestimated the natural gas requirements of a MOX plant	16%
Percentage DOE underestimated the water requirements of a MOX plant	55%
Percentage DOE overestimated the number of jobs at a MOX plant	13%
Number of months DOE refused to evaluate liquid acid plutonium processing--or plutonium "polishing"--as a reasonable alternative for plutonium conversion	35
Number of months after the MOX Industry Conference in Atlanta that it took for DOE to respond to Industry demands and develop Appendix N for a Plutonium Polishing option	2

1

Serious Texans Against Nuclear Dumping
7105 W 34th Ave, Suite E, Amarillo, TX 79109-2907
phone (806)358-2622 - fax (806)355-3837 - email <stand@arn.net>

FR009

FR009–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

While it is true that some of the estimates in the SPD Draft EIS have increased as noted by the commentor, other estimates have decreased such as the number of workers required to operate the MOX facility and the worker dose estimate. While some estimates have increased, none of the increases are expected to result in major environmental impacts to the public during normal operations at any of the candidate sites as shown in Section 2.18 and Chapter 4 of Volume I.

On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel. These reactors were selected in part because their operational lives would not have to be extended to support the surplus plutonium disposition program.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial

STAND OF AMARILLO, INC.
DON MONIAK
PAGE 2 OF 2

2. Putting MOX in old nuclear reactors is a bad idea:

Age of Nuclear Reactors when first MOX fuel scheduled to be inserted ..... 20 to 28 years

Age of Nuclear Reactors in 2020 when MOX fuel scheduled to leave ..... 24 to 32 years

Number of extra spent fuel assemblies expected from MOX 199 1

Percentage DOE underestimated maximum radiation dose to people near reactors: ... 82-329%

These comments will be supplemented in the future.

Sincerely:

Don Moniak
Program Director
STAND, Inc.

FR009

reactors. However, spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies.

As discussed in Section 4.28.2.4, the radiation dose to the population in the vicinity of the proposed reactor sites is not expected to change from normal operation of the reactors with a partial MOX fuel core instead of a full LEU fuel core. The commentor states that DOE "underestimated maximum radiation dose to people near reactors" but it is impossible to determine how this was derived. The *Storage and Disposition PEIS* presented information on a generic reactor but this is not directly comparable to the specific reactor information presented in this SPD EIS.

STAND OF AMARILLO, INC.
DON MONIAK
PAGE 1 OF 2

STAND

June 24, 1999
STAND COMMENT # S-1

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

These are STAND's (Serious Texans Against Nuclear Dumping) first comments on the April 1999 *Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement.*

Subject: Pit Repackaging requirements, Page 9.

The Department of Energy argues that the need to repackage 12,000 plutonium pits into shipping containers can be avoided if plutonium pit disassembly and conversion were conducted at Pantex. The Department implicitly alleges that the benefit of siting a pit processing facility at Pantex would be lower radiation exposures to Pantex.

Fundamental Flaws in DOE's Analysis

1. There are approximately 12,000 plutonium pits at Pantex that are stored in unsuitable AL-R8 containers. Up to 4,000 of these pits are:

- considered "National Assets;"
- not part of the surplus pit inventory;
- scheduled to be stored indefinitely at Pantex in Building 12-116.

The impact of packaging these "National Assets" is entirely separate from the impact of packaging surplus plutonium pits and DOE should make this adjustment. 1

2. The decision by DOE to abandon its efforts–after spending $50,000,000–to repackage pits in AT-400A storage/shipping containers represents inadequacies in Pantex's plutonium pit handling and storage operations. Prior to late 1997 there were no indications that the AT-400A was a problematic container and Pantex's public relations efforts praised the container as a great achievement, a "win-win" situation. In fact, the AT-400A is still identified as the container of the future in the DOE-funded Amarillo International Airport plutonium exhibit and in the storage storage section at http://www.pantex.com.

In this supplemental analysis, as with the Draft SPDEIS, the Department is actually rewarding Pantex for its failure to implement promised safety improvements. If Pantex were to proceed with using the AT-400A there would be no need to repackage pits into shipping containers. Pantex's

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FR008

FR008–1 **Alternatives**

DOE acknowledges the commentor's concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed; addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

STAND OF AMARILLO, INC.
DON MONIAK
PAGE 2 OF 2

decision to abandon this costly program functions to serve its efforts to keep the pits and become a plutonium processor.

3. The argument that worker exposures can be reduced if pits do not need repackaging is not balanced by the fact that worker exposures during secondary canning of plutonium powder (which would be unnecessary in co-located facilities) would be much higher than exposures during pit repackaging. Furthermore, workers at Pantex would be far more likely to suffer internal exposure to plutonium in a plutonium pit processing facility. 1

4. The argument made by DOE mirrors that made by Mr. Carl Beard, Nuclear Program Manager for the Amarillo National Resource Center for Plutonium (ANRCP). In comments on the Draft Surplus Plutonium Disposition EIS, Mr. Beard stated that, "if conversion is not done at Pantex, all the pits would have to be repackaged into AT400 (or some other approved transportation container) and shipped to SRS. This will not have to be done if the facilities are located at Pantex. The EIS estimates a 40% dose reduction to Pantex workers due to this. Were ALARA considerations evaluated as part of this process?" 2

Of course, Mr. Beard and the ANRCP have never raised any ALARA concerns when plutonium pits were unnecessarily shipped from Rocky Flats, and when the Department chose the more complicated MOX fuel option.

These comments will be supplemented in the future.

Sincerely:

Don Moniak
Program Director
STAND, Inc.

FR008

FR008–2 **Human Health Risk**

There would be reduced doses to Pantex workers involved with repackaging pits for shipment to other sites if the pit conversion facility were located at Pantex. There may be some overall advantage in terms of human health risk if the pit conversion facility is collocated with the other surplus plutonium disposition facilities. The SPD EIS presents a conservative estimate of the worker dose associated with operating these facilities. DOE is committed to reducing any human health risks at its sites to ALARA levels. The surplus plutonium disposition facilities would be designed, constructed, and operated to achieve these goals.

Pits were shipped from RFETS to Pantex to support activities DOE felt were necessary at RFETS. The MOX approach is a reasonable alternative because it is an effective way to accomplish the goal of the surplus plutonium disposition program. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors would reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Section 4.28 was revised to discuss the potential environmental impacts of operating the reactors that would use the MOX fuel, should the decision be made to proceed with the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

STAND

June 28, 1999
STAND COMMENT # S-3

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

These are STAND's (Serious Texans Against Nuclear Dumping) third set of comments on the April 1999 *Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement.* (SPDEIS)

Subject: Lead Test Assemblies, Uranium Feed, and Bad MOX Fuel

In the final SPDEIS, STAND is requesting that DOE:

- Clearly identify all major differences between weapons-grade and reactor-grade plutonium; 1
- Identify and explain the lack of progress in the MOX fuel test program at Los Alamos; 2
- Analyze the environmental, safety, and health impacts of producing uranium oxide powder for MOX that is derived from the "Ammonium Uranyl Carbonate" (AUC) process 3
- Analyze the option of having Los Alamos or other DOE entities produce off-spec MOX fuel as an alternative immobilization route for plutonium pits. 4

Background for Request

A March 1999 Los Alamos National Laboratory (LANL) report[1] calls into question the ability of the lab to successfully fabricate Mixed Oxide (MOX) test fuel using weapons-grade plutonium. At the root of the problem is that "weapons-grade plutonium morphology (shape) differs significantly than that of reactor-grade plutonium." These fundamental differences must be clearly identified in the final SPDEIS.

Los Alamos is the lead laboratory for the MOX fuel fabrication program while Oak Ridge National Laboratory is the lead lab for irradiating the fuel made at LANL and "post-irradiation" exams of that fuel, barring major accidents. The Department of Energy's goal was to begin conducting a "High Power Test" of MOX fuel pellets during April, 1999 in the "Advanced Test Reactor" (ATR) at INEEL.[2] 2

[1] LA-UR-99-1533. *Nuclear fuels technologies status report on feed materials baseline development and test fuel fabrication progress.* H. T. Blair, P. Chodak, S. L. Eaton, and A. D. Neuman. Los Alamos National Laboratory March, 1999.

[2] *FY 1999 Annual Operating Plan.* (Rev 0, October 1, 1998). DOE Office of Fissile Materials Disposition.

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FR006

FR006–1 **MOX Approach**

The major difference between weapons-grade plutonium and reactor-grade plutonium (i.e., plutonium recovered from spent nuclear fuel) is the level of plutonium 239. The level of plutonium 239 is lower in reactor grade plutonium. DOE recognizes that European MOX programs use different enrichment levels. However, European enrichment levels are more tied to programmatic needs and not to specific limits on plutonium 239. The plutonium 239 levels being proposed in this EIS may be higher than those in Europe but are still considered safe. If any specific safety limits or restrictions are required, they would be identified by NRC during the license amendment process.

FR006–2 **MOX Approach**

The plutonium dioxide feed to the MOX facility would be calcined, oxalate-derived material that would have morphology identical to that of the oxide used successfully in Europe to make MOX fuel.

Fuel fabrication R&D at LANL was sponsored in order to fabricate test fuel for irradiation in the Advanced Test Reactor at INEEL. Fuel for the first irradiation test was fabricated successfully. The second irradiation test was canceled based on technical input from DCS, the team that was selected to fabricate MOX fuel and irradiate it. Fuel R&D continues at LANL because further developing a domestic MOX fuel fabrication capability is useful to DOE for lead assembly fabrication and for other programmatic purposes, especially related to characterizing the feed powder from the pit conversion facility.

The difficulties encountered with fabrication of MOX test fuel at LANL are due neither to the lack of MOX fuel fabrication capability at LANL nor to generic technical difficulties associated with weapons-grade plutonium. These difficulties have been determined to be primarily due to switching the uranium oxide used in the MOX test fuel. LANL had successfully fabricated MOX test fuel for the first irradiation test using an uranium oxide commercially supplied by CAMECO. To begin fabrication of the MOX test fuel for the second irradiation test, uranium oxide from the ammonium uranyl carbonate process was used and it proved to be a problem.

STAND OF AMARILLO, INC.
DON MONIAK
PAGE 2 OF 3

In the past two years alone, the Department of Energy has allocated $3.425 million for MOX fuel fabrication research and development work at Los Alamos, and another $10.075 million on the program to irradiate the test pellets in the Advanced Test Reactor[3] (3). To date, fourteen batches of MOX test fuel pellets for this project have failed to meet technical specification and/or had some or all of the following unacceptable problems:

-"end capping"
--cracking on top
--bubbling when submerged in alcohol

These dismal results involved plutonium oxide powder produced from both dry (pyroprocessing) and wet (liquid acid) plutonium metal-to-oxide conversion processes. While the authors complained of running low on plutonium made from DOE's preferred conversion alternative called HYDOX, they failed to mention that in 1998 HYDOX was "retracted from the ARIES line by NMT-DO for safety reasons."[4] 2

In the final SPDEIS, DOE should identify the lack of progress in its MOX fuel test program and explain how spending millions of dollars on future efforts is justified. While Los Alamos plutonium programs--HYDOX, MOX, TIGR--continue to encounter delays and failures, the lab remains the Department's "preferred alternative" to fabricate MOX "Lead Test Assemblies" for use in commercial reactors. DOE should answer whether failure in the Los Alamos R&D projects are a function of site-specific incompetency or generic technical difficulty associated with weapons-grade plutonium.

The latest results at LANL involve MOX test fuel using uranium oxide powder derived from the "Ammonium Uranyl Carbonate" (AUC) process--the same process that has supplied uranium oxide for more than 90% of the world's supply of commercial MOX fuel. Since making MOX fuel for Light Water Nuclear Reactors generally involves a mix of 3-5% plutonium oxide powder and 95-97% uranium oxide powder, it is obvious that the uranium must be compatible with the plutonium. In the final SPDEIS, DOE must analyze the environmental, safety, and health impacts of uranium oxide powder production using the Ammonium Uranyl Carbonate process. 3

Given the fact that DOE's MOX program is having severe difficulties in the test phase, STAND requests that the option of immobilizing plutonium in "bad" MOX fuel be analyzed in the final SPDEIS. The disposition of excess plutonium using "off-spec" MOX pellets as a final immobilization waste form was raised in 1996 by G.A. Armantrout and L.J. Jardine.[5] 4

[3] FYs 1998 (Rev. 8) and 1999 (Rev. 0) *Annual Operating Plans*. DOE Office of Fissile Materials.

[4] September 28, 1998 Memorandum from U.S. DOE-Los Alamos Area Office to Bruce Matthews, Division Director, NMT-DO, LANL, MS-E500. *Approval of ARIES Project Hazard Analyses and Required Safety Controls*. Attachment 1. Page 10.

[5] Armantrout, G.A. and L.J. Jardine. *Disposition of Excess Plutonium Using "Off-Spec" MOX Pellets as a Sintered Ceramic Waste Form*. UCRL-JC-121830. Lawrence Livermore National Laboratory.

FR006

FR006–3 **MOX Approach**

Section 4.30.3 was added to this SPD EIS to evaluate the environmental impacts of converting depleted uranium hexafluoride to depleted uranium dioxide using a commercially available dry conversion process. As described in the *Initial Data Report in Response to the SPD EIS Data Call for the UO_2 Supply* (ORNL/TM-13466, November 1997), dry conversion is a proven technology for uranium dioxide production that is currently available at four domestic commercial fuel production facilities. The dry conversion process is a more efficient process than the ammonium diuranate wet conversion process and as indicated by the commentor, the wet process has proven to be more problematic in ongoing experiments at LANL.

FR006–4 **Alternatives**

Off-specification MOX fuel pellets would not normally be sent to the immobilization facility. As described in Section 2.4.3.2, MOX fuel pellets that do not meet specifications would be recycled in the MOX process line. Section 4.30 discusses the incremental impacts that would be expected if plutonium originally designated for MOX fuel (such as rejected MOX fuel) had to be immobilized instead.

Los Alamos has a proven ability to make off-spec MOX fuel pellets, and the technology for MOX fuel fabrication is highly advanced. DOE should consider a long-term strategy of immobilizing the plutonium found in pits in off-spec MOX fuel pellets. 4

These comments will be supplemented in the future.

Sincerely;

Don Moniak
Program Director
STAND of Amarillo, Inc.

FR006

Please include in the Public Record

JUNE 23,1999

TO: USDOE, OFFICE OF FISSILE MATERIALS DISPOSITION ,PO BOX 23786, Washington, DC 20026-3786

FROM: Tim Young and MB Condon, 380 Ilsa Way, Goldendale WA 98620
(509) 773-6991

RE: Supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement

We would like to express the following concerns to USDOE regarding the supplement to the Draft Surplus Plutonium Disposition EIS.

It is very disturbing that USDOE has gone forward with contracts with Duke Power and Virginia Power to utilize MOX fuel in commercial reactors before the Final Surplus Plutonium Disposition Environmental Impact Statement has been issued. It is even more disturbing that the only public meetings on this issue were held in Washington,DC, not in the communities where the MOX fuel will be shipped and burned . The people within the reactor communities and those along the shipping routes must be directly involved in USDOE's decisions that could increase the possibility of a nuclear accident and consequently increase the number of cancer deaths in their communities were such an accident to occur during the use of MOX fuels. 1

As residents of Washington State ,who have been to many public meetings regarding Hanford, we would contend that USDOE's lack of outreach in this instance is par for the course . It only serves to reinforce the conception that USDOE acts unilaterally , when there may be public oppossition to it's goals .

USDOE should extend the public comment period on this Supplemental EIS and hold public hearings in the reactor communities that will be affected by contracts with Duke Power and Virginia Power. These meetings should be publicized prominently in the affected communities and held at hours that are convenient for working people to attend.

Tim Young and MB Condon

Tim Young
MB Condon

FR012

FR012–1 **General SPD EIS and NEPA Process**

DOE conducted a procurement process in accordance with DOE NEPA regulations 10 CFR 1021.216. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. As stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are made and announced in the SPD EIS ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before the ROD is issued, and options that would allow construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach.

DOE acknowledges the commentors' request for additional public hearings in areas affected by the use of MOX fuel and an extension of the public comment period, including the reactor and shipping route communities. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS* or to extend the public comment period. The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

YOUNG, TIM, ET AL.
PAGE 2 OF 2

DOE provided other means and time for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. At the invitation of South Carolina State Senator Phil Leventis, DOE also attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina.

Although it did not extend the comment period, DOE did consider all comments received after the close of that period for the *Supplement*. All comments were given equal consideration and responded to as presented in Volume III, Chapter 4.

ALLIANCE FOR NUCLEAR ACCOUNTABILITY
BRAD MORSE
PAGE 1 OF 4

Statement of Brad Morse
Program Assistant
Alliance for Nuclear Accountability
June 15 Public Hearing on the Supplement to the Draft Surplus Disposition EIS
Morning Session

The Alliance for Nuclear Accountability is a network of organizations concerned with nuclear weapons, nuclear waste, materials disposition, and public health. ANA members are by and large community groups living in the shadows of the Department of Energy nuclear weapons complex.

ANA member organizations have a lifetime of experience with the legacy of fifty years of Cold War policy and production. It is with that experience that the 27 member organizations of the Alliance for Nuclear Accountability join with the over one hundred other organizations and individuals from more than a dozen countries in opposition to the use of weapons-grade plutonium as MOX fuel in commercial reactors. When that Pandora's Box of Plutonium is opened, we will be hard pressed to close it. 1

COMMENTS AND QUESTIONS ON THE SUPPLEMENT

I wanted to open with one question of some detail, and I hope I can have it answered today. On page 8 of Appendix P of the Supplement, table 6 indicates that the SPD Draft EIS estimated annual waste generation of .5 liters/year of liquid TRU waste, and .3 liters/year of liquid low level waste. The offeror estimated 500 liters/year of liquid TRU waste, and 300 liters/year of liquid low level waste. I don't want to be trivial right away, but is it the position of DOE that it was 1000% off in estimating annual waste generation. I ask this not as much out of concern of the total annual waste generated, but out of concern for where else an error of this magnitude may have occurred and its consequences. When that Pandora's Box of Plutonium is opened, we will be hard pressed to close it. 2

Question #1: What is the source of this error and has it been corrected?

The DOE and its predecessor agencies have a reputation for secrecy and a lack of meaningful public input. While the DOE has made strides in the right direction in recent years, the public process around the MOX proposal is shameful. Throughout the public process associated with the Draft Surplus Plutonium Disposition EIS, we in the NGO community were told time and again that the DOE couldn't possibly hold hearings in communities around nuclear reactors that were candidates for the MOX program, until the DOE knew which reactors were selected. Now we know the Catawba, McGwire, and North Anna reactors have been chose, and still the DOE declines to hold hearings in those communities. It is my most sincere hope that DOE reconsiders this decision, and does give communities which could endure decades of plutonium shipments in and out, and which assume the risk of a plutonium accident, the chance to voice their opinion. And how is it that we know which reactors will irradiate MOX fuel, without having yet completed the Environmental Impact Statement? The Department of Energy has done a discredit to itself and the public by its rush to judgement, and it has violated at least the spirit of NEPA. 3

Question #2: Doesn't the awarding of a MOX contract pre-determine the hybrid approach and the use of MOX?

DCR012

DCR012–1 MOX Approach

DOE acknowledges the commentor's opposition to the use of weapons-grade plutonium in MOX fuel and irradiating it in commercial reactors. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

DCR012–2 Waste Management

Initial estimates provided in support of the MOX data report indicated that liquid TRU waste generation would be on the order of 0.5 l/yr (0.1 gal/yr) and liquid LLW generation would be approximately 0.3 l/yr (0.08 gal/yr). As part of the request for proposals for the MOX fuel fabrication and irradiation contract, DOE asked prospective offerors to review the projected resource requirements and waste estimates included in the SPD Draft EIS to determine if they considered them reasonable for the proposed MOX facility. DCS stated that overall the waste estimates were consistent with their experience, but they noted that the liquid radioactive waste estimates appeared low and probably should be on the order of m^3/yr instead of l/yr. Thus, the estimates were increased to 500 l/yr (132 gal/yr) and 300 l/yr (79 gal/yr), equivalent to 0.5 m^3/yr (0.6 yd^3/yr) and 0.3 m^3/yr (0.4 yd^3/yr).

Although the waste generation estimates were increased by a factor of 1000, they are still very small. For example, 300 l/yr (79 gal/yr) would fill approximately one and a half (208-l [55-gal]) drums. As described in Chapter 3 of Volume I, the F- and H-Area Effluent Treatment Facility at SRS can process 1.9 million m^3/yr (2.5 million yd^3/yr) which is equivalent to 1.9 billion l/yr (0.5 billion gal/yr) of liquid LLW. Therefore, 300 l/yr (79 gal/yr) of additional liquid LLW would be a very small portion of the waste that could be processed in the F- and H-Area Effluent Treatment Facility.

In other cases, DCS reported that their estimates were lower than those presented in the SPD Draft EIS. For example, DCS estimated that fewer workers would be needed to operate the MOX facility and thus the average worker dose would be much lower.

DCR012–3 General SPD EIS and NEPA Process

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of open and public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. For example, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in the public hearing that was held in Columbia, South Carolina, on June 24, 1999. Additionally, various means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue. It is DOE policy to encourage public input into these matters of national and international importance.

DOE acknowledges the commentor's request that DOE hold public hearings in the communities near the potential reactor sites that would use the MOX fuel. During the 45-day public comment period on the *Supplement to the SPD Draft EIS*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement*. DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

DOE conducted a procurement process in accordance with DOE NEPA regulations 10 CFR 1021.216. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. As stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are made and announced in the SPD EIS ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before the ROD is issued, and options that would allow construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach.

ALLIANCE FOR NUCLEAR ACCOUNTABILITY
BRAD MORSE
PAGE 4 OF 4

Question #3: Knowing the nuclear fuel cycle creates more reactor-grade plutonium, and looking at footnote #1 on page 3 "Weapons-grade, fuel-grade, and power-reactor-grade plutonium are all weapons usable."; how do you reconcile the goal of the MOX project of eliminating or reducing weapons-usable plutonium with the fact that MOX irradiation actually creates plutonium? 4

Question #4: At a public meeting at the Nuclear Regulatory Commission, I asked the consortium about the public's ability to gain access to environmental safety & health records from Europe, based on the notion that the US MOX program would heavily depend on the European experience with reactor-grade plutonium. I was told "we haven't asked them, and we don't need them" referring to the environmental records. Based on comments today, I assume that the consortium will indeed be looking at those records. Could I get a formal response to that question? 5

DCR012

DCR012–4 **MOX Approach**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this.

It is true that in the MOX approach only a fraction of the plutonium would actually be consumed in the reactor; but the remainder would be an integral part of massive spent fuel assemblies. The spent fuel assemblies would be so large and radioactive that any attempted theft of the material would require a dedicated team willing to suffer large doses of radiation, along with substantial equipment for accessing and removing the spent fuel from the storage facility and carrying it away.

Reactor-grade plutonium can be made into a nuclear weapon but it presents would be users with much greater difficulties than weapons-grade plutonium. The level of reactor-grade plutonium in MOX spent fuel would be higher than that present in LEU spent fuel but it would still be a very small percentage of the remaining fuel and be highly radioactive. In order for it to be used in a nuclear weapon, the fuel would have to be reprocessed. This is an operation that is very difficult to conceal.

DCR012–5 **MOX RFP**

DOE considered past environmental performance of COGEMA in awarding the contract for MOX fuel fabrication and irradiation services. The operating experience at MELOX is being factored into the MOX facility design and was used to update information in the SPD Final EIS as discussed in Appendix P. More information on COGEMA's environmental record can be found on their Web site at http://www.cogema.com or by contacting Ms. Christi A. Byerly. Her address is: 7401 Wisconsin Avenue; Bethesda, MD 20814. She may also be contacted by telephone at (301) 941-8367. Her fax number is (301) 652-5690, and her email address is cbyerly@cogema-inc.com.

ALLIANCE FOR NUCLEAR ACCOUNTABILITY * CAROLINA PEACE RESOURCE CENTER * NUCLEAR CONTROL INSTITUTE * PHYSICIANS FOR SOCIAL RESPONSIBILITY * SAFE ENERGY COMMUNICATION COUNCIL * SERIOUS TEXANS AGAINST NUCLEAR DUMPING * UNION OF CONCERNED SCIENTISTS * U.S. PUBLIC INTEREST RESEARCH GROUP

April 21, 1999

The Honorable Bill Richardson
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue SW
Washington, DC 20585

Dear Secretary Richardson:

We are writing to express our strong objections to one important aspect of the Department of Energy's plans to release a supplement to the Draft Surplus Plutonium Disposition Environmental Impact Statement ("draft EIS"). [64 *Federal Register* 16720, April 6, 1999]

We agree that DOE is required under NEPA to prepare a supplement to the draft EIS in order to provide more information on "the potential environmental impacts of using mixed oxide (MOX) fuel in six specific commercial nuclear power reactors at three sites…" in Virginia, North Carolina, and South Carolina. We find it unacceptable, however, that DOE plans only one public hearing on these issues, to be held in Washington, DC.

When the draft EIS was released last summer, some of us objected to the lack of plans to hold hearings in the communities around reactors that would irradiate weapons-plutonium MOX. At that time, we were informed by representatives of the Office of Fissile Materials Disposition (MD) that local hearings in reactor communities could not be scheduled because the MOX procurement process was still underway, and reactor sites had not yet been selected. After DOE's contract award on March 22, 1999, this is clearly no longer the case. The consortium that won the contract has announced that it plans to irradiate MOX fuel in Virginia Power's North Anna reactors (located near Charlottesville, VA), and in Duke Power's McGuire and Catawba reactors (located near Charlotte, NC, and Rock Hill, SC). 1

The communities around these reactor sites have a great deal at stake in these decisions, and deserve an opportunity to voice their opinions on the MOX proposal. It is also important that DOE solicit input from stakeholders most directly impacted by the MOX plan, and make it easy for them to be heard by holding hearings in their

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MR013–1 General SPD EIS and NEPA Process

DOE acknowledges the commentors' request for additional public hearings in the communities near the potential reactor sites that would use the MOX fuel. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

communities. We therefore urge DOE to schedule promptly additional hearings near each of the reactor sites. 1

We thank you for your attention to this urgent matter.

Sincerely,

Paul Leventhal
Nuclear Control Institute

Linda Pentz
Safe Energy
Communication Council

Ethan Brown
Carolina Peace Resource Center

Susan Gordon
Alliance for Nuclear Accountability

David Lochbaum
Union of Concerned Scientists

Robert K. Musil, Ph.D
Physicians for Social Responsibility

Anna Aurilio
U.S. Public Interest Research Group

Don Moniak
Serious Texans Against
Nuclear Dumping

CC: Laura Holgate

MR013

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Nuclear Control Institute Comments on the Department of Energy's
Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement

June 28, 1999

Comments on the Environmental Impact Analysis (Section 5 and Appendix P)

The Nuclear Control Institute (NCI) has long urged the Department of Energy (DOE) to conduct a thorough, accurate and honest assessment of the environmental, safety and health risks associated with irradiating mixed-oxide (MOX) fuel derived from warhead plutonium in existing light-water reactors.[1] NCI believes it is essential that such information be given considerable weight in the development of DOE's strategies both for disposition of U.S. excess plutonium and for cooperation with Russia on their own disposition program. Reactor safety issues have not been given the consideration that they warrant in the formulation of disposition policy, as evidenced by the selection of the MOX-immobilization "dual track" in 1996 based on the rudimentary environmental analysis and flawed calculations of the 1996 *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement* (S&D PEIS).[2] 1

The calculations of severe accident consequences contained in the *Supplement to the Surplus Plutonium Disposition Environmental Impact Statement* appear to be somewhat improved compared with those presented in the S&D PEIS. However, the overall analysis remains grossly incomplete and inadequate. DOE's final analysis must be strengthened to improve its credibility both with the public and with the Nuclear Regulatory Commission (NRC), which in spite of its relatively late start in examining the safety issues associated with DOE's MOX plan now appears

[1] Edwin S. Lyman, "Comments on the Department of Energy's Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement: Public and Occupational Health and Safety Issues," Nuclear Control Institute, Washington, DC, June 7, 1996 (revised October 9, 1996).

[2] Edwin S. Lyman, "Public Health Consequences of Substituting Mixed-Oxide for Uranium Fuel in Light-Water Reactors," Executive Summary, Nuclear Control Institute, January 1999.

Strategies for stopping the spread and reversing the growth of nuclear arms.
Paul L. Leventhal, *President*, Peter A. Bradford, David Cohen, Julian Koenig, Sharon Tanzer, Roger Richter, Dr. Theodore B. Taylor
BOARD OF DIRECTORS

MR022

MR022–1 **MOX Approach**

DOE believes that this SPD EIS does evaluate the potential impacts of fabricating and irradiating MOX fuel, including those associated with postulated design basis and severe accidents at the reactors proposed to use the MOX fuel. In addition to these evaluations, Duke Power Company and Virginia Power Company, the reactor licensees for the plants proposed for irradiation of MOX fuel, would provide analyses and documentation to NRC in support of the required operating license amendments. NRC would not issue a license amendment without the licensee fully demonstrating that the requested change would not compromise safety at the plant.

DOE believes that analyses contained in the *Storage and Disposition PEIS* are sufficient for programmatic decisionmaking. Based on decision made in the *Storage and Disposition PEIS* ROD, to pursue the "dual track" or hybrid approach to plutonium disposition, use of MOX fuel is analyzed in this SPD EIS along with the No Action Alternative and immobilization-only alternatives.

NUCLEAR CONTROL INSTITUTE
EDWIN S. LYMAN
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to be taking a more thoughtful approach than DOE.[3] If DOE continues to refuse to address seriously the full array of MOX safety issues, it will be inviting regulatory delays when license amendments to use MOX are sought by the Duke Cogema Stone and Webster (DCS) consortium in the future. 1

1) Beyond-Design-Basis Accident Analysis

The results of the beyond-design-basis accident analysis contained in the *Supplement* are substantially different from those provided by DOE in the S&D PEIS. This is apparent from the information provided in Table 4.28-9. Yet, there is no discussion in the text that explains the reasons for the different results of the two calculations. In addition, the table is misleading in not mentioning the fact that the S&D PEIS results were obtained for a full MOX core, while the *Supplement* calculations are based on a 40% MOX core.

The S&D PEIS calculations, which are cited in the Draft Surplus Plutonium Disposition EIS, indicate that for three out of four severe accident scenarios considered, the number of latent cancer fatalities (LCFs) that would result would be 3%-7% smaller for a full MOX core than for an LEU core. For the remaining accident scenario evaluated (late containment failure), the number of LCFs would be 8% higher for a MOX core.

The calculations in the *Supplement* give nearly diametrically opposite results. The three accident scenarios which were found originally to have less severe consequences for MOX cores than for LEU cores are now shown to have more severe consequences, with increases in LCFs of 1%-15% relative to LEU cores. In contrast, the one accident which was found in the S&D PEIS to have more severe consequences for MOX cores than for LEU cores, late containment failure, is now predicted to have less severe consequences for MOX cores at Catawba and McGuire, but more severe consequences for North Anna. 2

For North Anna, at first glance it appears that the result for late containment failure (a 9% increase in LCFs) is essentially unchanged from the S&D PEIS prediction of an 8% increase. However, taking into account the fact that the S&D PEIS results were obtained for a full MOX core, while the *Supplement* calculations are based on a 40% MOX core, it is clear that the new calculations indicate a MOX impact 2.5 times more severe than that implied by the S&D PEIS results.

The revised results provided in the *Supplement* are consistent with those estimated by NCI in a report released in January 1999 (attached), which found for a generic light-water reactor that the number of LCFs resulting from a severe accident with early containment failure or bypass would be approximately 28% greater for a 1/3-MOX core than for an LEU core as a result of

[3] U.S. Nuclear Regulatory Commission, "Mixed-Oxide Fuel in Commercial Light-Water Reactors," White Paper, 1999.

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MR022–2 **Facility Accidents**

DOE agrees with the commentor that the accident consequences presented in Section 4.28 are closer to those postulated by the Nuclear Control Institute in February 1999. The results shown in this SPD EIS are related to the use of specific reactor information and a partial MOX core. It was always DOE's intention to update this section with reactor-specific information once the reactors that would use MOX fuel were identified as stated in the SPD Draft EIS. A footnote was added to the accident table referred to by the commentor to show that the *Storage and Disposition PEIS* evaluated the use of a full MOX core. The consequences of some of the accidents evaluated in this SPD EIS are greater than those presented in the PEIS. The analysis presented in Section 4.28 of this EIS used more precise data from the proposed reactors that have been selected to use MOX fuel.

This SPD EIS also analyzed several reactor accidents, including both design basis and beyond-design-basis accidents. For MOX fuel, as compared to LEU fuel, there is an increase in risk, about 3 percent, for the large-break loss-of-coolant accident (the bounding design basis accident). The largest increase in risk for beyond-design-basis accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. Both of these accidents have an extremely low probability of occurrence. In the unlikely event this beyond-design-basis accident were to occur, the expected number of LCFs would increase from 2,980 to 3,390 with a partial MOX core and prompt fatalities would increase from 54 to 60. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48 thousand per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

radiation exposures incurred within one week after the accident.[4] The chief difference between the NCI calculation and that of the *Supplement* is that the latter assumed that americium-241 (Am-241) would be removed from the plutonium via an aqueous separation process (so-called "plutonium polishing") prior to its fabrication into MOX fuel. However, at the time the NCI report was written, the baseline plan was to use only dry processing of plutonium feed, which would not remove the americium. NCI is revising its analysis to consider the effect of americium removal on its results. Preliminary results indicate that for a 40% MOX core with americium removal, the predicted number of excess LCFs is about 25% smaller than that originally estimated (for a 33% core without americium removal) or an increase of about 21% compared to an LEU core. Therefore, NCI's estimate and DOE's upper bound estimate are moving closer together. 2

However, many problems remain with DOE's analysis and presentation of data. These will have to be corrected and/or explained more fully in the final document. These include:

a) The results of calculations of population doses resulting from severe accidents are presented in the *Supplement* without sufficient detail to permit verification by independent analysts. The modeling of population dose in computer codes like MACCS 2 depends strongly on assumptions such as the time period of exposure considered, the cleanup standards, details of the evacuation and a whole host of other parameters. In general, the uncertainties associated with these calculations grow larger as longer time periods are considered. DOE must provide all the input parameters used in the calculations to facilitate independent public review.

Such information may shed light on some of the divergent results between sites, such as the reason why the MOX/LEU LCF ratios are smaller for Catawba and McGuire following a late containment failure accident, but larger for North Anna. These differences may be due to the use of results of the Independent Plant Evaluation (IPE), which have not been thoroughly reviewed by NRC. Because different utilities used different assumptions in developing their IPE submissions, the results may not be consistent for different plants. For instance, the frequencies of early containment failure at Catawba and McGuire given in the *Supplement* are smaller than that of North Anna, despite the fact that Catawba and McGuire have ice-condenser containments which are inherently more prone to failure in severe accident conditions. 3

Also, the reasons for the wide variation in MOX/LEU ratios depending on the particular type of severe accident must be discussed. NCI's analysis did not find such a large difference between early containment failure and containment bypass accidents.

b) There is an obvious error in the calculations in the *Supplement* which must be corrected in the final version. It is apparent from a comparison of population doses and LCFs in Tables 4.21-10 to 4.21-12 that a risk coefficient of 5×10^{-4} LCF/person-rem was used for all the calculations. This is inappropriate because it assumes a dose and dose-rate effectiveness factor (DDREF) of 2 is applicable for the entire affected population. However, this is clearly not the case, because 4

[4] Edwin S. Lyman, January 1999, *op cit.*

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MR022–3 **Facility Accidents**

The accident calculations are voluminous, and therefore, included in the Administrative Record for this SPD EIS rather than in the EIS proper. The calculations contain all of the input parameters including the MACCS2 computer files. Principal input parameters, such as accident source terms and population distributions, are included in the EIS.

To determine the consequences and risks of severe accidents, the EIS analysis included data from plant probabilistic risk assessments. Each plant's probabilistic risk assessment is based on plant specific parameters, systems, operating procedures, etc. This often results in different assumptions and conclusions even for similar plants. These probabilistic risk assessments are the best plant specific severe accident data available, and were therefore used in the EIS analysis.

The EIS accident analysis was performed to determine the largest increase in risks when comparing the MOX-fueled reactor to the LEU-fueled reactor for each plant. Therefore, only certain severe accident scenarios, those which would result in the highest risk, were presented in the EIS. This results in a range of bounding severe accident risks providing sufficient information for a NEPA analysis. A complete risk analysis would require a consequence evaluation of every possible release and then summing these risks for an overall risk.

The severe accident scenarios chosen for analysis were selected in the following manner. Containment bypass and failure scenarios were evaluated since these events would result in the highest consequences. The containment bypass and failure release categories from each plant's probabilistic risk assessment were screened to determine which would result in the highest risk to the surrounding population. The probabilistic risk assessments sometimes contain several release categories for a release classification such as early containment failure. Summing the frequencies of all the release categories within the early release classification would lead to the total early release frequency. However, the purpose of this analysis was not to determine the total risk, but to show the largest possible increase in risk as a result of converting to a partial MOX core. Thus, the early release containment failure release category resulting in the highest risk to the surrounding population was presented in the EIS.

many exposures following a severe accident will involve high doses delivered in short periods of time at rates far exceeding the threshold below which a DDREF of 2 is believed to be applicable (i.e. below 10 millirem per minute, according to UNSCEAR). DOE must revise its calculations so that the number of LCFs expected among those experiencing higher doses and/or dose rates are properly estimated using a DDREF of 1. 4

c) The calculations employ the MACCS 2 code developed by Sandia National Laboratories. NCI discovered a major error in this code which has a large impact on calculations of the consequences of severe accidents. Sandia altered the code and provided a corrected version to NCI. DOE should also use the corrected version for its final calculations. 5

d) The MOX/LEU ratios for fission product core inventories are remarkably similar to those used in the S&D PEIS, when adjusted for the different MOX core fraction. This leads one to surmise that Oak Ridge National Laboratory did not recalculate all fission product ratios for input into the *Supplement*, but only those for the actinides, and used the AP-600 ratios for the fission products. NCI has pointed out that the S&D PEIS ratios are not appropriate for use in the *Supplement* because they were obtained from an analysis of the Westinghouse AP-600 LWR, a reactor that has not been built and will not be used for plutonium disposition, rather than from an analysis of the designs of the existing reactors that will use MOX. Moreover, some of the fission product ratios are of questionable validity, such as that for Cs-134. The ratio of the inventory of Cs-134 in a 40% MOX core to that in a full LEU core is given as 0.85 in Table K-2 of the *Supplement*. This corresponds to a full MOX to full LEU ratio of 0.63, which is close to the value of 0.65 originally used in the S&D PEIS. NCI has been unable to reproduce such a low MOX/LEU ratio for Cs-134 in repeated ORIGEN-S runs. The value obtained by NCI is 0.96. (Incidentally, the value for this ratio given in the 1975 NRC Generic Environmental Impact Statement on the use of Mixed-Oxide Fuel in Light-Water Reactors [GESMO] is also 0.96.) 6

2) MOX Fuel Performance and Severe Accident Issues

The *Supplement* is silent on the question of MOX fuel performance, and in particular makes no mention of serious unresolved issues associated with the potentially inferior behavior of MOX fuel in certain severe accidents such as reactivity insertion accidents (RIAs) and loss-of-coolant accidents (LOCAs).[5] These issues will surely be prominent in MOX licensing proceedings.

The *Supplement* assumes that all accident frequencies will remain unchanged by the substitution of MOX for LEU in existing LWRs, and references statements to this effect in the 1995 plutonium disposition study by the National Academy of Sciences (NAS). However, the NAS discussion was very general and did not examine in detail the following issues. These questions must be addressed in the *Supplement* so that the public can be informed about the numerous unresolved issues associated with MOX fuel performance in severe accidents. 7

[5] NRC White Paper, *op cit.*

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MR022–4 **Facility Accidents**

The risk coefficient was corrected and used in the SPD Final EIS analysis.

MR022–5 **Facility Accidents**

The correction to the MACCS2 code was performed and employed in the SPD Final EIS analysis.

MR022–6 **Facility Accidents**

ORNL recalculated MOX/LEU ratios for all radioisotopes, including fission products, for the *Supplement to the SPD Draft EIS* based on operation of a typical Westinghouse pressurized water reactor. These ratios are not based on the Westinghouse AP–600. The MOX/LEU ratios are based on specific fuel enrichments and reactor cycle characteristics. Independent analyses, which do not use identical parameters, would result in different ratios.

MR022–7 **Facility Accidents**

Two significant light-water reactor transients analyzed in safety analyses are the loss-of-coolant accident (LOCA) and the reactivity insertion accident (RIA). Differences between LEU and MOX fuel could affect both of these accidents.

The reduced thermal conductivity in MOX fuel causes the fuel pellets to operate at somewhat higher temperatures than in LEU fuel of the same linear power rating. While the higher operating temperatures would not be a problem for normal operation, the fuel temperatures determine the amount of stored heat present at the beginning of a LOCA. However, the increased energy released per plutonium fission, compared with uranium fission, and early decrease in decay heat for MOX fuel will tend to offset the increased stored energy.

For RIAs, the higher fission gas release associated with plutonium hot spots may increase the severity of the pellet-cladding interaction, and the higher gas inventory may also cause greater entrainment and expulsion of fuel particles after cladding failure. Although, the higher creep rate of MOX fuel may reduce the severity of the pellet-cladding interaction that causes cladding failure at higher burnups.

MOX fuel produced via the MIMAS process, which will be the one used by the DCS consortium, is heterogeneous. It contains plutonium clusters (some of which have diameters of several hundred microns) which act as "hot spots," achieving much higher local burnups than occur in LEU fuel. For a fuel rod with an average burnup of 50 MWD/kg, the plutonium-rich clusters in MIMAS fuel achieve burnups of up to 200 MWD/kg.[6]

The locally high burnups in plutonium-rich clusters result in the formation of high-porosity regions which allow fission gas to escape from the interior of fuel pellets. In addition, MOX fuel has a thermal conductivity approximately 10% lower than LEU fuel, resulting in centerline temperatures about 50°C greater. These two effects cause greater fission gas releases to occur in MOX fuel than in LEU fuel at similar average burnups. Above about 35 MWD/kg, the fission gas release in MOX fuel rods rises to several times that of LEU fuel at the same burnup. Another troubling observation (from recent experiments at the Halden reactor in Norway) is that while fission gas release in LEU fuel ceases when the fuel temperature is lowered below the threshold of onset, the same is not true for MOX fuel.[7]

The increased fission gas release and higher temperature of MOX fuel rods can affect the severity of some accidents such as RIAs and LOCAs. The Rep-Na7 RIA test at the Cabri reactor in France, performed on a fuel rod that had been irradiated for four annual cycles and had a burnup of 55 MWD/kg, resulted in a "very severe failure" which caused the test channel to become almost completely blocked. This failure was unique because the fuel cladding did not have any important corrosion, unlike the LEU rods which failed in the same test series. As a result, according to those who conducted the experiment, "a MOX effect must be considered in this case."[8] 7

NCI acknowledges that the plan of DCS is initially to irradiate MOX fuel for only two 18-month cycles, whereas some LEU assemblies are now irradiated for three 18-month cycles. However, the *Supplement* should detail the exact fuel management scheme that will be used and specify the maximum MOX assembly and rod burnups that will occur under this scheme.

The maximum burnup to which DCS is initially seeking authorization to take MOX fuel, 50 MWD/kg, is above the maximum MOX rod burnup that is currently permitted in France (about 47 MWD/kg), and is in a region where the rods' resistance to RIAs is clearly in question. Moreover, DCS refuses to preclude eventually irradiating MOX fuel to the same maximum burnup to which it currently irradiating LEU (with maximum rod burnups well over 60

[6] "Reactivity Insertion Tests in Cabri with MOX Fuel," F. Schmitz, J. Papin and C. Gonnier, Institut de Protection et de Sûreté Nucléaire (IPSN), International Symposium on MOX Fuel Cycle Technologies for Medium and Long-Term Development, Vienna, Austria, 17-21 May 1999.

[7] W. Wiesenack, M. McGrath, "Performance of MOX Fuel --- An Overview of the Experimental Programme of the OECD Halden Reactor Project and Review of Selected Results," International Symposium on MOX Fuel Cycle Technology, IAEA, Vienna, 17-21 May 1999.

[8] F. Schmitz *et al*, op cit.

The particular reactivity insertion accident scenario for a pressurized water reactor is a control rod ejection. The Cabri RIA test program was designed to challenge typical fuel rods under conditions that are more extreme than conditions that would be experienced during a real pressurized water reactor control rod ejection. Out of the nine Cabri tests (six with uranium fuel, three with MOX fuel), two uranium fuel rods and one MOX fuel rod experienced failures. The MOX failure occurred at an energy deposition rate that is greater than can realistically be reached by high burnup fuel, even after an extremely unlikely worst case control rod ejection.

These differences suggest that the behavior of MOX fuel during transients could be different than that of LEU fuel. These differences continue to be studied through several research programs. However, until definitive results are obtained, the best available data is the current reactor safety analyses. The offsite consequence analysis of these accidents was therefore based on LEU fuel behavior.

Both LOCA and RIAs were considered in preparing the *Supplement*. Because it was determined that RIAs would result in lower consequences and were of lower risk than the LOCAs, they were not presented in the *Supplement*.

Regarding whether the differences between LEU and MOX fuel affect the frequencies of accidents, an NRC White Paper (1999), *Mixed-Oxide Fuel Use in Commercial Light Water Reactors*, concluded that it appeared likely that the probability of severe accidents will not change and that consequence analyses, rather than full probabilistic risk assessments, may be sufficient to assess the changes due to the different inventory of radionuclides.

NRC believes that severe accident source terms would not be significantly different for MOX fuel than for LEU fuel. This conclusion was based on the assumption that a few percent additional plutonium in the core, with a reduction of only about 10°C (50°F) in melting temperature, will not have a significant effect on accident progression. Also, the processes that remove fission products will not be affected by the small change in composition of the core debris. Further, the source term itself is given in terms of fractions of initial inventory, so these fractions should not be changed significantly.

MWD/kg). It is acknowledged in France that the current generation of MIMAS fuel must be modified and improved before such high burnups can be achieved. DCS should specify in detail how it is going to take into account future fuel modifications in its fuel qualification program.

The issue of MOX fuel performance in LOCAs is one which NRC has highlighted as a concern. Increased fuel and cladding temperature due to the lower thermal conductivity and higher average linear power of MOX assemblies, as well as the possibility of fuel-clad gap reopening due to the increased fission gas release, could enhance the clad oxidation rate during a LOCA and increase the severity of the accident. DOE should address this concern and its proposed LOCA mitigation strategy in the *Supplement*. 7

There are also disturbing indications that the fission gas release dynamics of MOX fuel may lead to enhanced releases of volatile and semi-volatile radionuclides during the early stages of core degradation compared to LEU fuel.[9] This could have an effect on the consequences of some accidents, both design-basis and beyond design-basis.

3) Spent Fuel Management

The *Supplement* claims that the MOX program will not "impact spent fuel management" at the reactor sites, even though it predicts that additional spent fuel assemblies will be generated over the course of the campaign. However, the heat generation of spent MOX fuel will be greater than that of spent LEU fuel. NCI's calculations indicate that for two-cycle spent MOX fuel, the heat generation rate will be more than twice that of two-cycle LEU fuel soon after discharge and will remain at that level for many years. The *Supplement* should discuss how DCS can accommodate this incremental heat loading in their existing spent fuel storage facilities. 8

In summary, NCI believes that DOE cannot make credible or defensible decisions on a plutonium disposition strategy without a much more complete analysis of outstanding reactor safety issues associated with MOX use. Only then can the risks and benefits of various disposition strategies accurately be determined. In our view, the uncertainties and risks associated with reactor irradiation of MOX are significant enough to warrant a reevaluation of the "dual track" strategy. More serious consideration should be given to utilization of an all-immobilization approach to achieve the "spent fuel standard," so that the risks of MOX irradiation can be avoided. 1

Sincerely,

Edwin S. Lyman, PhD
Scientific Director

[9] Advisory Committee on Reactor Safeguards, "Use of Mixed Oxide Fuel in Commercial Nuclear Power Plants," letter report to the Nuclear Regulatory Commission, May 17, 1999.

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NRC hypothesized that the gap release may marginally increase because of the elevated operating temperatures in MOX fuel compared to LEU fuel. The gap release is used in the analysis of design basis accidents and would not have a large effect on severe accident source terms. Once again, due to the lack of definitive information, for the offsite consequence analysis, the gap release was based on LEU fuel behavior. This possible difference is being evaluated by current research programs and any new information will be implemented in further safety analyses.

DCS proposes to continue the use of an 18-month fuel cycle. Specific fuel management schemes do vary during the life of a particular core life and setting a specific fuel management scheme would not be cost-effective. Maximum MOX fuel burnup levels will be approved by NRC only after thorough safety evaluations including information from current research programs.

MR022–8 **MOX Approach**

The DCS team reactor utility companies use a typical 18-month fuel cycle, replacing approximately 40 percent of the fuel assemblies in a reactor at each refueling. Some fuel assemblies are used for two cycles, some for three cycles. The utilities plan to maintain the current fuel management schemes and would use the MOX fuel assemblies for only two cycles.

Initially, when spent fuel is removed from the reactor, the MOX and LEU fuel would be about the same temperature and exhibit similar characteristics. After about a year out of the reactor, however, the temperature of MOX spent fuel would exceed that of LEU fuel of the same age. Therefore, storage of MOX spent fuel would increase the thermal loading in a spent fuel pool over that for only LEU fuel. However, thermal load limitations are based on the amount of cooling that the entire spent fuel pool can accommodate, not on individual fuel assemblies within the pool. Therefore, the additional heat load would be accounted for in the calculations for the reactor spent fuel management plans.

PUBLIC HEALTH CONSEQUENCES OF SUBSTITUTING MIXED-OXIDE FOR URANIUM FUEL IN LIGHT-WATER REACTORS

Edwin S. Lyman, PhD
Nuclear Control Institute
February 1999

Executive Summary

Background

In January 1997, the U.S. Department of Energy (DOE) decided to pursue a "dual track" policy for the disposition of approximately 50 metric tons (MT) of plutonium produced for weapons programs that have been declared excess to military needs. The two tracks of the "dual track" refer to two different approaches for converting separated plutonium into a dilute and highly radioactive form that is more difficult to return to weapons.

Under one approach, known as "can-in-canister" immobilization (CIC), plutonium will be incorporated into chemically stable ceramic discs. These discs will in turn be embedded in canisters of "vitrified" (glassified) high-level radioactive waste (VHLW) at the Defense Waste Processing Facility (DWPF) at the Savannah River Site in South Carolina. DOE is tentatively planning to use CIC for approximately 17 MT of excess plutonium in impure forms. The CIC facility will in all likelihood be sited at SRS adjacent to the DWPF.

Under the other approach, plutonium will be used to produce "mixed plutonium-uranium oxide" (MOX) fuel assemblies, which will be loaded and irradiated in a number of U.S. commercial nuclear reactors, displacing some or all of the low-enriched uranium oxide (LEU) fuel assemblies the reactors currently use. DOE is tentatively planning to utilize this option for approximately 33 MT of weapons-grade plutonium (WG-Pu). In 1998, DOE issued a Request for Proposals, seeking vendors interested in providing MOX fuel fabrication and irradiation services. Of the three proposals submitted, two have already been eliminated for failing to meet basic requirements. It is expected that DOE will sign a contract in February 1999 with the third party, a consortium including the French fuel fabricator Cogema and the U.S. utilities Duke Power and Virginia Power. It is also expected that Cogema will build and operate a MOX fuel fabrication plant at SRS, and that the fuel will be irradiated in Virginia Power's North Anna 1&2 plants and Duke Power's McGuire 1&2 plants in North Carolina and Catawba 1&2 plants in South Carolina.

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Both the immobilization and MOX tracks require large-scale handling and processing of plutonium, an extremely hazardous substance. Consequently, they will be expensive to carry out and will pose risks to human health and the environment. However, the costs and risks involved will be small compared to those experienced when the material was produced, and most arms-control advocates concur that the security benefits of plutonium disposition justify the risks.

Some analysts argue further that differences in cost and hazard associated with the two disposition approaches should not weigh heavily in policy decisions. However, this view is out of touch with both budgetary and political realities. Because Cold War-sized government coffers are not likely to be available to DOE for disarmament activities, the plutonium disposition program will be under pressure to minimize costs. Also, many environmental groups and citizens' groups near affected sites will likely oppose any disposition activities unless they clearly have low environmental and public health impacts. It is certainly sensible to reject an option with substantially greater economic and health risks, if it brings no additional benefits.

Cost and public health impact were major considerations in the process that DOE used to select MOX and immobilization from the large number of disposition options that were initially proposed. In deciding on the dual track policy, DOE argued that there are no decisive differences between the MOX and immobilization options with regard to any of its evaluation criteria, including public health impact. However, this report concludes that DOE's evaluation is inaccurate. We find that the public health risks associated with the MOX approach are significantly greater than those associated with CIC. This is due primarily to our findings that the consequences of severe accidents involving LWRs with MOX cores are likely to be greater than those involving LEU cores. 9

Our finding also has international implications. For instance, the U.S. and Russia are also pursuing a plan to utilize Russian excess WG-Pu in VVER-1000 light-water reactors located in Russia and Ukraine, which meet less stringent safety standards than nuclear plants in the U.S. Also, several nations, such as France, Switzerland and Japan, either use or are planning to use plutonium obtained in so-called "civil" reprocessing programs as fuel for LWRs. The "reactor-grade" plutonium (RG-Pu) used in these programs has different isotopic characteristics than WG-Pu and a different impact on reactor safety, including a greater increase in potential consequences. 10

In this report, the public health consequences of severe accidents at MOX-fueled pressurized water reactors (PWRs) are calculated and compared with the consequences of accidents at LEU-fueled PWRs. The acceptability of the increased risk associated with the change from LEU to MOX fuel in U.S. PWRs is then evaluated in the context of the "risk-informed" regulatory procedures now being implemented by the U.S. Nuclear Regulatory Commission (NRC).

Risks of MOX Use

The MOX approach consists of several stages, each of which can have a significant 2

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MR022–9 **MOX Approach**

DOE acknowledges the commentor's concern regarding increased public health risks associated with the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

As discussed in Section 4.28.2.4, the risks during normal operations using a partial MOX core are almost identical to risks using a full LEU core. As described in Section 4.28.2.5, the risks during accidents may be higher or lower for a partial MOX core, depending on the accident scenario.

The remainder of this comment is addressed in response MR022–2.

MR022–10 **Nonproliferation**

DOE acknowledges the commentor's concerns regarding the disposition of surplus Russian plutonium as MOX fuel, although programmatic and policy issues such as U.S. policies toward plutonium disposition in Russia are beyond the scope of this SPD EIS. Similarly, plutonium reprocessing programs conducted in France, Switzerland, and Japan are beyond the scope of this SPD EIS.

environmental and public health impact. A plant for fabrication of the fuel must be built and operated, the fuel must be shipped to reactor sites, and the fuel must be irradiated in reactors. By comparison, the environmental impacts of CIC immobilization are associated primarily with the operation of the ceramic immobilization plant. Because this plant will be very similar to the MOX fabrication plant in design and size, it will have similar impacts. Therefore, any risks associated with MOX transportation and irradiation increase the cumulative risk of the MOX approach to a level greater than that of immobilization.

In order to quantify and compare the public health impacts of the two options, it is necessary to understand how the risks of nuclear power plant operation change when WG-MOX is substituted for LEU. Risk is defined as the product of the probability and the consequences of a particular event, summed over all events. Nuclear power plants pose risks both as a result of routine operation (high probability and relatively low consequence events) and through the possibility of accidents (low probability and high consequence events). This report focuses on accident risk.

Carrying out a complete and accurate comparison of the accident risks of MOX and LEU cores is a difficult undertaking, for a number of reasons. Nuclear power plant accident safety analyses, or probabilistic risk assessments (PRAs), are extremely complex. In general, the substitution of WG-MOX for LEU fuel will affect both the probability of occurrence and the consequence of each accident sequence which can occur during reactor operation, so that existing PRAs will have to be extensively modified. The difficulty of doing so is compounded by the relative lack of experience with the use of WG-MOX fuel, as well as insufficient data on many technical aspects of MOX use. 2

Another complication results from the fact that almost every nuclear plant in the U.S. has unique features which are relevant to safety, so that the impacts of MOX use are highly reactor-specific. Also, the safety analysis will depend on details of the specific MOX irradiation plan, such as the amount of plutonium in the MOX fuel, the maximum burnup (amount of heat extracted) from each fuel assembly and the fraction of the core (from 33%-100%) that will be loaded with MOX fuel. These details have not been publicly released yet and may for the most part remain proprietary and unavailable to the public.

However, there are some safety-related problems with the use of MOX fuel which will apply to any LWR. For example, the total inventory of highly radiotoxic actinides, including plutonium-239 (Pu-239), americium-241 (Am-241) and curium-242 (Cm-242), is significantly greater in MOX cores than in LEU cores throughout the operating cycle. Our analysis shows that the public health consequences of some severe accidents will be greater for reactors fueled with MOX.

The exact quantities of plutonium and other actinides in MOX cores depend on parameters such as the concentration and isotopic content of the plutonium in the fresh fuel. For the case considered in this study we find that, compared to an LEU core, a full WG-MOX core will contain about three times the amount of Pu-239, seven times as much Am-241 and seven times

as much Cm-242 at the end of an operating cycle (i.e. just before the reactor is shut down for reloading). For MOX fabricated with reactor-grade plutonium (RG-Pu), Am-241 and Cm-242 inventories are greater by additional factors of 4 and 3, respectively.

Since most of these radionuclides emit alpha particles, which are much more hazardous per decay than beta or gamma particles if inhaled or ingested, they will contribute significantly to public radiation exposures following severe reactor accidents, even if only a small fraction of the core inventory is released.

The initial draft of DOE's Storage and Disposition of Weapons-Usable Fissile Materials Draft Environmental Impact Statement (DPEIS) did not analyze the environmental impacts of accidents involving MOX-fueled LWRs. Instead, it only included an analysis of an LEU-fueled LWR. DOE justified this by claiming that

> "separate studies ... indicate that the use of MOX fuel in a ... LWR does not increase the risk and consequences of accidents. This results from the fact that the other radioisotopes that are released in an accident have more serious impacts on human health than the Pu used in the MOX fuel."[1]

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Another DOE study makes the stronger claim that the greater actinide inventories in a MOX core will not affect the consequences of an LWR accident because "plutonium and other insoluble fuel isotopes are not included in the releases to the environment."[2]

These statements are misleading, however. Certain severe accidents can result in the expulsion of significant quantities of actinides into the environment. Although such "beyond design-basis" accidents are expected to occur very infrequently, there are both historical precedents and regulatory requirements for considering them in safety analyses.

The best possible laboratory for loss-of-containment consequences, the Chernobyl accident, has demonstrated that significant and wide-ranging dispersal of actinides is possible. Recent reviews of the Chernobyl source term have concluded that approximately 3.5% of the core actinide inventory was released. Moreover, dispersal of these relatively heavy aerosols was not limited to the immediate vicinity of the plant; fuel fragments were discovered as far away as Greece and Germany, over one thousand kilometers away.[3]

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[1] U.S. Department of Energy, *Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement*, DOE/EIS/0229-D, February 1996, Volume II, p. 4-690.

[2] Oak Ridge National Laboratory, *FMDP LWR PEIS Data Report*, Rev.3, ORNL/MD/LTR-42, December 1995, p. B-22.

[3] L. Devell *et al.* "The Chernobyl Reactor Accident Source Term: Development of a Consensus View," OECD/NEA, OECD/GD(96)12, November 1995.

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It has often been claimed that a Chernobyl-type accident cannot happen in the West because Western reactors have robust containment structures. However, while the presence of containment domes reduces the risk of such accidents, it does not eliminate it entirely. Many accident sequences for U.S. LWRs have been identified which can lead either to massive failure or bypass of the containment, thereby allowing significant releases of core particles. In fact, the U.S. Nuclear Regulatory Commission (NRC) has estimated that actinide releases as high as several percent of the core inventory are possible in such accidents.[4]

In comments on the DPEIS in 1996, the Nuclear Control Institute (NCI) challenged DOE's assumption that there was no difference between LEU and MOX with regard to reactor safety.[5] In particular, NCI cited the possibility of accidents resulting in a relatively large release of actinides.

DOE responded to NCI's comments in the final PEIS on storage and disposition of weapons-usable fissile materials (FPEIS) by presenting the results of a calculation that took into account the different radionuclide inventories of WG-MOX and LEU cores. The FPEIS claimed that the change in accident consequences (defined as the resulting number of latent cancer fatalities) associated with the substitution of WG-MOX for LEU ranged from +8% to -7%: in other words, the number of cancer fatalities caused by some accidents could actually *decrease* as a result of switching to MOX fuel.[6] 2

A complete review of the FPEIS calculation is not possible because few details are provided. However, an analysis of the information that is provided reveals several obvious inconsistencies. For instance, the FPEIS calculation used a value of 0.65 for the ratio of the quantity of cesium-134 (Cs-134) in the WG-MOX core to that in the LEU core. When this ratio was "arbitrarily set to 1.0" in the FPEIS analysis, however, the observed reduction in cancer fatalities associated with switching to MOX fuel changed to an increase. The FPEIS fails to mention a fact that appears in one of its own reference documents --- namely, that various studies have calculated Cs-134 MOX/LEU ratios ranging up to 1.08, and that the value used by the FPEIS was based on a Westinghouse "advanced" PWR and not on an existing reactor type.[7] Our study, which was based on existing PWRs, found a value of 0.96 for the Cs-134 MOX/LEU ratio at the end-of-cycle.

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[4] U.S. Nuclear Regulatory Commission, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants," NUREG-1150, 1990.

[5] Edwin S. Lyman, "Comments on the Department of Energy's Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement: Public and Occupational Health and Safety Issues," Nuclear Control Institute, Washington, DC, June 7, 1996 (rev. Oct 9, 1996).

[6] U.S. Department of Energy, *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement*, DOE/EIS-0229, December 1996, p. S-37.

[7] Oak Ridge National Laboratory (1995), *op cit.*

Another factor that the FPEIS did not take into account is the sensitivity of the consequences of MOX accidents to the fraction of the actinides in the core that is assumed to be released. There are large uncertainties in predictions of the fraction of core actinides that can be released in severe accidents. The FPEIS assumed only very low values of the actinide release fractions.

Because of the flaws in the FPEIS risk calculation, NCI undertook its own study to evaluate the consequences of loss-of-containment accidents at PWRs with MOX cores and compare them to those at PWRs with LEU cores. The specific example of a four-loop PWR with an ice-condenser containment was chosen for analysis. Four of the six plants included in the sole bid now being evaluated by DOE --- Duke Power's Catawba 1&2 and McGuire 1&2 --- are of this type. 2

First, radionuclide inventories were computed for LEU and WG-MOX cores, using the Oak Ridge National Laboratory (ORNL) SCALE 4.3 code to simulate changes in the fuel composition during irradiation. Full WG-MOX cores were considered as the bounding case. Fuel management schemes were based on those in a 1996 Westinghouse report on plutonium disposition in which full-MOX cycles were developed that resembled LEU cycles as closely as possible.

Second, the accident consequences (acute fatalities, early commitment of latent cancer fatalities, and other indicators of risk) for LEU and MOX cores were evaluated for several different accidents, using NRC methodology and the NRC consequence calculation software MACCS2,[8] and ICRP 72 dose coefficients. Generic parameters were used for population and atmospheric data. While the absolute values of consequence measures depend strongly on these parameters, the relative consequences of MOX and LEU accidents are much less sensitive to them.

Finally, the calculated increases in risk associated with substituting MOX for LEU were compared to the acceptance guidelines contained in the recently issued NRC Regulatory Guide (RG) 1.174,[9] "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis." RG 1.174 describes a methodology for grading the intensity of NRC review of requested changes to the licensing basis (LB) of nuclear

[8] D.I. Chanin and M.L. Young, *Code Manual for MACCS2: Volume 1, User's Guide*, SAND97-0594, Sandia National Laboratories, March 1997. In the course of generating data for the present paper, the author discovered an error in the MACCS2 software which resulted in the overcounting of cancer fatalities among individuals receiving committed effective doses (CEDs) greater than 10 sievert (Sv) and a consequent overestimate of population-averaged cancer risk. While the error will not be fixed until release of the next version of MACCS, an "unofficial" corrected version of the code was provided to the author. Although the corrected version has not been officially validated, the results agree well with calculations carried out by the author by hand. All data in this report has been generated with the corrected, unofficial version of MACCS2.

[9] U.S. Nuclear Regulatory Commission, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Regulatory Guide 1.174, July 1998.

power plants according to their risk significance. RG 1.174 therefore provides a framework for evaluating the regulatory significance of the increased risk associated with use of MOX fuel.

Although not directly applicable to the WG-Pu disposition program, the inventory of a typical reactor-grade (RG) MOX core was also calculated for comparison. Because RG-MOX cores have larger quantities of heavy actinides, the consequences of RG-MOX accidents are even more severe than those of WG-MOX, especially at the relatively high plutonium loadings necessary to achieve adequate utilization of the fuel.

Findings

1. The number of latent cancer fatalities (LCFs) committed within one week after a severe reactor accident will be significantly greater for both full and partial WG-MOX cores than for LEU cores. For most accidents considered, the number of prompt fatalities that result will also be greater.

(a) Compared to a PWR using LEU fuel, the number of latent cancer fatalities (LCFs) that will result from exposures immediately following a severe accident with early containment failure or bypass will be significantly greater for a PWR loaded with weapons-grade (WG) MOX fuel, for both full and 1/3-cores of WG-MOX. This is primarily due to the increased concentrations of plutonium and heavier actinides in MOX cores.

For a set of typical severe accidents that result in the release of about 1% of the inventory of plutonium and other actinides (compared with a 3.5% release for the Chernobyl accident), the number of "early" LCFs that result (those due to exposures occurring within one week after the accident), averaged over an operating cycle, was found to be 81%-96% greater for a full MOX core. 2

For a 1/3-MOX core, the corresponding percent increase would be 29%-32%, a factor of three smaller than for a full core. However, because the increase in consequences is essentially linear with respect to the MOX core fraction, the overall excess *risk* (the product of probability and consequences) associated with the disposition program will be approximately the same for both full and partial MOX core loadings. Whether 33 MT of WG-Pu is processed in six plants with a 1/3-MOX core in 15 years, in six plants with a full MOX core in 5 years, or in two plants with a full MOX core in 15 years, the total average increase in risk to the U.S. public will be approximately the same in each case (although the risk to a particular individual may be different).

(b) These increases are considerably greater than the upper limit of the +8% to -7% range cited by the Department of Energy (DOE) in its environmental impact statements on surplus plutonium disposition for full-core MOX.

(c) The actual number of additional LCFs resulting from a MOX accident depends on details of

the reactor site, such as population density and atmospheric conditions. For a generic site with a population density of 100 persons/square kilometer (which is very close to the actual density in the vicinity of the Catawba and McGuire plants) the number of additional LCFs within an area of 1000 miles radius, averaged over an operating cycle, was found to range from 1,440 to 6,165 for the set of accidents analyzed for a full-MOX core. For a 1/3-MOX core, the additional LCFs range from 495 to 2,385.

(d) The number of prompt fatalities resulting from acute radiation exposure is greater by around 40% for WG-MOX cores following early containment failure accidents. For containment bypass accidents, a 15% reduction was observed (from 33 to 28 cases) for a full-MOX core, and a 6% reduction for a 1/3-core. However, this reduction in prompt fatalities is tiny compared to the increase in LCFs observed.

2. The additional consequences of severe accidents involving MOX cores are sensitive to the fraction of actinides (i.e. plutonium, americium and curium) in the core that are released.

The increase in accident consequences associated with switching from LEU to MOX depends on the fraction of the actinide inventory that is released, which is a highly uncertain parameter. As the actinide release fraction is varied from 0.3% to 6%, the percent increase in LCFs resulting from an full-MOX core accident with early containment failure, averaged over an operating cycle, ranges from 39% to 131%, corresponding to an additional 1,730 to 18,185 LCFs for the generic reactor site. In the worst case, the number of *additional* cancers associated with a MOX accident is 60% as large as the *total* number of cases predicted to occur worldwide from the Chernobyl accident. For a 1/3-MOX core, the percent increases range from 14% to 44%, corresponding to an additional 610 to 6,135 LCFs. 2

3. The average latent cancer fatality accident risk to the population within ten miles of a nuclear plant is increased by approximately a factor of two when a full core of WG-MOX is substituted for LEU. This increase in risk is significant when compared to the risk limits in NRC's Safety Goal Policy Statement.[10] According to NRC's Regulatory Guide 1.174, a change in the licensing basis resulting in a doubling of risk <u>would not be allowed</u> for typical U.S. PWRs. The increase in risk associated with loading a 1/3-core of WG-MOX would also be unacceptably high.

When a full core of WG-MOX is substituted for LEU, the average increase in latent cancer fatality risk to the population near a reactor site nearly doubles. This is equivalent to the increase in risk that would occur if the probability of a severe accident with a large early release of radioactivity (the Large Early Release Frequency, or LERF) were doubled. For the PWR considered in this study, this would correspond to an increase in LERF of about seven in a million (7×10^{-6}) per year for a full MOX core, or more than two in a million (2×10^{-6}) per year

[10] U.S. Nuclear Regulatory Commission, "Safety Goals for the Operations of Nuclear Power Plants: Policy Statement," *Federal Register*, 51 FR 30028, August 4, 1986.

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for a 1/3-MOX core. In both cases, these exceed the threshold of one in a million ($1x10^{-6}$) per year established in NRC's Regulatory Guide 1.174 for allowable increases in LERF.

4. The use of WG-MOX in U.S. PWRs is not likely to lower the probability that a severe loss-of-containment accident may occur and may in fact increase it significantly.

Some reasons why this is the case are listed below.

(a) The ability of high-burnup MOX fuels in current use to withstand severe accident conditions is inferior to that of LEU fuel.

It has been observed that MOX fuel assemblies fabricated with current techniques are inferior to LEU fuel with regard to their integrity during abnormal events that cause rapid heating of the fuel, such as reactivity insertion accidents (RIAs) and loss-of-coolant accidents (LOCAs). Based on the results of a series of RIA tests at the Cabri test reactor in France, French regulators have concluded that "MOX fuel shows a higher failure potential than UO_2 at comparable burnup." In particular, a MOX fuel rod with a burnup of 55 gigawatt-days per metric ton (GWD/MT), which is typical of burnups achieved in U.S. PWRs today, experienced a violent rupture and dispersal of fuel particles, while two LEU rods of comparable and higher burnups were able to withstand similar conditions without rupture.[11] Based on this test, a French regulator recently concluded that this was a MOX-related phenomenon and that there is a "very high potential for rupture" of MOX fuel in RIA situations.[12]

(b) A MOX-fueled PWR may have a greater risk of experiencing pressurized thermal shock of the pressure vessel. 2

Due to a more rapid cooldown of the reactor vessel following a break in a main steam line, a MOX-fueled PWR may have a greater risk of experiencing pressurized thermal shock (PTS) than one fueled with LEU. PTS is a very severe event in which the reactor vessel becomes brittle at low temperature (below about 180°C or 350°F) and ruptures at high pressure, causing core debris to be expelled into the containment. Following such an event, it is nearly impossible to maintain cooling of the core and a meltdown becomes a virtual certainty. In addition, a sufficiently powerful rupture of the pressure vessel could damage the containment.

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[11] DOE has recently claimed that the Cabri test is not relevant to the U.S. MOX program, arguing that (1) the burnup was higher than that which MOX rods will experience in U.S. reactors, and (2) the Cabri test rod was an obsolete fuel type with a high degree of heterogeneity. Both these statements are false. PWR fuel assemblies are authorized in the U.S. for burnups up to 62 GWD/t, and reactor operators expect that MOX and LEU fuel assemblies will be fully interchangeable. The Cabri rod was fabricated using the MIMAS process, which the French and Belgian industries have been using since 1984 and which is expected to be the process that a U.S. MOX fabrication plant will utilize. DOE is not encouraging the development of improved MOX fuel for the U.S. program because of the delays that would occur in its qualification.

[12] A. MacLachlan, "International Meeting Fails to Resolve Questions Surrounding Cabri Future," *NuclearFuel*, July 27, 1998, p. 6.

(c) Ice-condenser containments may be more vulnerable to early failure in a severe accident than large dry containments.

Four of the six PWRs that have been offered for MOX irradiation services in the sole remaining proposal being evaluated by DOE, Duke Power's Catawba 1&2 and McGuire 1&2, have ice-condenser containment structures. These containments are smaller in volume and have less structural strength than other types of PWR containments. In the event of a core melt, followed by failure of the reactor pressure vessel at high pressure, a phenomenon known as high-pressure melt ejection (HPME) can occur, resulting in a very rapid heating and pressurization of the containment atmosphere (direct containment heating, or DCH) which can cause containment failure. Ice-condenser containments "do not have the same inherent capacity to withstand the credible DCH loads from all scenarios as other Westinghouse plants," according to NRC.[13] The ability of ice-condensers to withstand hydrogen combustion events and steam explosions is also questionable.

Together, these facts raise the concern that if U.S. utilities plan to irradiate MOX fuel to a burnup comparable to that of LEU fuel, the risk of violent rupture and fuel dispersal that makes cooling of the core debris more difficult will be increased. Moreover, because such accidents can result in both dispersal of the core into the containment and early containment failure through the phenomenon of direct containment heating, they are also associated with release of solid core materials, such as actinides, into the environment. Therefore, both the consequences and the probability of this class of accidents may increase when MOX is substituted for LEU in PWRs. 2

5. A severe accident at a PWR with a reactor-grade MOX (RG-MOX) core would cause up to twice as many latent cancer fatalities (LCFs) as would an accident at a PWR with a WG-MOX core.

The number of LCFs resulting from a severe accident at a PWR fueled with a full core of RG-MOX, at the end of an operating cycle, was found to be 123%-486% greater than that resulting from an accident at a PWR fueled with LEU, depending on the actinide release fraction. This is more than twice as many cases as would result from an accident involving a WG-MOX core. This dramatic increase in risk should be taken into consideration by nations that are currently using or planning to introduce RG-MOX in their nuclear plants. Recently, some U.S. policy-makers who regret the U.S. decision not to pursue commercial spent fuel reprocessing and plutonium recycling have been seeking to take advantage of the current political difficulties of siting a geologic repository for spent fuel to revive the reprocessing option in the U.S. The results of this article provide an additional validation of the U.S. decision and another argument why reprocessing and recycle should be avoided.

[13] U.S. NRC, "Status of the Integration Plan for Closure of Severe Accident Issues and the Status of Severe Accident Research," SECY-98-131, June 1998.

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Conclusions

1. Licensing of U.S. reactors to use MOX will have to take place primarily on a site-specific level. In addition, an NRC finding that MOX use poses "no significant hazards" under 10 CFR 50.92 clearly would not be justified.

A key question in the procedure for licensing reactors to use MOX fuel will be whether NRC will rule, under the procedures outlined in 10 CFR 50.92, that the introduction of MOX fuel into existing reactors involves a "significant hazards consideration," which would obligate the NRC to conduct public hearings prior to issuance of a license amendment. Prospective industry participants in the MOX program have indicated that they intend to have the MOX reload core methodology licensed on a generic basis, thereby removing most MOX-related issues from consideration on a plant-specific level. In this way, they hope to facilitate an NRC finding of "no significant hazards" in individual plant license amendment proceedings and thus prevent the possibility of site-specific hearings that could lead to substantial delays in introducing MOX fuel into reactors.

However, the results of this study indicate that site-specific considerations, such as the public health impacts associated with changes in the licensing bases of existing plants to use MOX fuel, will indeed be substantial, and therefore it should not be possible for NRC to justify issuing a finding of "no significant hazards" on the plant-specific level.

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2. Limitations on MOX fuel burnup to below 36 GWD/MT should be imposed unless high burnup safety issues are resolved.

Concerns with the performance of high-burnup MOX fuel in the event of an accident have led the French nuclear safety authority DSIN to restrict the burnup of MOX fuel to 36 GWD/t, whereas LEU fuel is permitted to reach 47 GWD/MT. The French national utility Electricité de France (EdF) has concluded that to achieve burnup parity with LEU, a new MOX fuel type will have to be developed. Such an effort could cause substantial additional delays to the MOX mission. The U.S. should follow France's lead and restrict MOX burnup pending resolution of these safety issues, even though this will be a costly inconvenience for U.S. nuclear plants.

3. Licensees who wish to use WG-MOX will have to demonstrate to NRC that the Large Early Release Frequencies (LERFs) of their plants are below one in a million ($1x10^{-6}$) per year. Even if they can meet this requirement, the request will be subject to an intensive NRC technical and management review, and the underlying probabilistic risk assessment (PRA) calculation will have to undergo peer review and satisfy quality control requirements.

We have shown that the introduction of a full core of MOX fuel into PWRs will result on average in a doubling of the risk to the public from a large early release of radioactivity. This increase in risk is equivalent to that which would occur if the Large Early Release Frequency (LERF) of the plant were doubled. According to NRC's RG 1.174, a change to the plant licensing basis resulting in a doubling of the LERF would only be considered for plants with a

MR022–11 **DOE Policy**

DCS does not intend to request licensing of MOX fuel use on a generic basis. Duke Power and Virginia Power, the reactor licensees, would submit individual reactor license amendment requests to NRC for each of their reactors in which the MOX fuel would be irradiated. Plant-specific core load and safety analyses would be performed, and an NRC license amendment approved, prior to MOX fuel being introduced into any reactor. All issues considered by NRC to be important to safety and the environment would be evaluated during the license amendment process.

MOX fuel burnup is proposed at 45 GWD/t with peak pin burnup of 50 GWD/t. Actual MOX fuel burnup limits will be established in concert with the NRC following a thorough safety review. It should be noted that reactors in Belgium and Germany typically use MOX fuel to burnups between 45 and 50 GWD/t and that while current French burnup limits are lower than that, French burnup limits for LEU fuel are also lower than those for U.S. reactors.

There is a recognition that detailed analyses would need to be done to support the NRC license amendment process. This information would be prepared if the decision is made in the ROD to go forward with the MOX approach. The commentor's interpretation of NRC Regulatory Guide 1.174 is his opinion and may not be the interpretation adopted by NRC.

baseline LERF of one in a million ($1x10^{-6}$) or below. For a 1/3-MOX core, the corresponding threshold would be three in a million ($3x10^{-6}$).

The guidelines in RG 1.174 are not absolute. In particular, an applicant may argue that quantitative increases in risk are offset by "unquantified benefits" and that a less strict NRC response is warranted. Even so, plants wishing to use MOX will have to undergo intensive site-specific reviews by NRC, and may have to conduct full-scope (Level 3) probabilistic risk assessments (PRAs), which very few plants have done to date because of the time and expense involved. These will be necessary to document that the Large Early Release Frequencies of the plants are sufficiently low that the increased risk associated with a large early release from a MOX-fueled plant are "small and consistent with the intent of the Commission's Safety Goal Policy Statement." Moreover, PRA documentation will have to be done more carefully and in more detail in the future. Because of the great variability in the content and quality of PRAs that have been carried out to date, NRC is in the process of developing a quality control standard for PRAs submitted in support of risk-informed regulatory proceedings. 11

4. The U.S. plan to encourage Russia to use WG-MOX in Russian and Ukrainian VVER-1000 LWRs poses even greater risks than the plan for U.S. domestic use of WG-MOX.

Russian VVER-1000s do not meet Western safety standards in such critical areas as fire protection and instrumentation and control systems. Although the U.S. is encouraging Russia to commence a program for using WG-MOX in VVER-1000s, and has provided a portion of the initial financing, there will be no simultaneous effort to upgrade these plants so that they fully meet Western safety standards, which would cost on the order of $150 million per unit, according to recent estimates. In fact, Russia has to date been reluctant to accept Western assistance for plant safety upgrades. Given that the use of MOX will increase risk even in plants that do meet Western standards, encouraging Russia to use MOX in its less robust plants without ensuring maximum possible adherence to safety is nothing short of reckless. 10

5. Risks associated with irradiation of WG-MOX in both U.S. LWRs and Russian VVER-1000s could be averted if both nations implemented an all-immobilization policy for the entire stockpile of excess WG-Pu. The use of MOX is unnecessary and should be avoided.

The significant additional public health risks of MOX use in existing nuclear plants cannot be justified in terms of the security benefits of plutonium disposition, because a less risky alternative exists --- immobilization. The insistence of the Russian Ministry of Atomic Energy (MINATOM), along with U.S. and European nuclear interests, that immobilization is not an acceptable approach for either the U.S. or Russia, is one of the driving forces behind the heavy emphasis on MOX in both countries. However, the U.S. should not be compelled by a handful of bureaucrats and industry lobbyists to adopt an outdated, shortsighted and technically flawed approach that will unnecessarily endanger the health of its citizens. Rather than proceeding with the MOX plan, the U.S. should recognize and highlight the environmental, economic and security advantages of immobilization and explore creative ways of enhancing its acceptability both at home and in Russia. 9

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NEI

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June 28, 1999

Ms. Laura S. H. Holgate
Director, Office of Fissile Materials Disposition
U.S. Department of Energy
Supplement to the SPD EIS
P.O. Box 23786
Washington, DC 20026-3786

Dear Ms. Holgate:

The Nuclear Energy Institute (NEI) has reviewed the Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement. We did not identify any significant comments to submit.

NEI would like to take this opportunity to endorse the Department of Energy's (DOE's) hybrid approach to plutonium disposition, with the majority of the surplus plutonium dedicated for use in existing reactors as mixed oxide fuel. NEI notes that the environmental impacts of the preferred plutonium disposition alternative (hybrid approach) are relatively minor, and the nonproliferation benefits of the program make the preferred alternative far superior to the "no action" alternative. In addition, NEI commends DOE for its thorough efforts to provide for public input as a part of the Surplus Plutonium Disposition Environmental Impact Statement process. 1

Sincerely,

Felix M. Killar, Jr.

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MR019

MR019–1 **Alternatives**

DOE acknowledges the commentor's support for the hybrid approach and appreciates the recognition of its public outreach efforts.

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Comments on the Supplement to Surplus Plutonium Disposition Draft Environmental Impact Statement

Prepared by Mary Olson, Nix MOX Campaign Coordinator

We share the overall goal of this program: to render weapons plutonium unusable in weapons. We oppose the proposal to make plutonium fuel for nuclear power reactors in the United States, Russia, Canada or anywhere else for that matter.

This is an experimental program with extremely high stakes which are not justified under any circumstances. The assertion that the Russians are dictating the US program is simply not credible. The US would wage a reversal of our policies against plutonium in commerce, risk a major reactor accident here and in Russia for the minor benefit of isotopic alteration of plutonium in Russia since they propose nothing more than a delay in the reprocessing of the MOX fuel and moving ahead towards a plutonium cycle, at US tax payers expense. The fact that plutonium fuels increase the real hazard of US reactors is not justified by this marginal gain a the geo-political level. 1

Comments on the Process

We appreciate that the Department is finally providing site specific information about irradiation of MOX, and for this opportunity to comment. However, the Department has made a mockery of public participation in a decision making process, and the inclusion of those most impacted in the process. The fact that there is already a consortia under contract which includes the use of these reactors (Duke Power's McGuire and Catawba and Virginia Power's North Anna reactors) precludes the very consideration of whether to use them or not. Further, the fact that DOE has not seen fit to do any public education or solicitation of direct in-put from these host communities betrays any claim that DOE has conducted a fair process as described under the National Environmental Policy Act. 2

We (again) formally request that DOE hold hearings on this Supplement and draft EIS in the vicinity of Duke Power's McGuire and Catawba and Virginia Power's North Anna reactors. While the people of Columbia, SC appreciated the opportunity provided by 3

FR003

FR003–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again. DOE will announce its decisions regarding the approach to surplus plutonium disposition in the SPD EIS ROD.

While it is true MOX fuel has not been produced commercially in the United States, it has been produced in Western Europe. MOX fuel fabrication is not a new technology. This experience would be used to benefit disposition of the U.S. surplus plutonium.

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials. DOE will continue to discourage Russia from reprocessing its spent nuclear fuel and starting a plutonium cycle but this issue is beyond the scope of this SPD EIS.

FR003–2 **General SPD EIS and NEPA Process**

DOE conducted a procurement process in accordance with DOE NEPA regulations 10 CFR 1021.216. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. As

stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are made and announced in the SPD EIS ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before the ROD is issued, and options that would allow construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach.

Efforts were made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. The *Supplement to the SPD Draft EIS* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD.

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. For example, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in the public hearing that was held in Columbia, South Carolina, on June 24, 1999. Additionally, various means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue. It is DOE policy to encourage public input into these matters of national and international importance.

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Senator Leventis, the June 24 event in Columbia cannot be construed as a substitute for hearings in the reactor communities. We also request an extension of the comment period. It is not appropriate to hold a single hearing and then close the comment period within a week. 3

Information Missing From the Supplement

In order to compare the 100% immobilization route to plutonium disposition with the hybrid approach that include making and using MOX plutonium fuel there are a number of direct comparisons which must be made. Most of these are in the department of contamination and waste.

Nowhere in the supplement or the draft EIS is there a compilation with radioisotopic profiles of the operating wastes and discharges. To get the full picture, reference must be given for each of the chosen reactors using LEU uranium fuel, projections using MOX fuel and the totals (including Pu processing and fuel fabrication) compared to the immobilization route.

Of particular interest is the air and water discharges and so-called "low-level" waste generated. It is not sufficient for the Department to simply say that the current regulation swill be met. The question remains whether the waste and discharges would bear more plutonium and total actinides and whether there would be more fission products and what the profile of tritium generation would be. Since we do recognize current regulations to be protective we are still interested in the net impact of shifting part of the fuel used in these reactors in such a way as to increase the plutonium in the system.

While it is possible to assert, as the Department does, that regulations would be met, this does not guarantee that in fact, the regulations will be met. Nor does this assertion justify the practice of putting unique, untested plutonium fuel in existing, aging reactors. The International Committee on Radiological Protection (ICRP) explicitly states in publishing their guidelines that society must justify a practice which leads to radiation exposure, and the standard is then applied, not he other way where the assumption is that any practice that meets a standard is therefore justified. The ICRP guidelines are the basis on which national regulators establish existing national radiological standards. 4

Current waste standards allow the generator to simply prepackage and dilute to meet regulations. Further, the basis for regulation of discharges looks only at each year's discharge, with no reference to the loading of the environment with persistent radionuclides.

It is also not appropriate to look at only one year of discharge for each reactor. It would be more appropriate to average the discharge to air and to water, each over 5 years, since there is considerable variation between years in air and water discharge. These figures would then be compared to projections of discharges to air and water using MOX fuel ,

FR003

FR003–3 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for additional public hearings in the communities near the proposed reactor sites. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Further, as discussed in response FR003–2, DOE attended and participated in a public hearing in Columbia, South Carolina at the invitation of Senator Phil Leventis. Moreover, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be pursued per the SPD EIS ROD.

FR003–4 **Waste Management**

The commentor states that the radioisotopic inventories of emissions from the reactors need to be assessed using MOX fuel against using LEU fuel. For normal operating conditions, the emissions are the same. The only emission stream that might result from using MOX fuel that would result in a different radioisotopic mix than LEU fuel occurs in the event that there is a MOX fuel failure, in which there is a emission pathway from the core. Given the history and integrity of fuel, a fail failure may never occur during the limited fuel campaign to disposition surplus plutonium. Notwithstanding, if there were a MOX fuel failure, the effect on the radioisotopic inventory in emissions would be almost indistinguishable because: (1) the radionuclide inventories in MOX and LEU fuel are similar (as shown in Table K–27) and (2) the contribution of fuel failures to the total emissions from the reactor is small (other contributions to the site's effluents dominate).

Electricité de France reactors in France have seen little or no changes in radionuclide releases in effluents from the use of MOX fuel. All of the proposed reactors would continue to operate within stringent NRC 10 CFR 20 and 10 CFR 50 radionuclide release and dose requirements. Doses for hybrid alternatives and immobilization-only alternatives are given for each of the

candidate sites in Appendix J and for each applicable alternative in Chapter 4 of Volume I.

While it is accepted that there are differences in fission product inventories and activation products between an LEU and MOX core during a fuel cycle, these differences are small enough that essentially no dose differential can be observed by members of the public during normal reactor operations. The only time significant quantities of fission products could be released to the environment would be in the event of a large-scale fuel leak. In regard to normal operations, FRAGEMA's (a subsidiary of COGEMA; one of the companies chosen to operate the proposed MOX facility) experience with fabricating MOX fuel indicates a leakage rate of less than one-tenth of 1 percent. FRAGEMA alone has provided 1,253 MOX fuel assemblies, with more than 300,000 fuel rods for commercial reactor use. There have been no failures and leaks have occurred in only 3 assemblies (a total of 4 rods). All leaks occurred as a result of debris in the reactor coolant system and occurred in 1997 or earlier. The French requirements for debris removal were changed in 1997 to alleviate these concerns. Since that time, there have been no leaks in MOX fuel rods.

In the event of a leaker, fission products are released into the primary containment and are ultimately either passed through a series of resins (for liquid releases) or through a HEPA filtration system (for releases to the atmosphere) that would capture approximately 99.99 percent of the radionuclides. In either case, the impact on dose would be expected to be small.

The use of MOX fuel would not be expected to result in any additional radioactive discharges to the air or water, or the production of additional LLW because the reactors would continue to operate on the same schedule as if they were using only LEU fuel. Any additional ionizing radiation would be limited to the containment and not reach the public. It is important to recognize that the quantities of "key" radionuclides (i.e., those radionuclides that typically account for the vast majority of public dose from normal reactor operations) are projected to remain about the same or in some cases decrease when a partial MOX core is used. These radionuclides include: iodine 131, cobalt 60, cesium 137, and tritium. By the end of core life, the presence of

these radionuclides is expected to increase by 3 percent, decrease by 28 percent, decrease by 9 percent, and decrease by 5 percent, respectively, as presented in Table K–27 when a partial MOX core is used.

As described in Section 3.7, the waste generation rates are 5-year average waste generation rates. Since waste generation rates and isotopic composition are not expected to change appreciably, offsite municipal and commercial waste treatment and disposal facilities, and nuclear laundries should not be adversely affected. Likewise, activities of state regulators and the LLW disposal compacts should not be adversely affected.

The reactors for MOX fuel irradiation would not be operated by DOE. The reactors would continue to be operated by the utilities and regulated by NRC. Eventual D&D of the reactors, to include any recycling of metals, would be performed by the utilities in accordance with NRC regulations in force at that time. However, it is premature to assume that scrap metal at the reactors would be recycled as part of D&D. MOX fuel use is unlikely to impact reactor D&D since as described above, radionuclide inventories and contamination are unlikely to change significantly.

based on real data from the so-called experience of the consortia members, radionuclide by radionuclide.

The same would be repeated for so-called low-level waste.

The reason that this must be done is so that decision makers at all levels of the impacted communities can really weigh the MOX option against the no-MOX option where uranium fuels continue to be used. Municipal drinking water is at stake. Ground and surface water is at stake, state resources for dealing with so-called low level waste sites are also at question.

This analysis must be carried fully to all the extensions of reactor operations: nuclear laundries – on –site and off, nuclear decontamination and waste treatment facilities, incinerators of so-called low-level waste, brokers of this waste (off-site storage) and all transportation steps between these points. What is the radioisotopic profile compared to uranium and what are the doses that would be expected. 4

Finally, because of the Department's cavalier practice of releasing radioactively contaminated metals from decommissioning to the market place as if they were not radioactive, it is also necessary to compare the contamination of metals and other materials from LEU operations and MOX operations. We oppose the release of this material, but do not think that an analysis of the relative impact of MOX and LEU will be complete without it.

Inappropriate Risk Assessment

It is not credible to tie the current health effects analysis to the calculated risk associated with a single year of the operation of any of the 6 chosen reactors. If residents in the area of these reactors only lived there one year, there could be an argument made for this. For the most part they live there longer. Regulations should assume that someone is going to spend their life in this location. That is still a strong cultural tradition in the United States. When the risk factors given are multiplied by 70 year life span one arrives at the familiar, and still unacceptable 3.5 cancer fatalities in 1000 life time exposures given an annual dose on 100 millirems . This is nothing to brag about. 5

We appreciate that the Department has significantly altered their analysis of the impacts of MOX plutonium fuel on the health effects resulting from a major reactor accident.. However, the claim that the likelihood of such an accident occurring is only 1 chance in 4.2 million per year is not credible. The Chernobyl accident happened. It is an ongoing example of the type of core breach that plutonium fuel would complicate. Chernobyl happened in less than 3000 worldwide reactor years. It was the third, perhaps more, reactor accident, but the first core dump. To calculate probability on a model when we have direct data is folly. One can argue that the reactors are different and that containment is a factor. However, containment fails at US reactors regularly, we are simply lucky that this has not (yet) happened coupled with a major reactor problem. OF 6

FR003

FR003–5 **Human Health Risk**

The assertion of 3.5 cancer fatalities over 70 years for a population of 1,000 people is accurate when assuming that each of these persons incurs the maximum permissible public dose level (per 10 CFR 20) of 100 mrem/yr. However, it should be noted that this 100 mrem/yr dose is a limiting dose as established in the U.S. Code of Federal Regulations and that the three candidate reactor sites (Catawba, McGuire, and North Anna) do not come close to this dose value for even a hypothetical MEI. As shown in Section 4.28, the MEI at these sites would be expected to receive an annual dose of less than 1 mrem. Hence, over a 70-year timeframe, this actually equates to 0.035 fatal cancers in a population of 1,000 persons. It should also be noted that the probability of just one individual receiving this "hypothetical maximum exposure" of 1 mrem/yr is small; therefore, an annual exposure of 1 mrem to 1,000 persons is highly unlikely. A typical member of the public would receive an annual dose from natural background radiation which is roughly 300 times higher than the hypothetical 1 mrem dose received from MOX reactor operations.

FR003–6 **Facility Accidents**

The frequency of occurrence estimates were obtained from each plant's probabilistic risk assessment in response to NRC's request for individual plant examinations to assess each plant's vulnerability to severe accidents.

It should be noted that D.C. Cook has been shut down due to issues unrelated to its ice condenser. NRC has not considered it necessary to restrict operation of any of the other reactors in the United States that use ice condenser containments.

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real concern is the choice to use 4 Duke ice condenser model reactors,. where like DC Cook, the containment can be unusable. 6

Chances of an Accident Greater

The physics of plutonium fission are not the same using weapons plutonium as either MOX fuel from reprocessing or the consistent claim from industry that this is no different from the fissioning of the plutonium which reactors make towards the end of their fuel cycle.

A higher percentage of prompt neutrons a positive coefficient of heat reactivity and the tendency to accelerate the aging of reactors, as well as the possible degradation of fuel cladding by any possible residual gallium leads us to assert that a reactor accident is more likely to occur using MOX plutonium fuel. 7

The Department acknowledges that the consequences of a core-dump type accident will be worse than if LEU furl was used.. In making a comparison, one must assume the probability off the event occurring is 1. This means that there is an absolute increase in hazard, even if the probability is low.

Need For Site Specific High-Level Waste Analysis

Supplement needs to include a very detailed comparison of LU and plutonium MOX fuel and the type of issues that are currently being seen with dry cask storage challenges. These include metallurgical reactions between fuel and coolant and the gases as well as coatings on the inside of the casks. There are also thermal load issues with being able to unload these casks. 8

There needs to be a detailed analysis of potential impacts on a repository at Yucca Mountain. What about comparative doses during transport? 9 10

Thermal load issues are of paramount concern for fuel pools and the reactor core in the case of extended loss of off-site power to the reactor . Turkey Point, Davis Besse and a Scottish reactor are all examples of the short fuse that LEU fuel has,. What is the impact of 40% MOX on these parameters? These are all site specific concerns. 11

If use of MOX is going to cause these 2 utilities to have more waste to handle, and need a fuel pool that is relatively open, then what about the impact on having to load more dry casks sooner, What about this in the context of current Department negotiations over high-level nuclear waste obligations? Who pays if the utility must go to dry casks sooner than otherwise? 12

No increased exposure to workers is not credible. 13

No plutonium contamination expected from plutonium activities at SRS is not credible. 14

FR003

FR003–7 **Facility Accidents**

Differences between MOX fuel and uranium fuel are well characterized and can be accommodated through fuel and core design. Initial evaluations indicate that partial MOX fuel cores have a more negative fuel Doppler coefficient at hot zero power and hot full power, relative to LEU fuel cores for all times during the full cycle. These evaluations also indicate that partial MOX cores have a more negative moderator coefficient at hot zero power and hot full power, relative to LEU fuel cores for all times during the full cycle. These more negative temperature coefficients would act to shut the reactor down more rapidly during a heatup transient.

All of the factors discussed by the commentor were evaluated by the proposed reactor licensees to ensure that the reactors can continue to operate safely using MOX fuel and will continue to be evaluated. Before any MOX fuel is used in the United States, NRC would have to perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications.

For MOX fuel, as compared to LEU fuel, there is an increase in accident risk for certain accident scenarios, about 3 percent, for the large-break loss-of-coolant accident (the bounding design basis accident). The largest increase in risk for beyond-design-basis accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. In the unlikely event this beyond-design-basis accident were to occur, the expected number of LCFs would increase from 2,980 to 3,390 with a partial MOX core and prompt fatalities would increase from 54 to 60. Both of these accidents have an extremely low probability of occurrence. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48,000 per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

FR003–8 **MOX Approach**

Initially, when spent fuel is removed from the reactor, the MOX and LEU fuel would be about the same temperature and exhibit similar characteristics. After about a year out of the reactor, however, the temperature of MOX spent fuel would exceed that of LEU fuel of the same age. By the time the

decay heat from MOX spent fuel assemblies becomes significantly greater than that from LEU fuel, the total decay heat load in the spent fuel pool would have dropped to such a point that it is no longer limiting from a heat removal standpoint. Consequently, there would be minimal adverse impact on the cooling needed for irradiated fuel assembly storage due to substitution of MOX for LEU fuel assemblies. During the base contract period, the utilities would confirm the decay heat removal characteristics of the MOX fuel assemblies and would confirm what, if any, modifications may be needed to the spent fuel pool and dry storage cask cooling systems. If necessary, the MOX spent fuel could be preferentially retained in the spent fuel pools and only LEU spent fuel moved to dry cask storage. This would eliminate any concerns about storing MOX fuel in dry casks.

FR003–9 **Repositories**

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. The potential MOX spent fuel and/or immobilized plutonium are included in the inventory analyzed in that draft EIS should the decision be made to proceed with the hybrid or immobilization-only approaches.

FR003–10 **Transportation**

As described in Appendix L.5.4, all shipments (including MOX spent fuel shipments) were conservatively assumed to have a dose rate equal to the regulatory limit of 10 mrem/hr at 2 m (6.6 ft). The dose rate near a vehicle carrying spent nuclear fuel could be lower depending on factors such as the degree of fuel burn-up, the amount of post-irradiation cool-down time allowed

before fuel shipment, and the amount of spent fuel being shipped. Because the dose rate can vary due to factors other than the fuel type, it is likely that shipments of MOX spent fuel and LEU spent fuel would have similar dose rates. Therefore, the impacts from shipping MOX and LEU spent fuel are expected to be similar under normal conditions. Accidents involving the shipment of spent fuel (which would reasonably represent the potential accident impacts from MOX spent fuel) are being considered in the *Yucca Mountain EIS* as described in response FR003–9.

FR003–11 **MOX RFP**

As discussed in response FR003–8, when spent fuel is initially removed from the reactor, the MOX and LEU fuel would be about the same temperature and exhibit similar characteristics. After about a year out of the reactor, however, the temperature of MOX spent fuel would exceed that of LEU fuel of the same age. Therefore, storage of MOX spent fuel would increase the thermal loading in a spent fuel pool over that for only LEU fuel. However, thermal load limitations are based on the amount of cooling that the entire spent fuel pool can accommodate, not on individual fuel assemblies within the pool. Therefore, the additional heat load would be accounted for in the calculations for the reactor spent fuel management plans.

The commentor has expressed a concern that MOX fuel in the reactor core might affect core cooling in the event of an extended loss of offsite power event. Each of the proposed nuclear units has two independent sources of offsite power capable of supplying power to the Engineered Safety Features, and two emergency onsite diesel generators as standby power sources should offsite power not be available. Each of the plant's extended shutdown capabilities has been evaluated, including during loss of offsite power and station blackout scenarios. As part of the safety analyses supporting the license amendment request to use MOX fuel, each licensee would reevaluate these scenarios to account for MOX fuel in the core, to ensure that the reactors can be safely shutdown and maintained in that mode for an extended period. Rigorous safety analyses and operational parameter assessments would be conducted, and a license amendment approved by NRC, prior to the use of MOX fuel in any reactor. Differences in neutron flux, decay heat, temperature of the fuel assemblies and other parameters that could affect

reactor operation and core cooling, both during normal operation and postulated transients and emergencies would be considered in these analyses, and factored into operating and emergency procedures, as necessary. Changes in the amount of moderator, neutron poisons and other reactor control mechanisms and emergency systems would be made as necessary to ensure continued safe operation of the proposed reactors.

Two examples of loss of offsite power in the United States were noted by the commentor. On August 24, 1992, winds from Hurricane Andrew caused extensive damage to southern Florida, including offsite power supplies to the Turkey Point Nuclear Generating Station. Offsite power to Turkey Point was unavailable for 6 days. During that time period, the emergency diesel generators operated and provided power for essential systems, including spent fuel pool cooling.

On June 24, 1998, a tornado struck the Davis-Besse Nuclear Power Plant and caused damage to the electrical switchyard. As a result, offsite power to Davis-Besse was lost for approximately 24 hours. The emergency diesel generators operated and provided power for essential systems, including spent fuel pool cooling. The ambient room temperature for one of the diesel generators slightly exceeded the design limit, but the generator continued to run and supply its load.

In both cases severe external phenomena caused a loss of offsite power for an extended period of time, but plant systems responded as designed to provide decay heat removal. It should be noted that all U.S. nuclear power plants, including the mission reactors, are required to demonstrate to NRC that they can withstand a station blackout (loss of all AC power, including onsite emergency power) for at least 4 hours. Therefore, there is substantial margin in the ability to provide adequate cooling for spent fuel. The impact of incorporating a limited number of MOX spent fuel assemblies on the ability to provide for spent fuel pool cooling is expected to be negligible and to be reviewed by NRC, as appropriate, as part of the reactor-license amendment process.

FR003–12 **Waste Management**

As described in Section 4.28, the amount of additional spent nuclear fuel generated is estimated to range from approximately 2 to 16 percent of the total amount of spent fuel that would be generated by the proposed reactors during the time period MOX fuel would be used. The amount of additional spent fuel is not expected to change spent fuel management practices at the reactor sites. Spent fuel from the reactors would be moved to the spent fuel pool and later, if needed, to onsite dry storage. Ultimately, the spent fuel would be moved to a potential geologic repository prepared in accordance with the NWPA. As is current practice, the utilities would pay for any spent fuel storage needed at the reactor sites.

As described in response FR003–9, DOE is preparing a separate EIS on a potential geologic repository for HLW and spent fuel.

FR003–13 **Health Human Risk**

Under normal operating conditions, it is not expected that the waste streams and handling characteristics would change significantly from those associated with LEU fuel. Electricité de France reactors in France have seen little or no increased impacts on workers from the use of MOX fuel; accordingly, little or no increases in worker exposure would be expected.

FR003–14 **Human Health Risk**

There are minute releases of plutonium to the environment expected from the proposed surplus plutonium disposition facilities at SRS. These releases are presented in Appendix J and factored into the analysis presented in Chapter 4 of Volume I.

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Physicians for Social Responsibility Comments On the Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement
(DOE/EIS - 0283-DS, April 1999)

June 28, 1999

Physicians for Social Responsibility (PSR) is a national organization of approximately 15,000 members. We are the United States affiliate of the International Physicians for the Prevention of Nuclear War (IPPNW), winners of the 1985 Nobel Peace Prize. PSR was founded in the 1960's when we worked to end atmospheric nuclear testing by documenting the presence of Strontium 90 in children's teeth. PSR is committed to achieving the complete, verifiable elimination of nuclear weapons, and addressing the legacy of the Cold War. In that context, we urge the safe, secure disposition of plutonium. We oppose policies and efforts that would encourage the United States or other countries to use or proliferate this most lethal bomb material. 1

We support the stated goal of the Department of Energy's plutonium disposition program: *"[To] Reduce the threat of nuclear weapons proliferation worldwide."* We believe however, that the planned use of MOX in commercial reactors does not achieve this goal. Instead, we find that the MOX program fuels a worldwide plutonium economy, incurs unnecessary environment, safety, and health impacts and risks, wastes taxpayer money, and is not supported in the United States or worldwide. We are also concerned that DOE has not held public hearings in communities around the chosen reactor sites where citizens will be most directly impacted by this MOX program. 2

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U.S. AFFILIATE OF INTERNATIONAL PHYSICIANS FOR THE PREVENTION OF NUCLEAR WAR

FR017

FR017–1 **Alternatives**

DOE acknowledges the commentor's concern that the MOX approach does not meet the surplus plutonium disposition program's goal. Use of MOX fuel in domestic, commercial reactors is proposed to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. DOE is not advocating a plutonium economy. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel) and therefore does not support building a plutonium economy.

FR017–2 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for extending the comment period and planning for additional public hearings in the three communities where the proposed reactors would use MOX fuel. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. In addition to the public hearing on the *Supplement* held in Washington, D.C., DOE provided other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Although it did not extend the comment period, DOE did consider all comments received after the close of that period. All comments were given equal consideration and responded to.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the

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MOX : Fueling a Plutonium Economy

We recognize the difficulty in negotiating with Russia on plutonium disposition issues. It is quite clear that Russia values plutonium as a fuel resource, intends to continue reprocessing activities, and would like to expand Russian use of breeder reactors. It seems however, that with our policy of pursuing a MOX program in parity with Russia, we have failed to exercise strong leadership. Real leadership on this issue would send a clear message to Russia and other countries that we are truly committed to our non-proliferation policies against reprocessing and could steer Russia and other countries away from reprocessing. Instead our policy has been a very confusing message, essentially saying to Russia and the world *"follow us, we're right behind you."*

While the DOE pays lip service to the United States policy on reprocessing (see box at right), in fact this current MOX program undermines that policy and supports a worldwide plutonium fuel economy.

"The United States does not encourage the civil use of plutonium and, accordingly, does not itself engage in plutonium reprocessing for either nuclear power or nuclear explosive purposes." (President Clinton 1993)

Examples of how MOX supports a worldwide plutonium economy:

- **"Aqueous Polishing" required for the U.S. weapons-grade plutonium to be used as MOX fuel is a reprocessing activity.** When we asked where there was experience with Aqueous Polishing, the answer from Cogema representatives was that Aqueous Polishing is part of the current reprocessing activities at La Hague. Thus, it seems that DOE's assertion that *"the MOX approach does not involve reprocessing,"* is incorrect. (DOE Fact Sheet, *Surplus Plutonium Disposition and the U.S. Policy of Reprocessing*, June 14, 1999). 3

- **The United States supports a Japanese effort to assist Russia in burning MOX at the BN-600, a breeder reactor.** Not only does this encourage the use of breeder reactors in Russia, it furthers Japan's understanding and use of similar fast reactors. DOE Under Secretary Moniz has reported that the United States is very supportive of this effort. (Under Secretary Moniz, spoke at the *Nuclear Weapons Exchange/ Monitor Publications' Sixth International Policy Forum on the Disposition of Plutonium and HEU* on June 7, 1999. Russian policymakers and Japanese contractors also made presentations.)

- Support of the BN-600 use is troubling especially given that Russia does not believe that enough MOX can be burned in the currently available VVER light water reactors to reach plutonium disposition goals. **Instead, Russia would like to build and operate the BN-800 -another new breeder reactor. Will the United States support that effort in order to enable Russian parity with the U.S. MOX program?**

- **Russia is committed to a "closed fuel cycle," and intends to reprocess MOX spent fuel at some point.**

- **Cogema, chosen as the MOX fabricator in the DCS consortium carrying out the U.S. MOX program, is well known throughout the world for its reprocessing operations, as well as related reactor-grade MOX use.**

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proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. As pointed out by the commentor, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

It is DOE policy to encourage public input into these matters of national and international importance. DOE has followed the spirit of NEPA and has not neglected its responsibilities to the public. Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. For example, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina.

FR017–3 **Nonproliferation**

As discussed in response FR017–1, DOE is not proposing to reprocess spent nuclear fuel or support a plutonium fuel economy. DOE acknowledges the commentor's concerns regarding the disposition of surplus Russian plutonium as MOX fuel. The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials. The goal of surplus plutonium disposition program is to reduce the threat of nuclear weapons worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. This activity permanently

removes nuclear materials from the military arena, and does not compromise the traditional separation between military and commercial uses of nuclear materials.

On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing. Plutonium polishing is not a reprocessing activity (it is performed on plutonium dioxide made from pits, not on spent reactor fuel) but rather a process that is used to remove impurities, in particular gallium, in order to meet the required plutonium dioxide feed specifications for MOX fuel.

The United States and the other G–8 nations (Group of Eight industrialized nations: Canada, France, Germany, Great Britain, Italy, Japan, Russia, and United States) are supporting plutonium disposition efforts, both financially and by providing technical assistance, in Russia because these countries consider it vitally important to ensure that weapons-usable nuclear material does not fall into the hands of terrorists or rogue states. Russia considers the plutonium a valuable resource that can be used for energy production. DOE will continue to discourage Russia from reprocessing its spent nuclear fuel and starting a plutonium cycle, but this issue and the issue of Japan assisting Russia in building a reprocessing facility are beyond the scope of the SPD EIS.

Should the decision be made to proceed with the hybrid approach, COGEMA, part of the team that would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel, would lend its expertise within the limits of the contract, which does not have any provisions for reprocessing.

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(Examples of MOX fueling a plutonium economy continued)

- **While DOE's stated intention is to shut down the MOX facility at the completion of the plutonium disposition mission, it would seem to be quite difficult to simply close down this large operation and infrastructure.** Thus, it is possible, if not probable, that the U.S. will continue to utilize the MOX process, eroding the once-through, no-reprocessing policy. 4

- **Use of MOX fuel in commercial reactors will forever blur to obliteration the line that the United States has maintained between military nuclear weapons processes and peaceful commercial nuclear power.** 3

Taken together these examples reveal the extent to which MOX and reprocessing are intrinsically related and serve to support the worldwide plutonium fuel economy, thereby undermining the non-proliferation goal of the plutonium disposition program.

MOX: A Public Safety & Health Risk

Plutonium is fairly characterized as one of the most lethal substances on earth. Any disposition method will pose inherent safety and health dangers to workers and the public. The DOE should make every effort to minimize those dangers.

Relative to the immobilization options, the MOX option presents additional risks and impacts. For example:

"Plutonium . . . poses an extraordinarily dangerous threat to health as an emitter of alpha particles. Experiments in animals have demonstrated that plutonium is readily absorbed when inhaled as fine particles. Absorbed plutonium lingers in the body for decades. Major sites of retention include the lung, lymph nodes, liver, and bone, with relative distribution of the plutonium depending on its chemical form and entry route. Exposed animals develop high rates of cancer, primarily of the lung and bone, even when the dose of plutonium is small. Cell culture experiments suggest that such carcinogenesis may reflect a unique ability of alpha particles to cause inherited chromosomal defects from a minute amount of exposure." Plutonium: Deadly Gold of the Nuclear Age, International Physicians for the Prevention of Nuclear War and The Institute for Energy and Environmental Research. 1992 5

- **MOX requires more, transportation and multiple reactor locations.** Thus, more people and a broader environment are exposed to radiation and potential accidents in the fuel fabrication, transport, handling, and reactor use of plutonium.

- **Operation of MOX-fueled reactors risks greater harm than current uranium-fueled reactor operations.** The Nuclear Control Institute's recent study estimates that in the event of a severe loss of containment accident, releases from a reactor burning MOX fuel could cause from hundreds to thousands of additional cancer deaths among people exposed to the radioactive fallout. This is because MOX-fueled reactors contain greater quantities of radioisotopes including plutonium, americium, and curium than do reactors using uranium fuel. (*Public Health Consequences of Substituting Mixed-Oxide for Uranium Fuel in Light-Water Reactors*, Edwin S. Lyman, PhD, **Nuclear Control Institute**, January 21, 1999.) 6

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FR017–4 **DOE Policy**

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. DOE will evaluate options for D&D or reuse of the proposed facilities at the end of the surplus plutonium disposition program. However, none of the current plans include using the facility to continue to manufacture MOX fuel.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard as discussed in response FR017–1. Although cost will be a factor in the decisionmaking process, this SPD EIS contains environmental impact data and does not address the costs associated with the various alternatives. A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

FR017–5 **MOX Approach**

The health and safety of workers and the public is a priority of the surplus plutonium disposition program, regardless of which approach is chosen. Operation of the proposed surplus plutonium disposition facilities would comply with applicable Federal, State, and local laws and regulations governing radiological and hazardous chemical limits. Within these limits, the level of exposure would be kept as low as is reasonably achievable. Chapter 5 summarizes the environmental statutes, regulations, and permits that cover emissions, waste, and ALARA standards.

DOE has considered the inherent risks, including terrorist concerns, associated with transporting plutonium materials. While DOE prefers to minimize the transportation of plutonium that is still desirable for weapons use, plutonium is routinely and safely transported in the United States. As described in Appendix L.3.3, transportation of nuclear materials would be performed in accordance with all applicable DOT and NRC transportation requirements. Interstate highways would be used, and population centers avoided, to the extent possible.

All shipments of surplus plutonium that have not been converted to a proliferation-resistant form would be made by DOE's SST/SGT system, as described in Appendix L.3.2. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. While it is true the MOX approach requires more transportation with regard to shipping the MOX fuel from the fabrication facility to the reactors, and then eventually shipping the MOX spent fuel to the potential geologic repository, each shipment would follow strict procedures using licensed equipment and in compliance with applicable requirements. A quantification of the risks associated with the various transportation scenarios is presented in Chapter 4 of Volume I by alternative and summarized in Section 2.18.

FR017–6 **Facility Accidents**

Section 4.28.2.5 provides a discussion of the analysis of several reactor accidents including both design basis and beyond-design-basis accidents. For MOX fuel, as compared to LEU fuel, there is an increase in risk, about 3 percent, for the large-break loss-of-coolant accident (the bounding design basis accident). The largest increase in risk for beyond-design-basis accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. In the unlikely event this beyond-design-basis accident were to occur, the expected number of LCFs would increase from 2,980 to 3,390 with a partial MOX core and prompt fatalities would increase from 54 to 60. Both of these accidents have an extremely low probability of occurrence. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48,000 per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

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(MOX: A Public Safety & Health Risk continued)

- **While much is made of the operational experience with MOX reactors in Europe, these reactors abroad are using reactor-grade MOX fuel with much more plutonium-239.** U.S. weapons-grade plutonium fuel is different and unique, and even requires the additional Aqueous Polishing step. 7

- **The operational experience in Europe is irrelevant without adequate information about the health, safety and environment records of those operations.** The record of Cogema's operations should be disclosed to the public. We were pleased to note at the June 15 Public Meeting that at least some of this information will be posted on the web. The full environment, safety and health record of Cogema's reprocessing activities, along with its MOX experience, should be made available to the public. 8

MOX: An Expensive Option

- **Subsidies to Russia.** Achieving Russian plutonium disposition is a goal that we support. Thus we do not object to funding for this effort, and indeed have communicated our support to Congress in the past. We wonder however, why the U.S. cannot be more persuasive in directing the Russian programs. Instead, the U.S. approach is to fund and pursue MOX which seems to lead inevitably to reprocessing and breeder reactor use in Russia. Lawmakers including Jesse Helms (R-NC), Chair of the Senate Foreign Relations Committee, have raised serious concerns about the MOX program in Russia. Any program that does not have the clear support of Congress risks losing needed financial support. PSR cannot support funding for a plutonium disposition program with Russia that so heedlessly pursues MOX in the face of crucial non-proliferation concerns. 3

- **Subsidies to U.S. Utilities.** *"There will be small savings to the utility company's customers for the use of partial MOX fuel reloads."* (DOE Fact Sheet *"The Economics of the Plutonium Disposition Contractual Arrangement,"* June 14, 1999). The same fact sheet lists the costs covered by the DOE (which is funded by taxpayers), including the licensing expenses of the Nuclear Regulatory Commission and all modifications to the MOX mission reactors. While funding assistance to Russia may be needed even with other plutonium disposition options, taxpayer subsidies to the utilities and their customers is a unique cost of the U.S. MOX program. It is impossible to tell how "small" this subsidy is without full disclosure of the cost figures. The full costs of the entire MOX program should be disclosed to the public. We were pleased to note that access to at least a redacted form of the DOE- DCS MOX contract was made available at the June 15 Public Meeting, and hope that further cost information will be disclosed throughout the process. 4

- **Exclusive focus on the MOX option may endanger Congressional funding and support for plutonium disposition. Sufficient funding for the immobilization option is critically important.** In the political, competitive budget atmosphere of the U.S. Congress, it is important that steady plutonium disposition progress is made in order to maintain solid funding support for the program. Even proponents of MOX realize that MOX is not an option for all of the surplus plutonium. Some plutonium wastes will have to be immobilized. Moreover, especially because MOX is a new process in the U.S., delays and glitches are to be expected, and complete failure is a possibility. We are concerned that if money is poured into MOX , there may not be sufficient funding in later years to pursue immobilization or other options. 9

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FR017–7 **MOX Approach**

Reactor fuel in Europe is fabricated to similar enrichment levels (about 5 percent plutonium 239) to the levels being proposed for the U.S. reactors that would be used to irradiate MOX fuel.

Fabricating MOX fuel from surplus weapons-usable plutonium should have less impact than fabricating MOX fuel from spent nuclear fuel. At the La Hague Plant in France, COGEMA is reprocessing spent nuclear fuel to recover the plutonium. Because spent fuel is highly radioactive, it presents a series of unique hazards that need to be carefully dealt with. The La Hague Plant includes a series of processes to remove highly radioactive fission and activation products from the spent fuel. The MOX process being evaluated in this SPD EIS does not involve reprocessing. The proposed U.S. MOX facility would handle plutonium that is unirradiated. Therefore, the radiation exposures and emissions normally associated with reprocessing spent nuclear fuel would not be present in the proposed MOX facility.

The remainder of this comment regarding plutonium polishing is addressed in response FR017–3.

FR017–8 **MOX RFP**

European reactors of various designs use MOX fuel. European nuclear regulatory authorities in France, Germany, Belgium, the Netherlands, and Switzerland have reviewed MOX fuel use in reactors of varying designs. Recent reports prepared by the French Government have concluded that the radioactive releases from the La Hague Plant are not the cause of an excess childhood leukemia in the area of the plant between 1978 and 1996. As discussed in response FR017–7, the La Hague Plant is a spent fuel reprocessing plant. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing so a plant like La Hague would not be needed for the MOX approach.

In this regard, questions on environment, safety and health records of COGEMA can be directed to Ms. Christi A. Byerly. Her address is: 7401 Wisconsin Avenue; Bethesda, MD 20814. She may also be contacted by telephone at (301) 941-8367. Her fax number is (301) 652-5690, and

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MOX: Unsupported by Citizens Worldwide

As we push for nuclear disarmament progress, PSR believes that it is especially important that plutonium disposition efforts be supported by citizens worldwide. If people feel that plutonium disposition methods are dangerous and waste money, they may be less willing to support nuclear disarmament efforts in the first place. There is much opposition to MOX in Russia, the United States and other countries. The ***"Statement of Non-Governmental Organizations on Plutonium Disposition"*** submitted at the June 15 Public Meeting, was signed by over 160 citizen's groups worldwide. This is the latest evidence that there is opposition to MOX throughout the world. 9

Public hearings should be held in the reactor communities.

DOE officials have stated that they would *"consider public hearings"* in the reactor communities. (Office of Fissile Materials Disposition (MD) Director Laura Holgate stated this at the *Nuclear Weapons Exchange/ Monitor Publications' Sixth International Policy Forum on the Disposition of Plutonium and HEU* on June 8, 1999, and MD Reactor Group Director Dave Nulton echoed this at the Public Meeting on June 15.) We strongly urge DOE to extend the comment period and ***plan*** hearings in the three communities where reactors will use MOX fuel.

PSR does recognize that the DOE has held a number of hearings throughout this Environmental Impact Statement process, and many of our members have participated in these hearings. We strongly believe, however, that DOE has an obligation to hold hearings in the communities where reactors have been identified. Hearings have not been held in these communities. The citizens in these areas feel that failure to hold hearings in their communities is a gratuitous slap in the face. DOE is asking them to carry the largest burden of risk and impact for its disposition program, but does not even have the courtesy to go hear directly the concerns and questions people have. 2

While it is true that the Nuclear Regulatory Commission will license the reactors, and public hearings will likely be held by the NRC, this does not discharge DOE's responsibility. It is DOE's plutonium disposition mission, DOE has the contract with DCS, and it is DOE that is paying for the NRC licensing processes. Therefore, it is DOE's responsibility to hold hearings in the most affected communities at this time. We look forward to knowing when and where those hearings are planned.

Thank you very much for considering our written comments, and we do appreciate the efforts of the DOE Office of Fissile Materials Disposition at the June 15, 1999 Washington DC Public Meeting.

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her email address is cbyerly@cogema-inc.com. You can also visit their Web site linked from the MD Web site at http://www.doe-md.com or directly at http://www.cogema.com.

FR017–9 **DOE Policy**

DOE acknowledges the commentor's observation that there is worldwide opposition to the MOX approach given the statement signed by over 160 citizen's groups. As discussed in response FR017–3, the disposition actions proposed are reasonable alternatives developed and analyzed to address the goals of the surplus plutonium disposition program. One of the advantages of pursuing the hybrid approach, which involves both immobilization and MOX fuel, is flexibility in meeting program goals and agreements reached with Russia should one of the approaches run into schedule delays. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. Should the decision be to proceed with the hybrid approach, construction and operation of the pit disassembly, immobilization, and MOX facilities would effectively occur simultaneously so there would be no threat of running out of funds to pursue immobilization. As shown in Appendix E, the immobilization would begin operating a year before the MOX facility was to begin cold startup operations.

ASHEVILLE
CITIZEN-TIMES

Tuesday, March 23, 1999

GUEST COLUMN

A global plutonium economy flourishes at our doorstep

By Lewis Patrie and Olga Pitsunova

We are writing to express our dismay about the proposed use of plutonium fuel both in the United States and Russia. Many U.S. citizens don't realize that environmental activists have been operating in Russia at their peril since before the break up of U.S.S.R. Recently, we took part in a lively discussion among six courageous Russian activists and many local community members who discussed nuclear issues on the UNCA campus.

Last December Secretary of Energy Bill Richardson identified the Savannah River Site in South Carolina as the preferred location to receive 50 tons of surplus plutonium from nuclear warheads from various locations around the country where most of it would be converted into plutonium fuel for use as fuel in nuclear power plants. Any day now the U.S. Department of Energy expects to contract with a consortium which includes French fabricator, Cogema, Virginia Power and Duke Power; the latter would accept MOX for use in its McGuire and Catawba reactors near Charlotte.

Lewis Patrie

Olga Pitsunova

Concurrently, the United States is promoting the use of plutonium fuel in Russian nuclear reactors. It would be U.S. money offered to conduct an initial experiment in the use of weapons grade plutonium fuel at the Balakovskaya Nuclear Power Station along the bank of the Volga River near Balakovo. The United States is promoting use of this fuel in many other Russian locations. Russian activists want U.S. citizens to know that plutonium plants in both countries are connected and that this movement signals the beginning of a global plutonium economy.

Our concerns about plutonium fuel include the billions of dollars for fabricating this fuel, transporting it to nuclear plants, offering it at no cost to power companies, future inestimable subsidies to the industry and the costs of promoting Russian fuel use. We dread even more that the characteristics of this fuel make it less stable than current fuel for reactor use, increasing the risk of a sever reactor accident and increasing the anticipated effects on human health should one occur. Such an event could ultimately result in many cancer deaths within 1000 miles of the accident.

Using pure plutonium fuel, the Nuclear Control Institute, a U.S. watchdog organization, estimates about doubles the cancer deaths from the radiation exposure within the first week of such an accident compared with nuclear fuel currently being used.

Although, DOE minimizes the risk of a disaster, reminiscent of Chernobyl, there are sufficient data to suggest that use of plutonium increases that risk.

Plutonium fuel substantially increases the waste management problem. Problems of security and nuclear proliferation are also increased with the use of plutonium fuel. Environmental problems from plutonium will linger for more than 200,000 years. For the sake of our world and that of our children, we should tell our governments that plutonium should never be used as fuel.

Olga Pitsunova is Program Director of the Center for Assistance to Environmental Initiatives in the Saratov region of Russia. The main goals of the organization are to encourage cooperation among environmental groups in the Saratov region and to encourage initiatives to protect and restore the environment.

Lewis Patrie is President of Western North Carolina of Physicians for Social Responsibility.

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The Rock Hill Herald
Sunday, March 28, 1999

MOX Fuel

Should weapons-grade plutonium be used in nuclear reactors?

By Brita Larsen Clark
and Katie C. Boniske
Special to The Herald

If you are like us, you may have no idea what MOX stands for. We have leaned only recently about this new development and what it means for our communities.

The U.S. Department of Energy (DOE) has developed a plan to combine surplus weapons-grade plutonium with uranium to produce fuel for civilian nuclear reactors. The fuel is called mixed oxide fuel, hence MOX. The Catawba II reactor, near Rock Hill, would be one of first to use this new and so far experimental fuel.

We all want to get rid of surplus plutonium, but is this a good way to do it? The more we learn, the more doubts surface.

When concerned groups asked the DOE to hold public hearings in communities such as Rock Hill, they were turned down. The public, however, has not only the right but also the responsibility to be involved in any policy decisions with such serious implications for our health and the health of future generations.

Clark

Our concerns about using MOX fuel are many. Here are some that directly affect those of us who make our homes in the Southeast:

◆ Weapons-grade plutonium never has been used in commercial reactors. They were not designed to use this fuel and would need extensive modifications.

◆ MOX fuel generates more high energy particles than uranium, and the rate of damage to key reactor parts would be accelerated.

◆ Increased energy also increases core temperatures, which increases fission, which in turn creates more heat in a cycle that makes the reaction harder to control.

Boniske

◆ Plutonium fission creates dangerous radioactive elements. Uranium "spent" fuel is about a million times more radioactive than fresh fuel (it is not "spent" at all; it becomes too highly irradiated to use) and MOX is even more dangerous.

◆ A just-released study by the Nuclear Control Institute finds that a severe accident at a reactor fueled with MOX could cause twice as many fatal cancers as an identical accident

please see MOX, page 1E

MOX

from 1E

at a uranium-fueled reactor.

◆ Plutonium not only causes cancers, it also is highly likely to disrupt reproductive cells, causing mutations that can show up in future generations.

◆ Processing warhead plutonium pits into MOX (which would be done at the Savannah River Plant near Aiken) would create huge amounts of high-level nuclear waste.

◆ MOX means transporting plutonium by truck and/or rail to the Savannah River Plant for reprocessing. It then must be sent out again to the selected reactor sites. This presents serious security risks regarding the possibility of theft or diversion, as well as the potential for accidents en route.

◆ MOX will not use up our stockpiles of plutonium. Though a small amount will be expended in energy production, plutonium also will be created in the process, along with a host of other toxic elements. Of even greater concern, weapons still could be made from the irradiated "spent" fuel, undermining the point of using plutonium in the first place.

These are just a few of the issues regarding MOX that we believe need a public airing. As concerned parents and grandparents, we are distressed to think that Duke Energy, long known as a responsible member of the utility industry, would consider using MOX fuel in its Catawba and McGuire reactors.

We call on Duke Energy and the DOE to join with concerned citizens in organizing public forums where we can ask questions and give our input.

For more information on MOX in the southeast, contact the Blue Ridge Environmental Defense League (336) 982-2691, or Nuclear Information and Resource Service, (202) 328-0002. We have also relied on information published by the Institute for Energy and Environmental Research, whose e-mail is *http://www.ieer.org*, and the Nuclear Control Institute, *http://www.nci.org/nci/*.

Brita Clark and Katie Boniske both joined a roundtable discussion with members of The Herald's editorial board. Clark, of Candler, N.C., is active in the organization Physicians for Social Responsibility. Boniske, of Arden, N.C., is a longtime member of the Women's International League for Peace and Freedom.

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Viewpoint

1E
Opinion 1E
Classified 3E-14E

The Herald
Sunday, March 28, 1999

Tamara La Valle / The Herald

MOX Fuel

Should weapons-grade plutonium be used in nuclear reactors?

By Erica Larsen Clark and Kate C. Boniske
Special to The Herald

If you are like us, you may have no idea what MOX stands for. We have learned only recently about this new development and what it means for our communities.

The U.S. Department of Energy (DOE) has developed a plan to combine surplus weapons-grade plutonium with uranium to produce fuel for civilian nuclear reactors. the fuel is called mixed oxide fuel, hence MOX. The Catawba II reactor, near Rock Hill, would be one of first to use this new and so far experimental fuel.

We all want to get rid of surplus plutonium, but is this a good way to do it? The more we learn, the more doubts surface.

When concerned groups asked the DOE to hold public hearings in communities such as Rock Hill, they were turned down. The public, however, has not only the right but also the responsibility to be involved in any policy decisions with such serious implications for our health and the health of future generations.

Clark

Boniske

Our concerns about using MOX fuel are many. Here are some that directly affect those of us who make our homes in the Southeast:

◆ Weapons-grade plutonium never has been used in commercial reactors. They were not designed to use this fuel and would need extensive modifications.

◆ MOX fuel generates more high energy particles than uranium, and the rate of damage to key reactor parts would be accelerated.

◆ Increased energy also increases core temperatures, which increases fission, which in turn creates more heat in a cycle that makes the reaction harder to control.

◆ Plutonium fission creates dangerous radioactive elements. Uranium "spent" fuel is about a million times more radioactive than fresh fuel (it is not "spent" at all; it becomes too highly irradiated to use) and MOX is even more dangerous.

◆ A just-released study by the Nuclear Control Institute finds that a severe accident at a reactor fueled with MOX could cause twice as many fatal cancers as an identical accident

please see MOX, page 3E

There's a better alternative

By Arjun Makhijani and Edwin Lyman
Special to The Herald

The United States and Russia must take action to reduce the risk from the vast surpluses of weapons-usable plutonium in both countries. It must be put into non-weapons-usable form, so as to keep it out of potential nuclear black markets. There are two ways to do this, and the jobs will, in any case, come to the Southeast.

One of the methods, the use of surplus plutonium as a fuel in commercial reactors, will increase environmental risks and proliferation dangers. That is the one that the Department of Energy (DOE) has chosen for most U.S. surplus plutonium. The fuel, consisting of a mixture of plutonium and uranium oxides (mixed oxide or MOX fuel), would be fabricated at the Savannah River Site (SRS) in South Carolina.

Last week, the DOE awarded a $130 million contract to design a nuclear power plant that can convert plutonium from decommissioned nuclear weapons into a fuel that would power its reactors. The contract went to an international consortium that includes Duke Energy, owner of the Catawba Nuclear Station in Lake Wylie and the McGuire reactors in North Carolina.

Makhijani

Lyman

In recognition of the risks of MOX fuel use, the United States has, for more than two decades, had a bipartisan policy of not using plutonium as a fuel in commercial reactors. But the need to put the surplus plutonium into non-weapons-usable form has created a new opportunity for plutonium fuel advocates.

There is a simpler, faster and cheaper method for dealing with weapons plutonium: mixing it with radioactive wastes and encapsulating it in molten glass, which also could be carried out at SRS, without the risks attendant on the use of plutonium fuel. Yet, the DOE plans to use this only for plutonium not suitable for fabrication into fuel.

Putting plutonium fuel into commercial circulation would require the militarization of commercial nuclear power plants to store the plutonium safely. It would require amending the licenses of the plants, which may need expensive modifications. It would make waste management more difficult and expensive. MOX fuel use also would require unnecessary plutonium transport.

Perhaps the most serious concerns

please see NUCLEAR, page 3E

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DCR003

DCR003–1 **Alternatives**

DOE acknowledges receipt of the commentaries that question the MOX approach.

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Sunday, March 28, 1999

MOX

from 1E

at a uranium-fueled reactor.

◆ Plutonium not only causes cancers, it also is highly likely to disrupt reproductive cells, causing mutations that can show up in future generations.

◆ Processing warhead plutonium pits into MOX (which would be done at the Savannah River Plant near Aiken) would create huge amounts of high-level nuclear waste.

◆ MOX means transporting plutonium by truck and/or rail to the Savannah River Plant for reprocessing. It then must be sent out again to the selected reactor sites. This presents serious security risks regarding the possibility of theft or diversion, as well as the potential for accidents en route.

◆ MOX will not use up our stockpiles of plutonium. Though a small amount will be expended in energy production, plutonium also will be created in the process, along with a host of other toxic elements. Of even greater concern, weapons still could be made from the irradiated "spent" fuel, undermining the point of using plutonium in the first place.

These are just a few of the issues regarding MOX that we believe need a public airing. As concerned parents and grandparents, we are distressed to think that Duke Energy, long known as a responsible member of the utility industry, would consider using MOX fuel in its Catawba and McGuire reactors.

We call on Duke Energy and the DOE to join with concerned citizens in organizing public forums where we can ask questions and give our input.

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Nuclear

from 1E

for people living downwind of the Catawba and McGuire reactors are the potential consequences of an accident in a reactor using MOX fuel. MOX-fueled reactors contain greater quantities of hazardous radioisotopes, including plutonium, americium and curium, than do plants using uranium fuel. A recent Nuclear Control Institute study estimates that in the event of a severe loss-of-containment accident, the higher releases of these isotopes from a plant using MOX could cause from hundreds to thousands of additional cancer deaths among people exposed to the radioactive fallout.

The DOE has tried to allay these concerns by pointing to countries such as France that use MOX fuel in some of their reactors. But the MOX experience abroad is not based on weapons-grade plutonium, which contains significantly more plutonium-239 and hence requires more stringent reactor control arrangements. The DOE also has failed to inform the public about the 1997 test in France in which a MOX fuel rod violently ruptured under simulated accident conditions while a uranium fuel rod with similar characteristics did not.

Finally, the MOX approach would mean that U.S. taxpayer dollars would be used to subsidize the creation of an infrastructure for commercial plutonium fuel use in this country and in Russia. Black-market dangers in Russia will only increase and proliferation problems will be aggravated by such a reversal of longstanding U.S. policy.

This poor plutonium policy is being accompanied by bad process. The DOE has not held hearings in the communities that host the reactors that would likely use the MOX fuel, nor even in Washington, D.C. Further, U.S. subsidiaries of two corporations, Cogema, owned by the French government, and British Nuclear Fuels, owned by the British government, would be intimately involved at SRS. The former is the likely contractor for the MOX plant; the latter is set to become part owner of Westinghouse, the SRS site contractor.

The DOE has not required these companies to make public their full operating safety, health and environmental records in their home countries. Yet they claim that extensive plutonium experience in their home countries especially qualifies them to do sensitive nuclear work in the United States.

Both Cogema and BNFL have polluted the environment in their home countries. Their plutonium separation operations are the subject of protest not only by environmentalists but also by other governments of the European Union, which have asked them to greatly reduce discharges of radioactivity, which are contaminating seafood.

Before letting a contract for MOX to Cogema or allowing BNFL to have a central role in operating SRS, the DOE should hold hearings in the Southeast and in Washington, D.C. on all relevant issues, including the home country records of Cogema and BNFL. All corporations that want public money, whether they are Cogema or Duke, should make all safety, health and environmental records public. (Much of Duke's record is already public via its disclosures to state and federal regulators.)

In the meantime, the region's public and policy-makers should withhold their support of the MOX program, which would introduce unnecessary environmental and proliferation risks and complicate the job of plutonium disposition.

Dr. Arjun Makhijani is president of the Institute for Energy and Environmental Research in Takoma Park, Md. Dr. Ed Lyman is scientific director of the Nuclear Control Institute in Washington, D.C. Both participated in a roundtable discussion with The Herald's editorial board regarding the use of MOX fuel.

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LINDA GUNTER
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Opinion

The Herald
Sunday, March 28, 1999

2E

Jayne Speizer
Publisher

Terry C. Plumb, **Editor**
Richard R. Rassmann, **Managing Editor**
James Werrell Jr., **Opinion Page Editor**

The editorial opinion of The Herald is reached by consensus of a board consisting of Jayne Speizer, Terry Plumb, James Werrell, Rich Rassmann and Deborah Burniss, day news editor.

Our view

Let's take a closer look at MOX fuel proposal

In summary

◆ Opponents of plan raise disconcerting questions.

Last week, the U.S. Department of Energy gave the go-ahead to an international consortium led by Duke Energy to develop a plan for the use of weapons-grade plutonium in nuclear reactors. We worry that this plan is hurtling forward with virtually no attempt to educate the public about the potential hazards or to seek public reaction to the plan.

The use of what may be the most dangerous substance on the globe would occur at the Catawba Nuclear Station near Lake Wylie. It would be transported here overland from the Savannah River Site in Aiken County.

We have been reassured by Duke Energy officials and by others in the industry that the process is safe. They say it has been implemented successfully in Europe. And they point to an excellent safety record at Catawba and other nuclear plants in the consortium.

Proponents also maintain that providing a commercial use for plutonium will encourage other nations, notably Russia, with stockpiles of the material to use it in reactors. And, they say, unless plutonium is degraded in reactors, there is no way to keep it out of evil hands over its 100,000-year lifespan.

But others in the scientific community dispute both the safety claims and the efficacy of "burning" plutonium in nuclear plants to reduce stockpiles. These critics are not simply radical "anti-nuke" activists; they are doctors and scientists with the right credentials.

For example, Dr. Arjun Makhijani, who wrote a commentary that appears on the cover of today's Viewpoint section, is president of the Institute for Energy and Environmental Research. His Ph.D thesis was on controlled nuclear fusion, and he has served on an Environmental Protection Agency subcommittee on national radiation cleanup standards.

What both sides do agree on is the pressing need to render the nation's stockpile of plutonium to its least harmful state and keep it out of the hands of terrorists who could use it to build nuclear weapons. Where they disagree is over the best way to accomplish that.

The plan approved by the DOE last week calls for the plutonium to be turned into fuel that could be used in reactors. Mixed oxide fuel, commonly referred to as MOX, is made by mixing uranium oxide and plutonium oxide and placing the material in fuel "rods" for commercial use.

Rods would be shipped from the Savannah River Site by trucks or rail. Security details would be required to ensure the shipments weren't hijacked.

Industry officials say using MOX to generate electricity in nuclear plants would consume a significant portion of the plutonium and degrade the remainder, making it harder to use as a nuclear weapon. Eventually, they claim, this method would reduce the U.S. stockpile of surplus plutonium and help generate energy in the process.

Critics, however, claim, the conversion of plutonium to MOX fuel would produce hundreds of gallons of liquid radioactive waste. Furthermore, only a small portion of the plutonium is "burned" away in reactors and the fission process that occurs in the reactor actually creates more plutonium. And

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finally, used MOX fuel is much more radioactive and difficult to handle than normal uranium waste.

Opponents of the MOX program say the nation's weapons-grade plutonium should be encased in molten glass and stored in a secure area. Immobilization, they say, would be a quicker, less expensive and more efficient way to make this substance inaccessible.

Before buying industry claims that use of MOX fuel is both safe and economical, the public should demand answers to the concerns posed by opponents of this program. They claim that:

◆ An accident at a reactor using MOX fuel would pose a far greater danger of contamination and resulting cancer deaths of residents living near the plant.

◆ Transporting plutonium would be more difficult and dangerous than transporting uranium.

◆ Customers would enjoy no savings on fuel bills as a result of the use of MOX fuel.

◆ Workers at nuclear plants would be at higher risk.

◆ Commercial use of weapons-grade plutonium would encourage Russia and other nations to produce more plutonium.

◆ The bulk processing of plutonium would make it more difficult to account for the whereabouts of this dangerous material.

◆ An accident in which plutonium "went critical" would be more difficult to contain than one involving uranium fuel.

◆ The cost of refitting plants to accept MOX fuel would reduce or completely negate any savings in fuel costs.

These are just a few of the issues raised by opponents of the MOX fuel plan. Perhaps the Department of Energy and the nuclear power industry have answers for all of them.

To date, however, those answers have not been forthcoming. Nor has the industry offered to conduct forums to educate the public about its intention to use plutonium fuel. 1

Too much is at stake, especially for a community located so close to a nuclear power plant. The assurance that the Catawba Nuclear Station has a sterling safety record and that its engineers are convinced of the safety of this program is not enough.

The public needs to know more before it can endorse this controversial program.

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LINDA GUNTER
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SECC

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Statement of
Linda Gunter, Communications Director
Safe Energy Communication Council

Date: **June 22, 1999**
To: **United States Department of Energy,**
Office of Fissile Materials Disposition.

Overall, commercial nuclear power is already uneconomical, environmentally damaging and dangerous. Its future looks bleak. All new reactors ordered in the United States since 1974 have subsequently been canceled. No new reactors have been ordered since the accident at Three Mile Island 20 years ago. In fact, more than 100 reactors planned or under construction, have been canceled. In poll after poll, U.S. voters are clear: Americans want taxpayers' money spent on renewable energy options, not nuclear power, which already produces vast quantities of radioactive waste without a safe, permanent storage solution. This year, the Washington International Energy Group (WEIG), an industry think tank, released its **1999 Electric Industry Outlook** which found that 80 percent of utility CEOs and managers surveyed said no new nuclear power plants will be ordered in North America. In January, 1999, Steven Fleischman, Utilities Analyst for Merrill Lynch, predicted that no more nuclear reactors would be constructed in the U.S. Therefore, nuclear power has failed on Main Street, Wall Street and in the executive suites. 1

Using weapons plutonium – whose only purpose was supposed to be, and has hitherto been for bombs – in commercial reactors is even more uneconomical and even more dangerous. Furthermore, it is unnecessary. There is a safer, cheaper, faster alternative – immobilization – puts this dangerous material away forever. The U.S. Department of Energy (DOE) has agreed to immobilize up to 17 tons of surplus weapons plutonium, although we suspect the only reason is because it is unsuitable for Mixed Oxide fuel (MOX). However, the Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement acknowledges that all of the surplus weapons plutonium could be immobilized. 2

So why pursue MOX at all? Why run such needless security, environmental and health risks to support a program that will prop up a 3

–more–

Safe Energy Communication Council

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MR011

MR011–1 **Other**

DOE acknowledges the commentor's view that commercial nuclear power has a bleak future in the United States.

MR011–2 **Alternatives**

DOE acknowledges the commentor's opposition to the use of weapons-grade plutonium in MOX fuel and irradiating it in commercial reactors. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

DOE does not agree that the MOX approach is inherently more dangerous than the immobilization approach. DOE and NAS have conducted studies to compare risks, including the nuclear material security and proliferation risks of alternatives analyzed in this SPD EIS. These studies include the *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Materials Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), *Proliferation Vulnerability Red Team Report* (SAND97-8203, October 1996), *Management and Disposition of Excess Weapons Plutonium* (NAS, 1994), and *Management and Disposition of Excess Weapons Plutonium, Reactor-Related Options* (NAS, 1995). As discussed in Section 4.28.2.5, studies by NAS have led it to the following conclusion: "no important overall adverse impact of MOX use on the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities will involve factors not related to fuel composition and hence unaffected by the use of MOX rather than LEU fuel."

The environmental, safety and health consequences of the MOX approach at the proposed reactors are addressed in Section 4.28. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and domestic, commercial reactors selected to use MOX fuel, to ensure adequate margins of safety.

As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach would be more expensive than the immobilization-only approach. However, as discussed, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing either approach by itself.

Operation of the proposed surplus plutonium disposition facilities is expected to take approximately the same amount of time for either the immobilization-only approach or the hybrid approach. The difference in timing for the hybrid approach is associated with the amount of time that MOX fuel would be irradiated in domestic, commercial reactors.

MR011–3 **Nonproliferation**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

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Statement from Linda Gunter, SECC
June 22, 1999
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mature industry rapidly going the way of the dinosaurs? The DOE's response so far has been that we should address these concerns to the Nuclear Regulatory Commission (NRC). SECC asked questions specifically about security issues at a recent NRC public meeting. We were referred to a second NRC meeting the following week where, we were assured, security would be at the top of the agenda. But at that subsequent meeting we were told in no uncertain terms right at the start that we would not be allowed to ask questions, nor would we be permitted to make statements. Furthermore, not only was security not at the top of the agenda, it wasn't on the agenda at all. So much for the myth of an open, thorough public hearing process at the NRC. 4

Again we ask, why pursue the MOX option? Let us not be fooled by the Duke-Cogema-Stone & Webster (DCS) Consortium's assertions that it is for the good of the country and the noble cause of non-proliferation. Using MOX will end non-proliferation as we know it and increase the risk of nuclear-weapon proliferation by countries and, more seriously, by terrorist organizations. 3 In reality, DCS is endorsing the MOX program for the usual reason – money. Its utilities, Duke Power and Virginia Power, will be paid to use MOX, which is the only way it is financially feasible for them. And who will have to shoulder the burden of this handout? We, the people. The American taxpayer. 5

We urge the DOE to abandon this needless waste of government time and public money on the MOX program. The Department should instead focus on immobilization and safe storage while allowing the nuclear power industry to continue in the direction in which it is already appropriately proceeding, toward an orderly phaseout. 2

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MR011

In order to address security against terrorist-related incidents, all intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications equipment and additional couriers. Further, DOE does not anticipate the need for any additional security measures at reactor sites, other than for the additional security applied for the receipt of fresh fuel. Commercial reactors currently have armed security forces, primarily to protect against perimeter intrusion. There would be increased security for the receipt and storage of fresh MOX fuel, as compared with that for fresh LEU fuel, for additional vigilance inside the perimeter. However, the increased security surveillance would be a small increment to the plant's existing security plan. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a geologic repository built in accordance with the NWPA.

MR011–4 General SPD EIS and NEPA Process

NRC's public outreach policies are beyond the scope of this SPD EIS, however, since the inception of the U.S. fissile materials disposition program, DOE has supported a vigorous public participation policy. All interested parties would likely have the opportunity to submit comments during the NRC reactor license amendment process should the MOX approach be selected.

MR011–5 MOX Approach

The MOX approach is not intended to affect the viability of nuclear power generation at any particular reactor. DCS would not have to continue to use MOX fuel if it determined that it was uneconomical to operate the reactor. Furthermore, DCS would only be reimbursed for costs solely and exclusively related to the MOX fuel irradiation. This would ensure that the taxpayers were not underwriting otherwise uneconomical electricity-generating assets.
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WOMEN'S ACTION FOR NEW DIRECTIONS
ANN OBER
PAGE 1 OF 7

Good Morning
My name is Ann with WAND -- Women's Action for New Directions, a national organization educating women to act politically. We also represent women state
legislators in all 50 states through our project Women Legislators Lobby (WiLL).

WAND was founded in 1980 as Women's Action for Nuclear Disarmament and has
worked toward nuclear arms reductions for nearly 20 years. We are encouraged
that at long last some nuclear weapons are being dismantled -- we hope there are many more to come. We also support the goals of the Clinton Administration
and the Department of Energy to dispose of the plutonium from these weapons in
such a way that they may never again be used in a weapon of mass destruction. 1

We are deeply concerned, however, with the DOE's approach to plutonium disposition and strongly disagree that converting some plutonium into fuel for
commercial power plants is the proper way to proceed. We feel the full balance
of the 50 tons of declared surplus plutonium should be immobilized and isolated
from the environment for safety, environmental, and proliferation reasons.

Fabricating MOX fuel and using it in commercial reactors in South Carolina, North Carolina and Virginia will require unnecessary and excess transportation
of plutonium, primiarly across the southeastern United States. WAND has active grassroots members and state legislators in these primary states. 2

While we hear repeated assurances that the plutonium will be transported "safely," it is important to remember that ANY shipment of plutonium involves
risk, and the MOX option maximizes that risk.

DCR009

DCR009–1 **Alternatives**

DOE acknowledges the commentor's opposition to converting some of the surplus plutonium into MOX fuel and irradiating it in commercial reactors. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The safety, health, and environmental consequences of the MOX approach at the proposed reactors are addressed in Section 4.28. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and domestic, commercial reactors selected to use MOX fuel, to ensure adequate margins of safety.

DOE and NAS have conducted studies to compare risks, including the nuclear material security and proliferation risks of alternatives analyzed in this SPD EIS. These studies include the *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Materials Storage and Excess Plutonium Disposition Alternatives* (DOE/NN-0007, January 1997), *Proliferation Vulnerability Red Team Report* (SAND97-8203, October 1996), *Management and Disposition of Excess Weapons Plutonium* (NAS, 1994), and *Management and Disposition of Excess Weapons Plutonium, Reactor-Related Options* (NAS, 1995).

DCR009–2 **Transportation**

DOE has considered the inherent risks, including terrorist concerns, associated with transporting plutonium materials. While DOE prefers to minimize the transportation of plutonium that is still desirable for weapons use, plutonium is routinely and safely transported in the United States. As described in Appendix L.3.3, transportation of nuclear materials would be

performed in accordance with all applicable DOT and NRC transportation requirements. Interstate highways would be used, and population centers avoided, to the extent possible.

All shipments of surplus plutonium that have not been converted to a proliferation-resistant form would be made by DOE's SST/SGT system, as described in Appendix L.3.2. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material.

The MOX option also maximzes cost, waste generation, and potential worker
exposure to plutonium as it involves far more processing than the immobilization option. It will require the construction of a MOX Fabrication
Factility at the Savannah River Site, which is already highly contaminated and
has will take many decades to clean up, if it can, in fact, ever be cleaned up. 3

We are particularly concerned about the impact of the use of MOX in commercial
reactors on the surrounding communities. The people living near these reactors,
who will not have the benefit of speaking directly on this matter as DOE has refused to hold hearings in their communities, will bear the brunt of any accident involving MOX fuel. Yet they have not been adequately informed of the
risk they are being asked to take on. 4

WAND represents women legislators and grassroots activists living within 50 miles of these
reactors. [[[Kim: reactor locations are: McGuire reactor, 10 miles north of Charlotte, NC; the Catawba reactor, about 6 mi. south of Charlotte; and the North Anna reactor in Mineral, VA, kind of between Richmond and Fredericksberg. Can you find members in these areas?]]]

They are concerned, as we are, that:

* a severe accident at one of these reactor sites using MOX fuel, would result in far greater consequences with many more deaths and injuries than if such an accident
occurred with conventional uranium fuel.

* using MOX fuel in the reactor will cause embrittlement and premature
aging of the reactor, compromising safety 5

*since MOX fuel is made from WEAPONS plutonium (and not commercial

DCR009

DCR009–3 **MOX Approach**

As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach would be more expensive than the immobilization-only approach. However, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing either approach by itself as discussed in response DCR009–1.

Cleanup at SRS is a priority, will remain a priority, and can coexist with other DOE initiatives. The surplus plutonium disposition program would be conducted in a way which ensures that cleanup remains a priority at SRS and that the production of any additional waste is processed and disposed of in a timely and environmentally acceptable manner.

As described in Chapter 4 of Volume I and summarized in Section 2.18, potential impacts of any of the proposed activities during routine operations at any of the candidate sites would likely be minor. To avoid contamination that has occurred in the past at some DOE sites, DOE would design, build, and operate the proposed surplus plutonium disposition facilities in compliance with today's environmental, safety, and health requirements. Furthermore, any accidental releases would be promptly addressed following established policies and procedures by trained personnel.

DCR009–4 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concern that the people living near the proposed reactors that would use MOX fuel are not getting to speak directly on this matter in a public hearing held in their community. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. DOE provided other means for the public to express their concerns and provide comments. Also, at the invitation of South Carolina State Senator Phil Leventis, DOE attended and participated in a public hearing held on June 24, 1999, in Columbia, South Carolina.

The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

For those interested parties who could not attend the hearing on the *Supplement* held in Washington, D.C., on June 15, 1999, DOE provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how or where they were received.

DCR009–5 **Facility Accidents**

While it is understood that there are differences from the use of MOX fuel versus LEU fuel, these differences are not expected to change the frequency of severe accidents in MOX-fueled reactors. Because differences between MOX fuel and uranium fuel are well characterized, they can be accommodated through fuel and core design. Before any MOX fuel is used in the United States, NRC would have to perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications.

Reactor vessel embrittlement is a condition in which the fast neutron fluence from the reactor core reduces the toughness (fracture resistance) of the reactor vessel metal. Analyses performed for DOE indicated that the core average fast flux in a partial MOX fuel core is comparable to (within 3 percent of) the core average fast flux for a uranium fuel core. All of the mission reactors have a comprehensive program of reactor vessel analysis and surveillance in place to ensure that NRC reactor vessel safety limits are not exceeded.

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plutonium) it is therefore an experimental fuel --and neither DOE, Duke Energy,
Virginia Power, Cogema, nor any other DOE subcontractor have a full understanding of how this fuel will behave in a reactor. The fact is, it has never before been used on a commercial scale and tests done at the labroatory
scale indicate we have much, much more to learn about this volitile fuel. 5

* MOX fuel made from weapons plutlonium will make the reactor harder to
control safely. We know "it can be done," but we also know the margin of safety is narrowed with the use of MOX fuel.

* the nuclear industry will receive huge, as-yet undisclosed subsidies and incentive fees for its participation in this program. 6

*storage of MOX fuel at reactor sites will be a security problem, as plutonium in MOX fuel can be extracted fairly easily and used in a weapon, making it very attractive to steal. Reactor sites are not set up to handle this kind of security situation.

* We are also concerned about plutonium fuel transportation and the impact on our communities and our children of heavily armored vehicles carrying
plutonium fuel moving through our town's streets and highways. 7

At the very least, communities that must face these risks should have the opportunity to speak for themselves and ask questions to you directly about this risky program. We are dismayed that you have robbed them of that chance. 4

We also feel the MOX program is costly and dangerous, puts people at risk unnecessarily, and undermines the efforts of WAND and so many others to reduce
the threat of nuclear weapons in the world. Your plan would provide the funds
and infrastructure for a plutonium economy, which only worsens environmental
and nuclear proliferation problems. It is particularly troubling that you are 8

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Section 4.28.2.5 provides a discussion of the analysis of several reactor accidents including both design basis and beyond-design-basis accidents. For MOX fuel, as compared to LEU fuel, there is an increase in risk, about 3 percent, for the large-break loss-of-coolant accident (the bounding design basis accident). The largest increase in risk for beyond-design-basis accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. In the unlikely event this beyond-design-basis accident were to occur, the expected number of LCFs would increase from 2,980 to 3,390 with a partial MOX core and prompt fatalities would increase from 54 to 60. Both of these accidents have an extremely low probability of occurrence. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48,000 per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

The fabrication of MOX fuel and its use in commercial reactors has been accomplished in Western Europe. This experience would be used for disposition of the U.S. surplus plutonium. Electricité de France reactors in France have seen little or no impact from the use of MOX fuel on radionuclide releases in effluents. No change would be expected from normal operations, given that MOX fuel performs as well as LEU fuel and the fission products are retained within the fuel cladding. FRAGEMA's (a subsidiary of COGEMA and FRAMATOME) experience with fabricating MOX fuel indicates a leakage rate of less than one-tenth of 1 percent. FRAGEMA has provided 1,253 MOX fuel assemblies, with more than 300,000 fuel rods for commercial reactor use. There have been no failures and leaks have occurred in only 3 assemblies (a total of 4 rods). All leaks occurred as a result of debris in the reactor coolant system and occurred in 1997 or earlier. French requirements for debris removal were changed in 1997 to alleviate these concerns. Since that time, there have been no leaks in MOX fuel rods. Further, as discussed in response DCR009–1, NRC would evaluate license applications and monitor the operations of the commercial reactors to ensure adequate margins of safety.

DCR009–6 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this

WOMEN'S ACTION FOR NEW DIRECTIONS
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pursusing this option when a cheaper, safer, more environmentally sound option
exists that does not encourage plutonium use and production in the US, Russia
and beyond. We implore [encourage? you to discard the MOX option and immobilize
all surplus plutonium as quickly and safely as possible. 8

Thank you for considering our comments.
=====

DCR009

proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

DCR009–7 **Nonproliferation**

DOE does not anticipate the need for any additional security measures at reactor sites, other than for the additional security applied for the receipt and storage of fresh fuel. Commercial reactors currently have armed security forces, primarily to protect against perimeter intrusion. There would be increased security for the receipt and storage of fresh MOX fuel, as compared with that for fresh LEU fuel, for additional vigilance inside the perimeter. However, the increased security surveillance would be a small increment to the plant's existing security plan. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a geologic repository built in accordance with the NWPA.

In order to address security against terrorist-related incidents, all intersite shipments of plutonium for the surplus plutonium disposition program would be made using DOE's SST/SGT system. This involves having couriers that are armed Federal officers, an armored tractor to protect the crew from attack, and specially designed escort vehicles containing advanced communications equipment and additional couriers.

The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of

shipments that would be required, by location, has been included in Appendix L. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

DCR009–8 **DOE Policy**

DOE is not advocating a plutonium economy. Rather, as discussed in response DCR009–6, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel) and therefore does not support building a plutonium economy.

The remainder of this comment is addressed in response DCR009–1.

CATHOLIC WORKER HOUSE OF HOSPITALITY
DON TIMMERMAN
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CATHOLIC WORKER HOUSE
OF HOSPITALITY

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US Dept. of Energy
Office of Fissile Materials Disposition
PO Box 23786
Washington DC 20026-3786

6-8-99

Dear Friends,

There is no real reason for dealing with deadly plutonium. There are alternative sources of energy that can be used for our energy. One of the problems is that corporations cannot make money on these alternative sources of energy. This, of course, is the reason why we do not adopt these sources. 1

The problem with radioactive waste, the product of plutonium, is that we still do not have a safe and adequate way of storing the waste. We are not leaving much of a future for our children and their children with this constant use of plutonium as a source of energy. 2

Unless we take the time, effort and cost of using alternative forms of energy other than plutonium there will be a slow and painful death for most Americans. You have the choice. You either give in to the corporations and continue to use plutonium or help to save lives with alternative sources of energy. 1

Thank you for your attention.

Sincerely,

Don Timmerman

MR004

MR004–1 Purpose and Need

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Use of MOX fuel is not proposed as an alternative energy source nor in order to subsidize the commercial nuclear power industry.

The issue of spending the time and resources to develop alternative forms of energy is beyond the scope of this SPD EIS.

MR004–2 Repositories

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. The immobilized plutonium and MOX spent fuel are included in the inventory analyzed in that draft EIS should the decision be made to proceed with the hybrid or immobilization-only approaches.

The public doesn't need the plutonium in the reactors in Mecklenberg County. We have enough pollution. I would like to see my grandchildren grow up without cancer from the plutonium in the air. 1

The U.S. Department of Energy (DOE) presumes in this environmental impact statement (EIS) that anything meeting the regulatory requirements is justified. Yet the International Commission on Radiological Protection, in the formation of its recommendations on allowable exposures, states that one must come up with a justification for a practice first, then find out if it meets the regulations. This means that a standard or regulation cannot be used as the justification, yet that is all the public is given. The public cannot be expected to compare what happens in different reactors using different fuels and what are the outcomes. 2

I find it very interesting that the litany of concerns I have raised in previous meetings is almost quoted in the sections on process materials, but without supporting data and analysis. There is, moreover, no mention of nuclear laundries in terms of a comparison for fission products. Are those products increased in a laundry that is serving a plutonium fuel reactor or not? Questions such as these are basic; they relate to information the public has a right to know but has not received. That tritium is elevated is something that I have heard, but I can't go anywhere in this document and find that. 3

WASHDC–1 **Reactors**

Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel. There would be no expected releases of plutonium from the proposed reactors occurring from normal operating conditions. Annual doses to an MEI at each of the plants are estimated to be small—i.e., McGuire, 0.31 mrem; Catawba, 0.73 mrem; and North Anna, 0.37 mrem. All of these doses fall within stringent NRC 10 CFR 20 and 10 CFR 50 regulatory requirements and are much lower than radiation annually received from natural background sources.

WASHDC–2 **Human Health Risk**

In Volume I the need for the proposed actions are summarized in Chapter 1. Within this chapter the "justification behind the proposed actions" is discussed in detail. Subsequently, in Chapter 4, analytical results are presented which are then compared against radiation protection standards. In essence, this approach is parallel with ICRP recommendations.

Section 4.28 presents an analyses of the impacts expected if MOX fuel were used in the proposed reactors. In the case of accidents, there are direct comparisons of the impacts of a partial MOX fueled reactor versus a traditional LEU core. Also doses from normal operations of the proposed reactors are compared to the current doses as presented in the affected environment section in Chapter 3 of Volume I.

WASHDC–3 **Human Health Risk**

Under normal operating conditions, it is not expected that there would be any change in nuclear laundries due to the use of MOX fuel at the proposed reactors. The laundries could be affected in either of two cases. If there were a fresh fuel assembly received at the reactor sites that had a cladding defect and contamination on the outside of a rod, the anti-contamination clothing would have a higher alpha-contamination with MOX fuel than it would with LEU fuel. However, since the cladding is sealed and inspected as a pressure boundary at the MOX facility prior to shipment and the fuel is transported in specifically designed packages, the likelihood that a rod would be ruptured

I am concerned as to the clear and present danger of this material. I am concerned about my grandchildren. We can spend a lot of time arguing about this. As I see it, however, we have to do something with this material other than store it. We need to put this material in a form that makes it unavailable for weapons use. The United States is not talking about reprocessing the spent fuel; it is talking about doing something with the separated plutonium. I have not heard any positive editorials read today, although some people have expressed agreement with use of the North Anna plant. 4

This process is reprehensible. It is clear that the main driver of the dual-track approach is access by nuclear corporations to taxpayer dollars. The decision had been made well before it was announced. This makes people mad—not only people in the communities of the reactors but also those giving their taxpayer dollars. Taxpayers do not want to have to give money to the largest debiting corporations in the world; they see the main issue as not that this program is better or that it accomplishes its goals, but that nuclear corporations need money. 5

when received at the reactor sites is remote. The other case that could result in a different radioisotopic inventory is if a MOX fuel rod failed in service and a different radioisotopic inventory were communicated to the reactor purification system and then this was somehow communicated to a worker's protective clothing. Both Virginia Power Company and Duke Power Company use onsite laundries for re-usable anticontamination protective clothing. The laundry water is filtered and then released in accordance with effluent release regulations and site permits. Alpha contamination, indicating the presence of actinides, is very low and far below regulatory limits. The same condition is expected to hold true for partial MOX fuel cores.

As shown in Table K–27, by the end of core life, the presence of tritium is expected to decrease by 5 percent when a partial MOX core is used.

WASHDC–4 **Purpose and Need**

DOE acknowledges the commentor's concern regarding the clear and present danger of surplus plutonium. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

WASHDC–5 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective

It is clear DOE can't meet its obligations, in particular the obligation to hold full and open public hearings. The local community will not have the information it needs if you don't talk to them. 6

I have a question about storage of plutonium at the Savannah River Site (SRS). I have heard that DOE is deferring construction of the Actinide Processing and Storage Facility (APSF) facility at SRS. I understand that plutonium would be stored in the K-Reactor building. If this program turned out to involve longer-term storage and the mixed oxide (MOX) fuel program did not go forward, could the goal of long-term storage be accomplished by the K-Reactor building alone—that is, without a dedicated facility? 7

value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract.

DOE has identified as its preferred alternative the hybrid approach for the disposition of U.S. surplus plutonium, it is not a decision. Decisions on the surplus plutonium disposition program will be made in the SPD EIS ROD based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input.

WASHDC–6 General SPD EIS and NEPA Process

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. Efforts were made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. The *Supplement to the SPD Draft EIS* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Additionally, various means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue. It is DOE policy to encourage public input into these matters of national and international importance.

WASHDC–7 Alternatives

In August 1998, DOE amended the *Storage and Disposition PEIS* ROD to allow for the receipt and storage of non-pit, surplus weapons-usable plutonium at SRS, in advance of the completion of APSF. If DOE selects SRS

Have the problems with Defense Waste Packaging Facility processing material caused the Office of Fissile Materials Disposition to rethink the immobilization technique? 8

as the immobilization site in the SPD EIS ROD, current plans are to ship material from RFETS to SRS and store it in shipping containers in Building 105–K (K Reactor) beginning in about 2000; material from Hanford would be shipped to SRS and stored in APSF. Before storage, the material would first be stabilized and packaged for long-term storage in accordance with DOE Standard-3013-96, *Criteria for Preparing and Packaging Plutonium Metals and Oxides for Long-Term Storage.*

Building 105–K is currently undergoing modifications to provide for the safe, secure storage of the RFETS surplus plutonium per decisions made in the amended *Storage and Disposition PEIS* ROD. These modifications include upgrades to safeguards and security features, installation of criticality monitoring devices, and removal of unused process equipment. DOE would also expand APSF, as planned in the *Storage and Disposition PEIS* ROD, to accommodate the storage of Hanford surplus plutonium pending disposition. Should DOE decide to build and operate APSF at SRS, a portion of the RFETS material could be transferred from Building 105–K to APSF in order to provide for operational flexibility. If APSF is not built, the development of additional storage space in Building 105–K or in other DOE facilities could be necessary in order to provide for storage of the balance of surplus plutonium materials; such an action would only be done after an appropriate NEPA review was completed.

WASHDC–8 **Alternatives**

DOE is presently considering a replacement process for the in-tank precipitation (ITP) process at SRS. The ITP process was intended to separate soluble high-activity radionuclides (i.e., cesium, strontium, uranium, and plutonium) from liquid HLW before vitrifying the high-activity fraction of the waste in DWPF. The ITP process as presently configured cannot achieve production goals and safety requirements for processing HLW. Three alternative processes are being evaluated by DOE: ion exchange, small tank precipitation, and direct grout. DOE's preferred immobilization technology (can-in-canister) and immobilization site (SRS) are dependent upon DWPF providing vitrified HLW with sufficient radioactivity. DOE is confident that the technical solution will be available at SRS by using radioactive cesium from the ion exchange or small tank precipitation process. A supplemental EIS (DOE/EIS-0082-S2) on the operation of DWPF and associated ITP alternatives is being prepared.

Will any expected failures of the fuel rod process be considered in the licensing process? | 9

Is there any known analysis of the radionuclide profile of low-level waste (LLW) generated during operations with plutonium fuel at the proposed reactors? | 10

WASHDC–9 **MOX RFP**

FRAGEMA's (a subsidiary of COGEMA and FRAMATOME) experience with fabricating MOX fuel indicates a leakage rate of less than one-tenth of 1 percent. FRAGEMA has provided 1,253 MOX fuel assemblies, with more than 300,000 fuel rods for commercial reactor use. There have been no failures and leaks have occurred in only 3 assemblies (a total of 4 rods). All leaks occurred as a result of debris in the reactor coolant system and occurred in 1997 or earlier. French requirements for debris removal were changed in 1997 to alleviate these concerns. Since that time, there have been no leaks in MOX fuel rods.

WASHDC–10 **Waste Management**

No, there are not any current analyses of the radionuclide profile of LLW generated during operations with MOX fuel at the proposed reactors. There are differences in fission product inventories and activation products between an LEU and MOX core during a fuel cycle. However, the only time significant quantities of fission products could be released to the environment or end up in LLW would be in the event of a large-scale fuel leak. In regard to normal operations, FRAGEMA's (a subsidiary of COGEMA; one of the companies chosen to operate the proposed MOX facility) experience with fabricating MOX fuel indicates a leakage rate of less than one-tenth of 1 percent. FRAGEMA alone has provided 1,253 MOX fuel assemblies, with more than 300,000 fuel rods for commercial reactor use. As previously discussed, there have been no failures and leaks have occurred in only 3 assemblies (a total of 4 rods). FRAGEMA has also produced 43,826 LEU assemblies over the years and has experienced leaks in only 471 assemblies.

The use of MOX fuel would not be expected to result in any additional LLW from refuelings because the reactors would continue to operate on the same schedule as if they were using only LEU fuel. Before any LLW would be shipped from the reactors to a disposal site, analyses would be performed to ensure that the concentrations of radioisotopes fall within regulatory limits. All of the proposed reactors will continue to operate within stringent NRC (10 CFR 20) radionuclide release and dose requirements.

Because radioisotopic profiles are linked to fuel rod failure, any additional information on such failure in other countries would be helpful. 11

In regard to high-level nuclear waste repositories, what differences are known to exist between low-enriched uranium (LEU) fuel and MOX fuel at the point where they become what we call high-level nuclear waste? It seems to me that there is not enough information on such waste and its effects on the program? 12

On page K–3 of the EIS, the curium 244 fraction is given as 0.94, when it should be over 2. Also, the chart shows no delayed neutron precursors, in particular those of the bromine series; they should be added. The chart also does not show all of the reactor poisons, specifically samarium, nor all fission product gases. The buildup of these gases could lead to a bursting of the fuel rods. The tritium fraction should also be included, as should any other fraction of gases produced in quantity. 13

WASHDC–11 **Facility Accidents**

This comment is addressed in response WASHDC–10.

WASHDC–12 **Repositories**

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository. As described on page 2–2 of the *Yucca Mountain Draft EIS*, immobilized plutonium and MOX spent fuel generated by the surplus plutonium disposition program are included in the inventory analyzed in that draft EIS should the decision be made to proceed with the hybrid or immobilization-only approaches. Section A.2.4.5.1 of the *Yucca Mountain Draft EIS* describes the expected material characteristics of MOX spent fuel from the surplus plutonium disposition program including: mass and volume, amount and nature of radioactivity chemical composition, thermal output, and physical parameters. Section A.2.1.5 describes similar characteristics for commercial LEU spent fuel.

WASHDC–13 **Facility Accidents**

The curium 244 inventories shown in Appendix K were extracted from the output for the ORNL Isotope Generation and Depletion Code (ORIGEN) cases. Because the rate of curium 244 production is strongly dependent on burnup, it has a higher inventory level in LEU assemblies that are left in the reactor for three cycles than MOX assemblies that are left in the reactor for a maximum of two cycles. As a result, at the end of a cycle the ratio of curium 244 in a 40 percent MOX core would be about 6 percent lower than the ratio of curium 244 in an LEU core because more of the LEU core would be made up of assemblies that have been used for three cycles (33 percent of the core versus 20 percent of the core for the proposed MOX core).

It is true that burnups of 40 GWD/t or more result in higher fission gas production than LEU fuel at the same burnup. However, this does not automatically result in higher doses from reactors operating with MOX fuel. MOX fuel assemblies are engineered to accommodate this additional gas. In the event of a leaker, the gas is released into the reactor coolant and scrubbed through a series of filters that capture nearly all of the radionuclides so that any impact on dose would be expected to be small. Appropriate MOX fuel burnup limits would be established in concert with NRC following a thorough safety review. It should be noted that reactors in Belgium and Germany typically use MOX fuel to burnups between 45 and 50 GWD/t and that while current French burnup limits are lower than that, French burnup limits for LEU fuel are also lower than those for U.S. reactors.

This SPD EIS analyzes offsite consequences and risks in terms of LCFs and/or prompt fatalities. Previous studies have determined that certain radioisotopes are primary contributors to offsite consequences due to their effects on humans and the environment. These radioisotopes are included in Table K–27. Radioisotopes bromine 87 through bromine 91 and iodine 137 through iodine 141 are not included in Table K–27 because they are not significant contributors to offsite consequences. Bromine 87 through bromine 91 and iodine 137 through iodine 141 are delayed neutron precursors with half-lives of less than 1 minute. They were included along with the hundreds of other isotopes in the ORIGEN analysis done to support this EIS.

Xenon 135, the most important reactor poison, with a thermal absorption cross-section 60 times greater than samarium 149 is included in Table K–27. Samarium 149, a stable (nonradioactive) isotope, is not included because it is not a significant contributor to offsite consequences.

Tritium is a significant contributor to offsite consequences. The MOX/LEU ratio for tritium was calculated to be 0.95. Since this value is lower for the MOX core than an LEU core, the current analysis is conservative with respect to tritium.

WASHINGTON D.C.
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I have a real objection to similar statements presented on pages 33 and K–2. The statement on page 33 reads as follows: "Although it has been suggested that the frequency of these accidents would be higher with mixed oxide fuel, no empirical data is available to support this." I have been trying to give you this information, the use of MOX fuel would involve a lower delayed neutron fraction; faster neutrons due to the higher thermal neutron absorption cross-section of plutonium, meaning a higher average neutron speed and thus both a reduction in control rod worth (a safety impact) and a shorter reactor period; different temperatures coefficients of reactivity; and more gas production, thus higher releases. 14

In Section 4.28.2.1 (page 31) of the EIS, it is stated that the estimated air pollutants resulting from operation of the proposed reactors would not be expected to increase due to the use of MOX fuel. It is my understanding that the gas production of MOX fuel is much higher—not just tritium, but also xenon and krypton—so I would assume that statement to be incorrect. I would like for you to respond to that. 15

WASHDC–14 **Facility Accidents**

The commentor states that MOX fuel will have a lower delayed neutron fraction, harder neutron spectrum, lower control rod worth, a shorter reactor period, different reactivity coefficients, and higher gas generation rate. These are all factual statements. These parameters require that the nuclear core designers accommodate these differences using verified and validated codes that incorporate these affects. Such nuclear codes have been used successfully in Europe and would be adopted and utilized by fuel designers in the United States. Before any MOX fuel is used in the United States, NRC would have to perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications pursuant to 10 CFR 50.

WASHDC–15 **Air Quality and Noise**

Section 4.28.2.1 discusses nonradiological air impacts of the proposed irradiation of MOX fuel. Radiological impacts are discussed in Section 4.28.2.4 which indicates that the radiation dose to the general public from normal operations would not be expected to change with the use of MOX fuel in the selected reactors.

For normal operating conditions, the emissions are the same. The only emission stream that might result from using MOX fuel that would result in a different radioisotopic mix than LEU fuel occurs in the event that there is a MOX fuel failure, in which there is an emission pathway from the core. Given the history and integrity of fuel, a failure may never occur during the limited fuel campaign to get rid of surplus plutonium. Notwithstanding, if there were a MOX fuel failure, the effect on the radioisotopic inventory in emissions would be practically indistinguishable because: (1) the inventories in MOX and LEU fuel are similar (as shown in Table K–27), and (2) the contribution of fuel failures to the total emissions from the reactor is small (other contributions to the site's effluents dominate).

In the last public meeting in Amarillo, I asked what exactly the temperature fuel coefficient of reactivity response curve is. I received no response, so I submitted a card again. 16

Plutonium has a lower melting point, which will reduce safety; the higher decay heat of spent nuclear fuel would seem to increase the likelihood of a waste accident; and concerns as to the criticality of MOX fuel in storage would appear to justify greater concern as to the risks of spent MOX fuel in storage. 17

WASHDC–16 **Facility Accidents**

DOE is unsure what the commentor means by "temperature fuel coefficient of reactivity." DOE suspects that the commentor is interested in either the Doppler coefficient or the moderator temperature coefficient. For core designs similar to the ones DOE expects at the mission reactors, DOE has some illustrative data to provide. Moderator temperature coefficients are more negative for MOX cores than LEU cores. The beginning of life value for an "equilibrium MOX core" is approximately -12 pcm/F, which is more than twice as negative as the LEU number, which is about approximately -5 pcm/F. The temperature coefficient becomes more negative as a function of burnup and approximately linearly changes as a function of burnup until a burnup of approximately 20 GWD/t with a value of approximately -35 pcm/F. At this burnup, the coefficients for MOX and LEU merge and are approximately the same. (ANRCP-199-1, *Disposition in Weapons-Grade Plutonium in Westinghouse Reactors*, March 1998.) In the original question related to Doppler coefficient, DOE has an illustrative estimator of the parameter from *The Plutonium Disposition Study, Implementation of Weapons-Grade MOX Fuel in Pressurized Water Reactors* (Westinghouse Electric Corporation, August 30, 1996). At 100 percent power, the coefficient for an "equilibrium" MOX core is approximately -8.5 pcm/ percent-power which is slightly more negative than an LEU core at approximately -7.7 pcm/percent-power. These numbers are extracted from design studies performed under contract or grant from DOE for representative Westinghouse cores and may not be precise indicators for the actual mission reactors or mission fuel cycles. These more negative temperature coefficients would act to shut the reactor down more rapidly during a heatup transient.

WASHDC–17 **Facility Accidents**

The plutonium in MOX fuel would be present as plutonium dioxide in ceramic-like fuel pellets, not elemental plutonium. Plutonium dioxide has a significantly higher melting point than pure plutonium metal. In any case the melting point of MOX fuel would be within the specifications for that type of reactor fuel.

Initially, when spent fuel is removed from the reactor, the MOX and LEU fuel would be about the same temperature and exhibit similar characteristics.

I was glad to see that the *Supplement* does not suggest, as original data suggested, that health effects go down—that is, that plutonium is good for local communities. However, I don't see any reflection of the information received at the Canadian meeting a month ago. At that meeting, the head of the regulating body acknowledged that alpha radiation may in fact have a quality factor of 2,000, not 20, which is what the U.S. Nuclear Regulatory Commission (NRC) provides for us. Credible work shows that the presence of plutonium in a reactor would double the impacts of a reactor accident. There are, however, no voices from the communities to let you know how they feel. 18

After about a year out of the reactor, however, the temperature of MOX spent fuel would exceed that of LEU fuel of the same age. Therefore, storage of MOX spent fuel would increase the thermal loading in a spent fuel pool over that for only LEU fuel. However, thermal load limitations are based on the amount of cooling that the entire spent fuel pool can accommodate, not on individual fuel assemblies within the pool. Therefore, the additional heat load would be accounted for in the calculations for the reactor spent fuel management plans.

Although the amount of fissile material would be higher in MOX spent fuel rods than in LEU spent fuel rods, rod spacing and boron content in the spent fuel pools would be adjusted as necessary to maintain criticality safety.

WASHDC–18 **Facility Accidents**

The latest published version of 10 CFR 20.1004 (January 1, 1999) states that the quality factor for alpha particles is 20. This regulatory criteria (10 CFR 20) is established by NRC, and is therefore the official benchmark from which U.S. nuclear utilities are continually governed in the realm of radiation protection.

This SPD EIS analyzed several reactor accidents, including both design basis and beyond-design-basis accidents. For MOX fuel, as compared to LEU fuel, there is an increase in risk, about 3 percent, for the large-break loss-of-coolant accident (the bounding design basis accident). The largest increase in risk for beyond-design-basis accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. In the unlikely event this beyond-design-basis accident were to occur, the expected number of LCFs would increase from 2,980 to 3,390 with a partial MOX core and prompt fatalities would increase from 54 to 60. Both of these accidents have an extremely low probability of occurrence. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48 thousand per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

Efforts were made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. The *Supplement to the SPD Draft EIS* was mailed to those stakeholders who requested it as well as

When the dual track was announced, I asked if anyone had looked into the impacts of reactor irradiation of plutonium fuel on the LLW from reactor operations, and the resulting impacts on the destination of that LLW, the low-level radioactive waste dump. An example would be the impact on Ward Valley of a waste stream from Palo Verde. Ward Valley has not been designated as an LLW site but could well be within the time allotted. A major concern as to Ward Valley is how much plutonium would be going into the site and whether it would jeopardize the Colorado River. Government officials and the citizens of South Carolina are concerned that Barnwell is leaking. 19

There is a need for analysis of DOE's new—and currently contested—standard on the release of contaminated metals to consumer products. What about effects of the release of metals from facilities using MOX rather than LEU fuel on consumer products developed from recycled metals? The public doesn't have the information it needs on this matter. 20

to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. DOE provided various means for the public to express their concerns and provide comments: public hearing, mail, a toll-free telephone and fax line, and the MD Web site. Further, the communities near the proposed reactors and all other interested parties will likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

WASHDC–19 **Waste Management**

As described in Section 4.28.2.2, the volume of LLW generated at the reactor sites is not expected to increase as a result of the reactors using MOX fuel. There are differences in fission product inventories and activation products between an LEU and MOX core during a fuel cycle. However, as discussed in response WASHDC–10, the only time significant quantities of fission products could be released to the environment or end up in LLW would be in the event of a large-scale fuel leak. The amount of radioactivity that can be received at commercial LLW disposal sites is determined through the NRC licensing process for the particular site (e.g., Barnwell). This licensing process considers potential impacts on the environment near the disposal unit. Reactor wastes are only accepted if they meet the waste acceptance criteria of the disposal site. The LLW generated at the proposed reactors that would use MOX fuel is expected to meet the waste acceptance criteria.

WASHDC–20 **Waste Management**

The reactors proposed for MOX fuel irradiation would not be operated by DOE. The reactors would continue to be operated by the utilities and regulated by NRC. Eventual D&D of the reactors, which may include recycling of metals, would be performed by the utilities in accordance with NRC regulations in force at that time. However, it is premature to assume that scrap metal at the reactors would be recycled as part of D&D.

I would like to see a table comparing the wastes associated with the use of MOX versus LEU fuel and another comparing the MOX and immobilization approaches to surplus plutonium disposition. This table would make matters clearer for the public. The public would see that the MOX approach involves more steps and thus more opportunities for something to go wrong, more expense, and more waste streams. The taxpayer dollar spent on these processes goes to someone, and it represents a kind of nuclear welfare. I think that the energy producers are going to start noticing that in a deregulated market some people are getting a handout. 21

The environmental analysis does not state the positive health and safety impacts of substituting MOX fuel for the LEU fuel. Once MOX fuel is used, you will see that the impacts of using LEU are worse. This will not clean up our entire area, but it will make an improvement. I wish everyone would look at both side of the issue and make a mature decision. 22

Is DOE planning to conduct a public meeting next week in Russia? Have public meetings ever taken place in Russia? 23

WASHDC–21 **Alternatives**

This SPD EIS does not evaluate MOX, by itself, versus immobilization. Rather, this EIS evaluates hybrid alternatives (i.e., both immobilization and MOX) and immobilization-only alternatives. All of the surplus plutonium would not be made into MOX fuel because of the complexity, timing, and cost that would be involved in purifying the material to make it suitable for fabrication. A simple comparison of these approaches at the same site can be observed by comparing Alternative 2 to Alternative 11A in Table 2–4. This EIS does, however, look at the differences in operating the reactors with LEU and MOX fuel. Section 4.28 indicates that there is very little difference in the potential impacts of reactor operation, including waste generation, using MOX fuel in place of up to 40 percent of the LEU assemblies as proposed.

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors.

WASHDC–22 **MOX Approach**

Section 4.28.3 was added to this SPD EIS to show an estimate of the environmental impacts that would be avoided if MOX fuel was substituted for LEU fuel at the proposed reactors.

WASHDC–23 **General SPD EIS and NEPA Process**

DOE has no plans to hold a public hearing in Russia and has not held any public hearings there on this subject.

Why has DOE not held any meetings at any of the reactor communities? 24

The citizens of the United States do not have access to the radionuclide profile analysis from France. Under the National Environmental Policy Act (NEPA) process what can be done to enable public review of that information? What other information is being discussed that the public does not have access to? 25

WASHDC–24 **General SPD EIS and NEPA Process**

After careful consideration of its public involvement opportunities, including availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on *the Supplement to the SPD Draft EIS*. DOE felt there were sufficient other means provided for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Efforts were made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. The *Supplement* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. For those interested parties who could not attend the hearing on the *Supplement* in Washington, D.C., on June 15, 1999, DOE provided the various other means discussed above for the public to express their concerns and provide comments. Further, interested parties will likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

WASHDC–25 **General SPD EIS and NEPA Process**

In accordance with CEQ implementing regulations (40 CFR 1506.6(f)), DOE has provided copies of reports and documents used in the preparation of this SPD EIS in DOE reading rooms and made them available on their Web site at http://www.doe–md.com. The radionuclide profile analysis referred to by the commentor was not used in this EIS but may be available from COGEMA. Information on COGEMA's environmental record can be found on their Web site at http://www.cogema.com or by contacting Ms. Christi A. Byerly. Her address is: 7401 Wisconsin Avenue; Bethesda, MD 20814. She may also be contacted by telephone at (301) 941-8367. Her fax number is (301) 652-5690, and her email address is cbyerly@cogema-inc.com.

I am confused as to where DOE is in the NEPA process. Has the public been given the information needed to assess the dual-track approach. Is it DOE's opinion that the public will be able to compare and comment on the impacts of the immobilization-only and dual-track approaches? 26

The affected communities have been ignored by DOE, NRC, and Duke. We are tired of being ignored. All you want to do to us is dump on us and use us. The public does not know about these issues and is being deceived. 27

WASHDC–26 **General SPD EIS and NEPA Process**

DOE is committed to providing the public with comprehensive environmental reviews of its proposed actions in accordance with NEPA and believes it provided numerous opportunities and means for public comment on the program. The SPD Draft EIS analyzed each environmental resource area in a consistent manner across all the alternatives to allow for a fair comparison among the alternatives and among the candidate sites for surplus plutonium disposition facilities. The comment period for the SPD Draft EIS was extended from 45 days to 60 days. During that time, DOE convened five public hearings to obtain oral and written comments from the public. These hearings were open to all individuals and organizations, and their format was intended to encourage public discussion and interaction.

As part of the procurement process, bidders were asked to provide environmental information to support their proposals. This information was analyzed in an Environmental Critique prepared for the DOE source selection board prior to award of the MOX fuel fabrication and irradiation services contract. DOE then prepared an Environmental Synopsis on the basis of the Environmental Critique, which was released to the public as Appendix P of the *Supplement to the SPD Draft EIS* in April 1999. This *Supplement* included a description of the affected environment around the three proposed reactor sites, and analyses of the potential environmental impacts of operating these reactors using MOX fuel (Sections 3.7 and 4.28 of this SPD EIS, respectively). During the 45-day period for public comment on the *Supplement*, DOE held a public hearing in Washington, D.C., on June 15, 1999, and invited comments. Responses to those comments are provided in Volume III, Chapter 4.

WASHDC–27 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concern that they are being ignored, taken advantage of, and not kept informed. Efforts were made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. The *Supplement to the SPD Draft EIS* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North

In regard to the public hearing process, DOE has made a good attempt, but not having meetings since the reactors were chosen and not having those meetings in the affected communities are like a slap in the face. DOE has an obligation to hold meetings in the reactor communities and to educate the public as to what is going to be used in the reactors. 28

I am opposed to use of plutonium in Duke reactors. 29

Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. For those interested parties who could not attend the hearing on the *Supplement*, DOE provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Further, interested parties will likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

To stay informed and involved on the progress of the surplus plutonium disposition program, request to be included on the mailing list by visiting the MD Web site at http://www.doe-md.com, or writing to the following address: Office of Fissile Materials Disposition, United States Department of Energy, P.O. Box 23786, Washington, DC 20026-3786. Another source of information is the public reading rooms located at each of the DOE sites.

WASHDC–28 General SPD EIS and NEPA Process

Although DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*, since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy, including informing and educating the public. DOE has presented information about the disposition of fissile materials to the public in various forms: public hearing presentations, fact sheets, exhibits, technical reports, visual aids, and a video. Information has been distributed by such mechanisms as mail, email, fax, Web sites, telephone, and press interviews.

WASHDC–29 Reactors

DOE acknowledges the commentor's opposition to using MOX fuel in Duke reactors. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. Section 4.28 was revised to discuss the potential environmental impacts of operating the Duke reactors (Catawba and McGuire) with MOX fuel.

The representative of COGEMA stated that information is sent to those who ask. What is the address? | 30

In view of the fact that you have no plans for holding meetings in the Southeast, my organization, the Nuclear Information and Research Service, will submit three videotapes of its hearings. We gave individual members of the public an opportunity to get information and make comments. There is a zero relationship between the tapes and public meetings. | 31

Who is the contractor chosen to complete the MOX fuel process? COGEMA has a vested interest in reprocessing technologies worldwide. | 32

WASHDC–30 **MOX RFP**

Information on COGEMA's environmental record can be found on their Web site at http://www.cogema.com or by contacting Ms. Christi A. Byerly. Her address is: 7401 Wisconsin Avenue; Bethesda, MD 20814. She may also be contacted by telephone at (301) 941-8367. Her fax number is (301) 652-5690, and her email address is cbyerly@cogema-inc.com.

WASHDC–31 **General SPD EIS and NEPA Process**

Videotapes of hearings hosted by the Nuclear Information and Research Service were not received by DOE.

For those interested parties who could not attend the public hearing on the *Supplement to the SPD Draft EIS*, DOE provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Equal consideration was given to all comments, regardless of how or where they were received. Further, interested parties will likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be pursued per the SPD EIS ROD.

WASHDC–32 **MOX RFP**

The contractor selected by DOE for MOX fuel fabrication and irradiation services, is DCS. They would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. Should the decision be made to proceed with the hybrid approach, COGEMA would lend its expertise within the limits of the contract, which does not have any provisions for reprocessing.

U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing and separation of plutonium from spent nuclear fuel. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel). The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was

It is appalling that the consortium is relying on the operating experience of European reactors, which use different fuel, and that the safety records of the consortium have not been made available. 33

I understand it has been requested that some of the Federal budget money earmarked for APSF be moved to the SRS canyons project. Will this diversion of money affect the APSF project in the long term? 34

What types of activities or technologies can the United States provide to Russia before the U.S.–Russian agreement is in place in September? 35

produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

WASHDC–33 **MOX Approach**

Information gleaned from experience of European reactors is one of many factors taken into consideration in developing the strategy for using the MOX fuel in domestic, commercial reactors. The environmental, safety and health consequences of the MOX approach in the proposed reactors are addressed in Section 4.28. In addition, NRC would evaluate license applications and monitor the operations of both the MOX facility and reactors selected to use MOX fuel, to ensure adequate margins of safety. As discussed in the revised Section 4.28, the most recent performance assessments of the reactors selected to irradiate MOX fuel, completed in the first three months of 1999, were deemed acceptable by NRC. (In 1999, NRC began to perform plant performance reviews instead of the systematic assessments of licensee performance. At that time, NRC changed its rating system from adjectives of acceptable, good or superior, to one of acceptable or unacceptable.)

WASHDC–34 **Other**

The funding of APSF is beyond the scope of this SPD EIS. Since it is uncertain whether APSF will be built, this SPD Final EIS does not take any credit for the presence of APSF and has revised any discussion of APSF to include the phrase “if built” to inform the reader of this uncertainty. This change is discussed in more detail in Chapter 1 of Volume I.

WASHDC–35 **Nonproliferation**

The United States and Russia have been engaged in extensive ongoing cooperative research, small-scale tests, and demonstrations of plutonium disposition technologies under the auspices of the *Agreement on Scientific and Technical Cooperation in the Management of Plutonium.* Technical subjects addressed in these collaborative efforts include conversion of plutonium metal to an oxide form, use of weapons-grade plutonium in MOX fuel in various types of nuclear power reactors, and immobilization of plutonium into forms suitable for geologic disposal.

To date has any technology been transferred from the United States to Russia? There is a May 4, 1999, application on file with NRC, but it does not really say what would be transferred to Russia. Will this technology or information go forward before the agreement is finalized? 36

Is DOE sure that equipment can be exported before the U.S.–Russian agreement is in place? 37

MOX fuel does not meet the goals outlined by the Office of Fissile Materials Disposition. The Russians are really trying to pursue the reprocessing of plutonium, which is contrary to U.S. policy. Our leadership is always confused, and it seems that it may be getting manipulated. The clearest expression of our policy seems to be, "Follow us; we are right behind you." The relationship of our policy and our goals is confusing to Russia. Therefore, I question whether our policy is meeting the goals that the two countries share. 38

WASHDC–36 **Nonproliferation**

Technology that has been transferred to date includes a code package for performing safety analyses on fast reactors, critical experiment data to validate computer safety codes, and data on irradiation of MOX fuel in commercial U.S. reactors. The May 4, 1999, NRC license application is intended to cover equipment for manufacturing fuel. The precise equipment list will be developed once Russia has selected the fuel fabrication methods it intends to use for this mission. Equipment and technology may be transferred to support work covered by the *Agreement on Scientific and Technical Cooperation in the Management of Plutonium* signed in July 1998. All transfers of equipment and technology completed to date were covered by individual licenses submitted on a case-by-case with the appropriate government organization.

WASHDC–37 **Nonproliferation**

Yes, equipment may be transferred to support work covered by the *Agreement on Scientific and Technical Cooperation in the Management of Plutonium* signed in July 1998.

WASHDC–38 **Nonproliferation**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this.

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

Why run the security risk of MOX fuel fabrication and use? We have tried to discuss security with NRC with no avail. The United States has so many nuclear weapons that it is easy for people to get their hands on weapons-grade plutonium. The availability of plutonium, however, is not a good excuse for its use in MOX fuel. In fact, the use of MOX fuel will end nonproliferation as we know it. 39

Commercial nuclear power is already highly uneconomical, environmentally damaging, and dangerous. No new reactors have been built since Three Mile Island. Americans want renewable energy, not nuclear power, which produces radioactive waste for which there are no accommodations. Plutonium was made for bombs; using it in commercial reactors is dangerous. 40

WASHDC–39 **Nonproliferation**

DOE acknowledges the commentor's concern for security of MOX fuel. The proposed DOE surplus plutonium disposition facilities are all at locations where plutonium would have the levels of protection and control required by applicable DOE safeguards and security directives and requirements. Safeguards and security programs would be integrated programs of physical protection, information security, nuclear material control and accountability, and personnel assurance. Physical barriers; heavily armed guards; access control systems; detection and alarm systems; procedures, including the two-person rule (which requires at least two people to be present when working with special nuclear materials in the facility); and personnel security measures, including security clearance investigations and access authorization levels, would be used to ensure that special nuclear materials stored and processed are adequately protected. Closed-circuit television, intrusion detection, motion detection, and other automated materials monitoring methods would be employed. Furthermore, the physical protection, safeguards, and security for the MOX facility and domestic, commercial reactors would be in compliance with NRC regulations. International inspections of the proposed facilities would be conducted strictly by procedure so as not to compromise security.

WASHDC–40 **DOE Policy**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry or provide a new energy source. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently

There seems to be an implication in the viewgraphs that there are two options: one, immobilization of all 50 t (55 tons); the other, a combination of immobilization and the irradiation of MOX fuel. Are these in fact the options, and when will there be a decision as to going one way or the other?	41
What is aqueous polishing, and how is it incorporated into the surplus plutonium disposition process? Is there experience in other places with aqueous polishing.	42
Is part of the reprocessing process at La Hague?	43

declared excess to national security needs is never again used for nuclear weapons.

The use of renewable energy sources is beyond the scope of this SPD EIS.

WASHDC–41 **Alternatives**

Section 2.3.1 explains the development of the 15 reasonable alternatives that were analyzed in this SPD EIS. Four of the alternatives (11A, 11B, 12A and 12B) provide the option to immobilize all the surplus plutonium while the other eleven provide facility siting options of the hybrid approach of using both immobilization and MOX fuel fabrication. DOE has identified as its preferred alternative a hybrid approach to disposition up to 50 t (55 tons) of surplus plutonium. Under this approach, approximately 33 t (36 tons) of clean plutonium would be used to fabricate MOX fuel, which would be irradiated in domestic, commercial reactors. The remaining 17 t (19 tons) of low-purity plutonium would be immobilized because it is not suitable for fabrication into MOX fuel due to the complexity, timing, and cost that would be involved in purifying those plutonium materials. Decisions on the surplus plutonium disposition program will be based on environmental analyses, technical and cost reports, national policy and nonproliferation considerations, and public input. DOE will announce its decisions regarding facility siting and approach to surplus plutonium disposition in the SPD EIS ROD no sooner than 30 days after publishing the SPD Final EIS.

WASHDC–42 **Plutonium Polishing**

Aqueous polishing as proposed for surplus plutonium disposition is a process that removes gallium and other impurities that can affect the use of the plutonium as reactor fuel from the plutonium dioxide feed for the MOX facility. The process, described in Section 2.4.3.2, would dissolve plutonium dioxide in nitric acid, subject the solution to solvent extraction, then convert the solution back to an oxide powder through precipitation. Similar processes have been used at many DOE facilities including Hanford, LANL, and SRS.

WASHDC–43 **MOX RFP**

La Hague is a reprocessing facility. However, U.S. policy dating back to the Ford Administration has prohibited the commercial, chemical reprocessing

Immobilization is safer, faster, and cheaper. You have agreed to immobilize 17 tons of surplus plutonium, but probably only because it is not suitable for MOX fuel. All of the material could be immobilized, so why not immobilize all of it? Why resort to MOX fuel at all? 44

We find the MOX plan unacceptable, for it poses unreasonable risks to public health and the environment, undermines U.S. nonproliferation goals, and lacks a sound economic strategy. 45

and separation of plutonium from spent nuclear fuel. The U.S. surplus plutonium would be fabricated into MOX fuel at a secure DOE site that is owned by the U.S. Government and would be irradiated in the selected domestic, commercial reactors. This does not involve reprocessing (reprocessing is a chemical separation of uranium, transuranic elements [including plutonium], and fission products from spent reactor fuel and the reuse of the plutonium and uranium to produce new fresh fuel).

WASHDC–44 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach which includes both immobilization and MOX fuel. As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach would be more expensive than the immobilization-only approach. However, pursuing the hybrid approach provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

WASHDC–45 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach to surplus plutonium disposition. DOE has identified as its preferred alternative the hybrid approach.

This SPD EIS identifies and analyzes the potential human health and environmental impacts from the construction and normal operation of the MOX facility, and irradiation of MOX fuel in the Catawba, McGuire, and North Anna reactors. The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium which was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons.

The utilities are in this for money, and that money will be furnished by taxpayers. We need to forgo this endeavor and allow for the phaseout and shutdown of nuclear energy operations. Immobilization should be our focus. 46

Is the annual 10 million dollar cap stipulated in the Request for Proposals no longer applicable? 47

A separate cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), which analyzes the site-specific cost estimates for each alternative, was made available around the same time as the SPD Draft EIS. This report and the *Plutonium Disposition Life-Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999), which covers recent life-cycle cost analyses associated with the preferred alternative, are available on the MD Web site at http://www.doe-md.com and in the public reading rooms at the following locations: Hanford, INEEL, Pantex, SRS, and Washington, D.C.

WASHDC–46 **MOX Approach**

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. The MOX facility would produce nuclear fuel that would displace LEU fuel that utilities would have otherwise purchased. If the effective value of the MOX fuel exceeds the cost of the LEU fuel that it displaced, then the contract provides that money would be paid back to the U.S. Government by DCS based on a formula included in the DCS contract. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

WASHDC–47 **MOX RFP**

The $10,000,000 cap is no longer applicable. During negotiations it was clear that fluctuations in the price of LEU that the MOX fuel would replace, a variable that the contractor has no control of, has a significant impact on the economics. In order to ensure an equitable sharing of risk, a revised approach to the maximum Government liability was included in the final negotiated contract. The revised approach includes a consideration of market price of LEU as well as other variable factors affecting the fabrication of MOX fuel

Will there be disclosure to the taxpayers of how much utilities will be compensated, over and above their costs, for participation in this program? 48

Who is liable for environmental damage during the transportation and irradiation of MOX fuel? 49

Is the plutonium still Government material after it is converted to MOX fuel? 50

I am concerned about the dimensional stability of MOX fuel. If the fuel shrinks slightly, there is a loss of heat transfer between the fuel and the cladding, which can lead to fuel melting. If there is expansion, resulting pressure on the cladding can cause a rupture. It is my understanding that COGEMA has more experience with these processes. What is the consortium's track record? 51

such as throughput and escalation. The final methodology to determine the maximum cost to the Government for any given year is to be submitted by the contractor for DOE approval prior to commencement of fabricating MOX fuel.

WASHDC–48 **MOX RFP**

The utilities would be compensated for all costs in excess of the cost associated with the use of LEU which are directly attributable to MOX fuel. These costs include, for example, increased NRC oversight costs; modification costs required for the proposed reactors to use MOX fuel; and increased costs for additional LEU enrichment. In addition, the utilities would receive the MOX fuel at a discounted price when compared to the price of the LEU fuel that the MOX fuel replaces. The exact amount of the discount is set in the contract. It is between 10 and 50 percent.

WASHDC–49 **DOE Policy**

The reactor licensee is responsible for the MOX fuel once it is received at the reactor site. The transportation of special nuclear materials, including fresh MOX fuel is the responsibility of DOE's Transportation Safeguards Division. The transportation of the MOX spent fuel to the potential geologic repository for disposal would also be the responsibility of DOE.

WASHDC–50 **DOE Policy**

DOE would own the MOX facility and MOX fuel until the fuel was received at the reactor site. At that point, the fuel would become the responsibility of the reactor licensee.

WASHDC–51 **MOX RFP**

FRAGEMA's (a subsidiary of COGEMA and FRAMATOME) experience with fabricating MOX fuel indicates a leakage rate of less than one-tenth of 1 percent. FRAGEMA has provided 1,253 MOX fuel assemblies, with more than 300,000 fuel rods for commercial reactor use. There have been no failures (including fuel melts or ruptures) and leaks have occurred in only 3 assemblies (a total of 4 rods). All leaks occurred as a result of debris in the reactor coolant system and occurred in 1997 or earlier. The French requirements for

I am curious about your position on differences between MOX spent fuel and the low-level radioactive waste that is generated in the normal operation of the reactor, and about your estimation of the amounts of plutonium that would be released under recycle or clearance level rulemaking in which NRC is currently involved. I am defining "recycle" in terms of materials that can be converted into consumer products. 52

In performance of the health evaluations, what is the biological effectiveness rating used for alpha emitters? 53

According to the *Supplement*, the MOX fuel assemblies would only be irradiated for two cycles, whereas uranium is now irradiated for three 18-month cycles. What is the basis for making that change to operating procedures? Will accommodations for that change have any impact on existing fuel management? What is the highest rod burnup on discharge of the second-cycle fuel assemblies? What is the highest burnup for the second cycle that we can expect? Do you have any plans for transition to three cycles for MOX fuel in the course of the program? 54

debris removal were changed in 1997 to alleviate these concerns. Since that time, there have been no leaks in MOX fuel rods.

WASHDC–52 **Waste Management**

There are differences in fission product inventories and activation products between an LEU and MOX core during a fuel cycle. However, the only way significant quantities of fission products could end up in LLW would be in the event of a large–scale fuel leak. As discussed in the previous response, there have been no failures and very few leaks in FRAGEMA's experience. The use of MOX fuel would not be expected to result in any additional LLW from refuelings because the reactors would continue to operate on the same schedule as if they were using only LEU fuel. Eventual D&D of the reactors, which may include recycling of metals, would be performed by the utilities in accordance with NRC regulations in force at that time. However, it is premature to assume that scrap metal at the reactors would be recycled as part of D&D and end up in consumer products.

WASHDC–53 **Human Health Risk**

The latest published version of 10 CFR 20.1004 (January 1, 1999) states that the quality factor for alpha particles is 20, and this factor was used in the analysis performed for this SPD EIS. This regulatory criteria (10 CFR 20) is established by NRC, and is therefore the official benchmark from which U.S. nuclear utilities are continually governed in the realm of radiation protection.

WASHDC–54 **MOX Approach**

The fuel management plan that would be used with the MOX assemblies does not reflect a change in operating procedures, other than the fact that some of the assemblies would be MOX rather than LEU. The DCS team utility companies currently use a typical 18-month fuel cycle, replacing approximately 40 percent of the fuel assemblies in a reactor at each refueling. Some assemblies are used for two cycles, some for three cycles. The utilities plan to maintain the current fuel management schemes and would use the MOX fuel assemblies for only two cycles. There are currently no plans to transition to three cycles for the MOX assemblies.

The EIS indicates that 0.25 mg of plutonium will be released annually into water and air at the fabrication facility. This seems like a very large amount. How much would be released into the air or water annually near the reactor communities? Will those numbers be written out somewhere? I want to know the numbers. My definition of significant might not be the same as yours. 55

I recently wrote a report criticizing the analysis of design basis accidents for reactors using MOX fuel. My criticism focused on the treatment of the emissions of plutonium and other alpha-emitting actinides in beyond-design-basis accidents at reactors, and the impacts of those emissions in terms of additional latent cancer fatalities. It is noteworthy that the *Supplement* reflects recalculations that are much closer to my figures. There are, however, some outstanding questions relative to those calculations. For example, it is not clear for how long into the future the dose is calculated. What are the assumptions? Will there be evacuation or cleanup? It is impossible for someone to make an independent check without knowing all of the parameters and assumptions. I hope that these will be provided in the SPD Final EIS. The document is still inadequate with regard to the discussion of potential differences in the consequences of accidents and the risks of severe accidents associated with the use of MOX fuel. There is still no discussion of very germane, unresolved fuel performance issues associated with the current generation of MOX fuel that have been noted in Europe; increased fission gas generation, increased fuel temperature, and the Cabri reactor test go unmentioned in the document. There is also no concrete discussion of the severe accident risks of the reactors that have been chosen. In particular, four of the six reactors have special ice condenser containments that are not representative of the fleet of U.S. pressurized water reactors, and NRC has outstanding concerns about their performance. 56

MOX fuel burnup is proposed at a maximum burnup of 45 GWD/t with peak pin burnup at 50 GWD/t. Actual MOX fuel burnup limits would be established in concert with the NRC following a thorough safety review. It should be noted that reactors in Belgium and Germany typically use MOX fuel to burnups between 45 and 50 GWD/t and that while current French burnup limits are lower than that, French burnup limits for LEU fuel are also lower than those for U.S. reactors.

WASHDC–55 **Human Health Risk**

From a scientific standpoint, an annual release of 0.25 mg of plutonium is a very small quantity. There would be no expected releases of plutonium isotopes from the proposed reactors occurring from normal operating conditions. Doses to an MEI at each of the plants are also expected to be small—i.e., McGuire, 0.31 mrem; Catawba, 0.73 mrem; and North Anna, 0.37 mrem. All of these doses fall within stringent NRC 10 CFR 20 and 10 CFR 50 regulatory requirements.

WASHDC–56 **Facility Accidents**

The accident results in Section 4.28 have been revised to incorporate computer code corrections. The accident calculation is included in the Administrative Record for this SPD EIS. The calculation contains all of the input parameters including the MACCS2 computer files.

The particular “control rod ejection” scenario is a bounding postulated accident. None has ever occurred at a nuclear power plant. The Cabri RIA test program was designed to challenge typical fuel rods under conditions that are more extreme than conditions that would be experienced during a real pressurized water reactor control rod ejection. Out of the nine Cabri tests (six with uranium fuel, three with MOX fuel), two uranium fuel rods and one MOX fuel rod experienced failures. The MOX failure occurred at an energy deposition rate that is greater than can realistically be reached by high burnup fuel, even after an extremely unlikely worst case control rod ejection. These data, both for LEU and MOX fuel, will be used in ongoing fuel design studies.

While it is understood that there are differences from the use of MOX fuel versus LEU fuel, these differences are not expected to decrease the safety of

I have heard nothing about what will be done with the additional waste from this process. | 57

the reactors. All of the factors discussed by the commentor were evaluated by the proposed reactor licensees to ensure that the reactors, including those with ice condensers, can continue to operate safely using MOX fuel and will continue to be evaluated. Before any MOX fuel is used in the United States, NRC would have to perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications.

WASHDC–57 **Waste Management**

As described in Section 4.28.2.2, the volume of waste generated is not expected to increase as a result of the reactors using MOX fuel. The wastes would continue to be handled in the same manner as they are today with no change required due to the use of MOX fuel at the reactors.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial reactors. Spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies. Likewise, the additional spent fuel would be a very small fraction of the total that would be managed at the potential geologic repository.

This SPD EIS assumes, for the purposes of analysis, that Yucca Mountain, Nevada, would be the final disposal site for all immobilized plutonium and MOX spent fuel. As directed by the U.S. Congress through the NWPA, as amended, Yucca Mountain is the only candidate site currently being characterized as a potential geologic repository for HLW and spent fuel. DOE has prepared a separate EIS, *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250D, July 1999), which analyzes the environmental impacts from construction, operation and monitoring, related transportation, and eventual closure of a potential geologic repository.

My principal concerns go to the well-known toxicity of plutonium. The only solution to the management of the radioactive waste generated by the production and use of plutonium in the weapons program would be isolation for the full hazardous life of the materials. It appears that the hazardous life is now far longer than we had previously understood. Recent research findings with respect to alpha emitters and alpha-related damage at the cellular and subcellular level indicate far greater risks of cancer and other health impacts than are currently considered in the setting of radiation protection standards. (Those standards are currently based on either the lifetime risk of fatal cancer or gross genetic defects in the first couple of generations.) We have been learning more in recent years about the impacts of low-dose irradiation, particularly as it may be received repeatedly over a period of time. The most recent studies show that DNA may be affected by exposures in the cytoplasm rather than the nucleus of a cell. There may also be a delayed mutational effect at the cellular level. This means that we may have underestimated the impacts of alpha emitters. At the Second International Symposium on Ionizing Radiation (held in Canada), a statement was made that rather than the range of biological effectiveness that was previously used, 2- to 20-fold, it may be necessary for us to consider a quality factor of 2,000 or more with respect to alpha emitters. Moreover, all of the international regulators attending that conference concurred that it is necessary to set protective standards for each distinctive component of the environment for its own sake. NRC was not represented at the conference. 58

Where are the transport corridors and what communities would be affected? Where are the results of that analysis? 59

WASHDC–58 **Human Health Risk**

DOE acknowledges the commentor's concern of the toxicity of plutonium and its effects on human health. The latest published version of 10 CFR 20.1004 (January 1, 1999) states that the quality factor for alpha particles is 20, not 2000. This regulatory criteria (10 CFR 20) is published in coordination with NRC, and is the official benchmark from which U.S. nuclear utilities are continually governed in the realm of radiation protection.

WASHDC–59 **Transportation**

The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in Appendix L. The results of transportation analyses are presented in the transportation sections in Chapter 4 of Volume I. Additional details are provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

I am glad DOE will be using safe, secure transport. However, the communities the vehicles are to pass through will not know about the materials being transported. Can you tell me where it says in the law or regulations that these individuals do not have a right to this information? 60

Transportation has not been given enough emphasis. 61

There has not been adequate inclusion of the areas through which this material would be transported. Any terrorist who wants to find out where the material is can simply track the shipments. 62

WASHDC–60 **Transportation**

The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in Appendix L. DOE Safeguard and Security Orders govern the handling and transport of fissile materials and can be found on the DOE Web site at http://www.explorer.doe.gov.

WASHDC–61 **Transportation**

DOE acknowledges the commentor's concern that the transportation issue has not been given enough emphasis. The transportation requirements for the surplus plutonium disposition program are evaluated in this SPD EIS. Potential environmental impacts of transportation are presented in the transportation sections in Chapter 4 of Volume I and in more detail in Appendix L. The transportation of special nuclear materials is the subject of detailed planning with DOE's Transportation Safeguards Division. The dates and times that specific transportation routes would be used for special nuclear materials are classified information; however, the number of shipments that would be required, by location, has been included in Appendix L. Additional details are also provided in *Fissile Materials Disposition Program SST/SGT Transportation Estimation* (SAND98-8244, June 1998), which is available on the MD Web site at http://www.doe-md.com.

WASHDC–62 **Transportation**

DOE has considered the inherent risks, including terrorist concerns, associated with transporting plutonium materials. While DOE prefers to minimize the transportation of plutonium that is still desirable for weapons use, plutonium is routinely and safely transported in the United States every day. As described in Appendix L.3.3, transportation of nuclear materials would be performed in accordance with all applicable DOT and NRC transportation requirements. Interstate highways would be used, and population centers avoided, to the extent possible. All shipments of surplus plutonium that have not been converted to a proliferation-resistant form would be made by DOE's SST/SGT system, as described in Appendix L.3.2.

Response WASHDC–59 provides additional information related to transportation concerns.

All of the communities on the transportation route are affected communities. I would like to call your attention to a DOE-commissioned study by Dr. Jenkin Smith at the University of New Mexico. This study very thoroughly documents public concerns with the transport of any type of nuclear materials. The public is discerning as to whether it wants to take a risk, and as to the causes and goals of the risk. Nevertheless, there are those in the community who have more to say before a decision is made—some of them in support of immobilization at SRS. I believe, furthermore, that there are those out there in the general public who can distinguish one goal from another. They are aware, for example, that the transportation of plutonium would be more complicated—i.e., involve more steps—for the MOX fuel option than for immobilization. Because all persons in the transportation areas would be affected, all should be included in this information exchange on the issue of transportation. 63

The people of Southeast know little of this program and have no access to the relevant information. How many DOE persons are available to come down to the reactor communities and attend meetings like this one? 64

WASHDC–63 **Transportation**

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material.

DOE acknowledges the commentor's concern that all persons along the transportation routes be included in the information exchange. Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. Additionally, various means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue. It is DOE policy to encourage public input into these matters of national and international importance.

WASHDC–64 **General SPD EIS and NEPA Process**

Efforts were made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. The *Supplement to the SPD Draft EIS* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. For those interested parties who could not attend the meeting on the *Supplement*, DOE

I am glad to hear that additional meetings are going to be considered. We have been told of the 80 meetings that you as an office have held. We would like to get a list of those meetings showing when and where they were held, how they were announced, and what topics were discussed. Laura Holgate did not stay to hear the earlier comments or questions, and she is not here this afternoon. How serious can this be taken if the Director does not stay? 65

provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. After careful consideration of its public involvement opportunities, including the availability of information and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement*. DOE felt there were sufficient other means provided for the public to express their concerns and provide comments as discussed above. Further, interested parties will likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy, including informing and educating the public. DOE has presented information about the disposition of fissile materials to the public in various forms: public hearing presentations, fact sheets, exhibits, technical reports, visual aids, and a video. Information has been distributed by such mechanisms as mail, email, fax, Web sites, telephone, and press interviews. To learn more about the surplus plutonium disposition program or request to be included on the mailing list, visit the MD Web site at http://www.doe-md.com, or write to the following address: Office of Fissile Materials Disposition, United States Department of Energy, P.O. Box 23786, Washington, DC 20026-3786. Information on the program is also available in the public reading rooms located at each of the DOE sites.

WASHDC–65 General SPD EIS and NEPA Process

Although DOE decided not to hold additional meetings on the *Supplement to the SPD Draft EIS*, other means have been provided for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Further, interested parties will likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be pursued per the SPD EIS ROD.

Laura Holgate regrets she was not able to attend the entire hearing but she was required to meet with the State Department in preparation for her trip to Russia. Dave Nulton, the program manager since the inception of MD in 1994, is well versed in the surplus plutonium disposition program and has acted on

the behalf of Ms. Holgate on many occasions. DOE is entrusted with implementing the U.S. nonproliferation policy and takes that responsibility very seriously.

The following is the list of meetings and hearings detailing the dates and location, by topic, of previous public meetings and hearings held by DOE that addressed the fissile materials disposition program. These meetings and hearings were advertised to the public through newspaper advertisements, special mailings, or public service announcements. Scoping meetings and hearings on draft NEPA documents included two complete sessions for each date given (usually one in the afternoon and one in the evening; and in Washington, D.C., one in the morning and one in the afternoon).

DOE PUBLIC MEETINGS AND HEARINGS RELATING TO THE STORAGE AND DISPOSITION OF WEAPONS-USABLE FISSILE MATERIALS PROGRAM

Pre-Scoping Meetings for *Storage and Disposition of Weapons-Usable Fissile Materials PEIS*

Date	Location
4/21/94	Washington, DC[1]
5/4/94	Arlington, VA[1]
5/5/94	Arlington, VA[1]
8/5/94	Washington, DC (Public Interest Groups)
9/30/94	Washington, DC (Industry Groups)

[1] DOE provided travel and living expenses for representatives from various organizations to attend this meeting (nongovernmental organizations; tribal representatives; Citizens Advisory Board members, etc.).

Scoping Meetings for *Storage and Disposition of Weapons-Usable Fissile Materials PEIS*

Date	Location
8/17/94	North Augusta, SC
8/24/94	Chicago, IL
8/24/94	Denver, CO
8/31/94	Richland, WA
9/7/94	Amarillo, TX
9/14/94	Boston, MA
9/14/94	Las Vegas, NV
9/21/94	Idaho Falls, ID
9/28/94	Oak Ridge, TN
9/28/94	Livermore, CA
10/5/94	Los Alamos, NM
10/12/94	Washington, DC

Remove HEU from Scope of *Storage and Disposition of Weapons-Usable Fissile Materials PEIS*

Date	Location
11/10/94	Oak Ridge, TN

Review Hearings for *Disposition of Surplus Highly Enriched Uranium Draft EIS*

Date	Location
11/14/95	Knoxville, TN
11/16/95	Augusta, GA

Plutonium Disposition Option Meeting

Date	Location
12/13/94	Washington, DC

Review Hearings for *Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS*

Date	Location
3/26/96	Denver, CO
3/28/96	Las Vegas, NV
3/29/96	Las Vegas, NV
4/2/96	Oak Ridge, TN
4/11/96	Richland, WA
4/15/96	Idaho Falls, ID
4/18/96	Washington, DC
4/22/96	Amarillo, TX
4/23/96	Amarillo, TX
4/ 30/96	North Augusta, SC

Date	Location
7/23/96	Austin, TX
7/25/96	Palo Alto, CA
7/29/96	Chicago, IL
7/31/96	Boston, MA
8/1/96	Washington, DC

Proposed Nonproliferation Assessment Outline
Review of *Draft Nonproliferation Assessment*

Date	Location
10/28/96	Oakland, CA
10/28/96	Las Vegas, NV
10/28/96	Idaho Falls, ID
10/30/96	Richland, WA
10/30/96	Portland, OR
11/1/96	Washington, DC
11/4/96	Amarillo, TX
11/6/96	North Augusta, SC
11/6/96	Oak Ridge, TN
11/8/96	Denver, CO

Scoping Meetings for *Surplus Plutonium Disposition EIS*

Date	Location
6/10/97	Idaho Falls, ID
6/12/97	Amarillo, TX
6/19/97	North Augusta, SC
7/1/97	Richland, WA

MOX Procurement Meetings

Date	Location
8/28/97	Chicago, IL
12/11/97	Chicago, IL
5/20/98	Atlanta, GA
5/21/98	Atlanta, GA

Immobilization Conference

Date	Location
5/12/98	Washington, DC

Review Hearings for *Surplus Plutonium Disposition Draft EIS*

Date	Location
8/4/98	Richland, WA
8/11/98	Amarillo, TX
8/13/98	North Augusta, SC
8/18/98	Portland, OR
8/20/98	Idaho Falls, ID

Review Hearing for *Supplement to the Surplus Plutonium Disposition Draft EIS*

Date	Location
6/15/99	Washington, DC

National Dialogue Meetings

Date	Location
7/23–24/96	Chicago, IL
11/18–19/96	Washington, DC
9/6/97	Knoxville, TN
9/9–10/97	Boise, ID
10/20/97	Portland, OR
10/21/97	Richland, WA
10/22/97	Spokane, WA
10/23/97	Seattle, WA
6/22–23/98	San Diego, CA
6/25–26/98	Chicago, IL

DOE Citizens Advisory Boards[2]

Date	Location
2/24/98	Amarillo, TX
6/27/98	Aiken, SC

FISSLE MATERIALS DISPOSITION PROGRAM PARTICIPATION IN PUBLIC MEETINGS SPONSORED BY OTHER ORGANIZATIONS

National Tribal Plutonium Forum

Date	Location
4/30/96	Seattle, WA

Public Meeting Sponsored by South Carolina State Senator Leventis

Date	Location
6/24/99	Columbia, SC

Military Production Network/Alliance for Nuclear Accountability

Date	Location
5/96	Washington, DC (DC Days)
5/94	Washington, DC (DC Days)
1/22/98	Washington, DC
5/98	Washington, DC (DC Days)

[2] MD briefed DOE Citizens Advisory Board meetings upon request. More briefings were provided than those listed.

Is the Brockett report available, and how would I get a copy of it? This report goes back a couple of decades.	66
I have a concern about COGEMA. In the United States we can ask for information under the Freedom of Information Act and typically get answers from the appropriate agency—NRC, for example. With COGEMA, however, we don't have this opportunity. COGEMA has extensive experience with MOX fuel in its country. Will we have full access to its information on MOX fuel use? How would I go about getting this?	67
What kind of access do we have to COGEMA's experimental database on the use of MOX fuel?	68
What was the reason for announcing the Chicago Operations Office address. What information will we receive from that office? I don't think it will be the contract itself. How will we know the quantitative outcome of the new negotiations, which will include replacement of the only compensation rate that the public is aware of?	69
Will speakers be able to review their comments before they are submitted for publication in the SPD Final EIS?	70

Speakers Bureau Presentations Given by DOE Personnel

Date	Location
3/25/99	Oklahoma City (Conference of Southern County Associations)
7/19/99	Kansas City (Conference of Southern Legislators)

WASHDC–66 **General SPD EIS and NEPA Process**

DOE was unable to identify the requested report.

WASHDC–67 **MOX RFP**

Information on COGEMA's environmental record can be found on their Web site at http://www.cogema.com or by contacting Ms. Christi A. Byerly. Her address is: 7401 Wisconsin Avenue; Bethesda, MD 20814. She may also be contacted by telephone at (301) 941-8367. Her fax number is (301) 652-5690, and her email address is cbyerly@cogema-inc.com.

WASHDC–68 **MOX RFP**

See response WASHDC–67 for contact information at COGEMA.

WASHDC–69 **General SPD EIS and NEPA Process**

Copies of the redacted contract for MOX fuel fabrication and irradiation services is available from the Chicago Operations Office and were handed out at the June 15, 1999 hearing. Additional copies can be requested by contacting Mr. Robert Selby at (603) 252-2067 or by email, Robert.Selby@ch.doe.gov. This will provide all information on the contractual arrangement between DCS and DOE.

WASHDC–70 **General SPD EIS and NEPA Process**

Notetakers captured the main points of issues or concerns raised by the commentors; therefore, the comments presented here are not a verbatim transcript of the hearing. In the interest of finalizing this SPD EIS it would not be practical to have each speaker review their comments prior to publishing

The Blue Ridge Environmental Defense League opposes the use of plutonium fuel in commercial reactors for the reasons stated in the written comment by Lou Zeller, and for other reasons as well. The planned use of MOX fuel establishes a dangerous precedent in the nuclear industry by needlessly exposing people to the risks of plutonium. DOE will be engaging in a crapshoot if it moves forward with the MOX fuel plan. 71

The public must bear in mind that NRC is proposing to eliminate or curtail adjudicative license proceedings, the only opportunity we have as citizens for access to the judicial system. 72

I resent having to drive—in my case from North Carolina—to a meeting with persons outside the affected area. When the Chicago Operations Office handled a meeting in the Southeast, it was a real formal meeting with a real transcript. Those who held the meeting were patient people who did not pretend that they were in charge; it was a public meeting, and we were in charge. The move to an interactive meeting, even though it may seem to be more polite, diminishes the public's role. In this format the public is not listened to. There must be a more open process and better access to information. Several people are working today and cannot come to the meeting. My democratic rights are threatened due to fact that all relevant information—i.e., proprietary and other corporate information—has not been provided. 73

the Comment Response Document. DOE and the notetakers have made every effort to ensure the essence of each participant's comment(s) has been presented in a clear, concise, and accurate manner. Written comments were accepted at the hearing and have been submitted via fax, mail, or Web site. Equal consideration was given to all comments, regardless of how or where they were received.

WASHDC–71 **MOX Approach**

DOE acknowledges the commentor's opposition to the use of MOX fuel in commercial reactors. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

This SPD EIS identifies and analyzes the potential human health and environmental impacts from the construction and normal operation of the MOX facility. Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel.

WASHDC–72 **DOE Policy**

NRC requirements for adjudicative license proceedings are beyond the scope of this SPD EIS.

WASHDC–73 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's concern that the hearing format does not allow the public to be listened to and that the process should be more open, with easier access to information. Since the inception of the fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum

required by NEPA regulations to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. Efforts were made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. The *Supplement to the SPD Draft EIS* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. Additionally, various means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue. It is DOE policy to encourage public input into these matters of national and international importance.

Based on the feedback from participants in previous public hearings, DOE used an interactive hearing format. This format facilitates open discussions and better understanding of the proposed actions associated with surplus plutonium disposition. It also provides an opportunity for the participants to meet one another, exchange information, and share concerns. Notetakers captured the main points of issues or concerns raised; these comments, along with the written comments submitted and the phone messages recorded during the public comment periods, were analyzed and responded to. Equal consideration was given to all comments, regardless of how or where they were received.

DOE has also placed copies of data reports and documents used in the preparation of this SPD EIS in DOE reading rooms. DOE is not permitted to disseminate proprietary or classified information, although as much information as possible (e.g., redacted copies of the contract with DCS) has been made available to the public. To learn more about the surplus plutonium

I have a videotape of testimony by people from the reactor community, but have been denied permission to play this tape at the meeting today. I was told there was no opportunity. These people are not being heard. In my view, sane-looking people are making an insane proposal. The Southeast will not be victimized any further by the Federal Government. 74

The proposed reactors have been operated very safely. In fact, nuclear reactors are inherently an environmentally safe source of energy. The only truth told by the antinuclear advocates today is that nuclear power is expensive. That is due to construction costs. Nuclear power does have a role to play. I can't understand why persons have these concerns when the citizens of Lake Anna do not seem to have a problem. 75

Public meetings should be held in the Southeast, and the comment period should be extended to accommodate those meetings. 76

disposition program; DCS, the team selected to fabricate the MOX fuel and irradiate it; request to be included on the mailing list; or to contact the program office, visit the MD Web site at http://www.doe-md.com. Written requests for information on the program can be addressed to: Office of Fissile Materials Disposition, United States Department of Energy, P.O. Box 23786, Washington, DC 20026-3786.

WASHDC–74 **General SPD EIS and NEPA Process**

In the interest of stimulating discussions and providing opportunities for the participants to speak, it was not possible to show the proceedings of other public hearings contained on the videotape. The comments from the videotape and their responses are addressed in the responses identified as DCR005A and DCR005B presented in the State of North Carolina in Volume III, Chapter 4.

WASHDC–75 **MOX Approach**

DOE acknowledges the commentor's belief that nuclear power reactors are a source of safe energy and have a role to play in the disposition of surplus plutonium. Based on the analyses of the potential environmental impacts presented in the revised Section 4.28, DOE believes using MOX fuel in domestic, commercial reactors is an effective way to accomplish the goal of the program. The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Because the reactors selected to use MOX fuel already exist, the expense to build new reactors is avoided.

WASHDC–76 **General SPD EIS and NEPA Process**

DOE acknowledges the commentor's request for additional public hearings in the Southeast and extension of the comment period. After careful consideration of its public involvement opportunities, including information availability and mechanisms to submit comments, DOE decided not to hold additional hearings on the *Supplement to the SPD Draft EIS*. However, interested parties will likely have the opportunity to submit additional comments during the NRC reactor license amendment process should the MOX approach be selected. In addition to the public hearing on the

What is the role of Nuclear Fuel Services in Irwin, Tennessee, on the contractor team? 77

On page 1 of the *Supplement*, it is stated that no construction would begin until the Record of Decision for the *Surplus Plutonium Disposition Environmental Impact Statement* was issued. When you look at the Federal budget request, however, you can see that in 1999 there were appropriations for construction in the amount of 48 million, and 28 million of that was for a MOX fuel fabrication facility. This looks like design, not construction. Will this be changed in the next budget request? It is getting a little confusing. 78

There are problems in fabricating test fuel at the Los Alamos National Laboratory (LANL). A report indicates that to date 14 batches of MOX fuel test pellets have failed to meet technical specifications or have experienced other problems. I would encourage DOE to address this in the SPD Final EIS. I was thinking that it would be helpful to know if this could affect the time line in a general or specific way. 79

Supplement held in Washington, D.C., DOE provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Although it did not extend the comment period, DOE did consider all comments received after the close of that period. All comments were given equal consideration and responded to.

WASHDC–77 **MOX RFP**

Nuclear Fuel Services will lend support in the area of safeguards and security based on its experience as a NRC fuel fabrication plant licensee.

WASHDC–78 **DOE Policy**

The money included in the fiscal year 1999 budget request was for the MOX facility design. The terminology used in preparing the budget has been set by the U.S. Congress and Office of Management and Budget. DOE does not have the ability to change this terminology.

WASHDC–79 **MOX Approach**

Fuel fabrication R&D at LANL was sponsored in order to fabricate test fuel for irradiation in the Advanced Test Reactor at INEEL. Fuel for the first irradiation test was fabricated successfully. The second irradiation test was canceled based on technical input from DCS, the team that was selected to fabricate MOX fuel and irradiate it. Fuel R&D continues at LANL because further development is useful to DOE in the event that a lead assembly fabrication facility is needed and for other programmatic purposes, especially related to characterizing the feed powder from the pit conversion facility.

The difficulties encountered with fabrication of MOX test fuel at LANL are due neither to the lack of MOX fuel fabrication capability at LANL nor to generic technical difficulties associated with weapons-grade plutonium. These difficulties are primarily due to switching the uranium oxide used in the MOX test fuel. LANL had successfully fabricated MOX test fuel for the first irradiation test using an uranium oxide commercially supplied by CAMECO. To begin fabrication of the MOX test fuel for the second irradiation test, an uranium oxide from the ammonium uranyl carbonate process was used.

There are some issues I am uneasy about. We (the United States) have a 50-year history of attempting to separate the military and commercial uses of nuclear power, but this MOX approach far more effectively combines the two than anything in the past. It also does not incorporate any means of disposal. The State of Pennsylvania has had a little experience with an experimental reactor that features a partial plutonium core. Over the period during and immediately after its operation, a level of leukemia six times higher than expected was seen in the nearby community. However, these findings were dismissed as insignificant. The people in the environs of the facility are concerned both about the materials remaining in the area and about the impact of releases prior to facility shutdown. 80

Although LANL is involved in this process, along with Pantex, the citizens in the area have been fighting the Waste Isolation Pilot Project (WIPP). WIPP is now open, probably illegally, but that is how you people do business. We don't want any more waste shipped throughout the country, and we particularly don't want to see more waste coming to WIPP or LANL, making it more of a "bomb plant." DOE has made promises of a cleanup but has only been creating more waste. There is no reason to make this MOX fuel. No one wants nuclear power anymore; the nuclear power plants now operating are old and are not being replaced. There is no reason for the Government to get involved in providing fuel to a dead industry that is going to kill us all. 81

WASHDC–80 **DOE Policy**

Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing. After irradiation, the MOX fuel would be removed from the reactor and managed with the rest of the spent fuel from the reactor, eventually being disposed of at a potential geologic repository built in accordance with the NWPA.

Under normal operating conditions, it is not expected that the makeup of the discharges will change significantly from those associated with non-MOX (LEU) fuel. Electricité de France reactors in France have seen little or no impact from the use of MOX fuel on radionuclide releases in effluents. The use of MOX fuel in U.S. reactors is analyzed in Section 4.28. No LCFs would be expected from normal operations.

Furthermore, annual doses to an MEI at each of the plants are estimated to be small—i.e., McGuire, 0.31 mrem; Catawba, 0.73 mrem; and North Anna, 0.37 mrem. All of these doses fall within stringent NRC 10 CFR 20 and 10 CFR 50 regulatory requirements and are much lower than radiation annually received from natural background sources.

WASHDC–81 **MOX Approach**

The goal of the surplus plutonium disposition program is to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors is an effective way to accomplish this. The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program.

This is the first time DOE has gone through NRC in regulating DOE facilities. DOE is paying for the licensing processes. Are you also paying for licensing of the tritium process? | 82

The operation of WIPP has been subject to NEPA review, EPA certification, and legal challenge. NEPA documentation for the operation of WIPP was completed in 1997 with the publication of the *WIPP Disposal Phase Final Supplemental EIS* (DOE/EIS-0026-S-2, September 1997) and ROD. The operation of WIPP received EPA certification in May 1998. Despite continued legal challenges, Judge John Garrett's March 22, 1999, ruling paved the way for WIPP to receive its' first waste shipment on March 26, 1999.

Transportation would be required for both the immobilization and MOX approaches to surplus plutonium disposition. Transportation of special nuclear materials, including fresh MOX fuel, would use DOE's SST/SGT system. Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents causing a fatality or release of radioactive material. The transportation requirements for the surplus plutonium disposition program are also evaluated in this SPD EIS.

Response WASHDC–80 provides additional information on doses at each of the proposed reactors.

WASHDC–82 **NRC Licensing**

The use of TVA commercial reactors to produce tritium for DOE is addressed in the *Final EIS for the Production of Tritium in a Commercial Light Water Reactor* (DOE/EIS-0288, March 1999). DOE anticipates reaching an agreement concerning license amendment costs associated with this proposal.

STATEMENT OF NON-GOVERNMENTAL ORGANIZATIONS ON PLUTONIUM DISPOSITION

June 15, 1999
FINAL VERSION

The nuclear arms race has left the United States and Russia with large plutonium stockpiles. Both countries have had terrible experience with plutonium processing and its attendant wastes. Contamination of areas such as Hanford, Savannah River, and Rocky Flats in the United States, and Chelyabinsk, Tomsk, and Krasnoyarsk in Russia demonstrates the hazards of plutonium processing, and the poor environmental and safety culture of the US Department of Energy (DOE) and the Russian Ministry of Atomic Energy (Minatom).

With the end of the Cold War, we have the opportunity to redirect resources from nuclear weapons programs into cleaning up the legacy of nuclear weapons development, and to other needed programs. Under the pressure of people of both countries, the governments of the US and Russia have between them declared 100 metric tons of plutonium (roughly one-third of the total) to be "surplus" to military needs. We recognize the need for this plutonium to be stored as safely as possible, and to be converted into non-weapons-usable forms.

However, we are deeply disturbed by the primary method by which this conversion is planned. We are convinced that using surplus weapons plutonium in fuel for nuclear reactors (known as mixed-oxide or MOX fuel) is not an acceptable solution. A better method of disposition would be to immobilize the plutonium -- that is, to mix it with ceramic or glass and to provide a radioactive barrier to further prevent theft and diversion. 1

We are very concerned about the safety risks of using MOX fuel in existing reactors, almost none of which are designed to run on plutonium fuel. According to a study released by the Nuclear Control Institute in January, the use of a one-third core of warhead plutonium fuel in U.S. nuclear reactors could result in up to a 37% increase in cancer risk to the public in the event of a severe accident. Concerns are even greater in Russia. Many of the Russian reactors slated for MOX use are old and will reach the end of their 30-year licensed lifetimes before the disposition program is complete. Furthermore, Russian regulatory agencies do not have sufficient resources or political standing to adequately ensure safety at a MOX fabrication facility and at reactors. 2

Furthermore, we are dismayed that the people of both countries have been cut out of the process as decisions about plutonium disposition are made. The US has not ensured that Russian programs funded with American money follow environmental and public participation requirements. Joint US-Russian documents are largely unavailable to the Russian public, and the Russian translation of a 1996 joint study was marked "for official use only." Within the US itself, the DOE has made a mockery of the public participation process by issuing a contract for production and irradiation of MOX fuel before issuing a final Environmental Impact Statement and Record of Decision on the subject. It has also failed to include the input of communities living near reactors that are proposed for MOX fuel irradiation. Much of the European reprocessing and MOX performance record, cited by 3

DCR008

DCR008–1 **MOX Approach**

DOE acknowledges the commentors' concern regarding the use of weapons-grade plutonium in MOX fuel and irradiating it in commercial reactors. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

The commercial reactors selected for the MOX approach include only those reactors whose operational life is expected to last beyond the life of the surplus plutonium disposition program. Furthermore, although no U.S. commercial reactors are licensed to use plutonium-based fuel, several are designed to use MOX fuel, and others can easily and safely accommodate a partial MOX core.

The environmental, safety and health consequences of the MOX approach at the proposed reactors are addressed in Section 4.28. This section analyzes several reactor accidents, including both design basis and beyond-design-basis accidents. For MOX fuel, as compared to LEU fuel, there is an increase in risk, about 3 percent, for the large-break loss-of-coolant accident (the bounding design basis accident). The largest increase in risk for beyond-design-basis accidents is approximately 14 percent for an interfacing systems loss-of-coolant accident at North Anna. Both of these accidents have an extremely low probability of occurrence. In the unlikely event this beyond-design-basis accident were to occur, the expected number of LCFs would increase from 2,980 to 3,390 with a partial MOX core and prompt fatalities would increase from 54 to 60. At North Anna, the likelihood of a large-break loss-of-coolant accident occurring is 1 chance in 48 thousand per year and the likelihood of an interfacing systems loss-of-coolant accident occurring is 1 chance in 4.2 million per year.

NRC would evaluate license applications and monitor the operations of both the MOX facility and domestic, commercial reactors selected to use MOX fuel, to ensure adequate margins of safety.

DCR008–2 **Nonproliferation**

DOE acknowledges the commentor's concerns regarding the safe disposition of surplus Russian plutonium as MOX fuel, although programmatic and policy issues such as U.S. policies toward plutonium disposition in Russia are beyond the scope of this SPD EIS. The scope of this SPD EIS is focused on analysis of alternatives on whether and how much U.S. surplus plutonium should be used as MOX fuel, which technology should be used for immobilization, where to construct the proposed surplus plutonium disposition facilities that are needed, and where to perform lead assembly fabrication and testing.

DCR008–3 **General SPD EIS and NEPA Process**

The public outreach programs available to the people of Russia concerned with plutonium disposition are beyond the scope of this SPD EIS. Since the inception of the U.S. fissile materials disposition program, DOE has supported a vigorous public participation policy. It has conducted public hearings in excess of the minimum required by NEPA regulations to engender a high level of public dialogue on the program. The office has also provided the public with substantial information in the form of fact sheets, reports, exhibits, visual aids, and videos related to fissile materials disposition issues. It hosts frequent workshops, and senior staff members make presentations to local and national civic and social organizations on request. Additionally, various means of communication—mail, a toll-free telephone and fax line, and a Web site (http://www.doe-md.com)—have been provided to facilitate the public dialogue.

Efforts were made to contact persons living near the selected reactor sites and inform them of the proposed use of MOX fuel. The *Supplement to the SPD Draft EIS* was mailed to those stakeholders who requested it as well as to those specified in the DOE *Communications Plan* (i.e., Congressional representatives, State and local officials and agencies, and public interest

groups around the United States) and the utilities' contact lists. The utilities, Duke Power Company and Virginia Power Company, would operate the proposed reactors (located in North Carolina, South Carolina, and Virginia) should the MOX approach be pursued per the SPD EIS ROD. For those interested parties who could not attend the public hearing on the *Supplement* held in Washington, D.C., DOE provided various other means for the public to express their concerns and provide comments: mail, a toll-free telephone and fax line, and the MD Web site. Further, interested parties would likely have the opportunity to submit additional comments during the NRC reactor license amendment process.

DOE conducted a procurement process in accordance with DOE NEPA regulations 10 CFR 1021.216. The selected team, DCS, would design, request a license, construct, operate, and deactivate the MOX facility as well as irradiate the MOX fuel in domestic, commercial reactors. However, these activities are subject to the completion of the NEPA process. As stipulated in DOE's phased contract with DCS, until and depending on the decisions regarding facility siting and approach to surplus plutonium disposition are made and announced in the SPD EIS ROD, no substantive design work or construction can be started by DCS on the MOX facility. Should DOE decide to pursue the No Action Alternative or the immobilization-only approach, the contract with DCS would end. The contract is phased so that only nonsite-specific base contract studies and plans can be completed before the ROD is issued, and options that would allow construction and other work would be exercised by DOE if, and only if, the decision is made to pursue the MOX approach. DOE is not permitted to disseminate proprietary or secret information, although as much information as possible (e.g., redacted copies of the contract with DCS) has been made available to the public. To learn more about the surplus plutonium disposition program or DCS, the team selected to fabricate the MOX fuel and irradiate it; request to be included on the mailing list; or to contact the program office, visit the MD Web site at http://www.doe-md.com. Written requests for information on the program can be addressed to: Office of Fissile Materials Disposition, United States Department of Energy, P.O. Box 23786, Washington, DC 20026-3786.

STATEMENT OF NON-GOVERNMENTAL ORGANIZATIONS ON PLUTONIUM DISPOSITION
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DOE as proof that MOX is a sound technology, is secret, further hindering public participation. | 3

We hear a number of contradictory things from the US and Russian governments about the rationale behind a MOX program. DOE representatives say that the United States must support MOX programs in both countries because Russia insists upon it. Meanwhile, Minatom has said that it would prefer not to undertake a large-scale MOX program at the current time, and will do so only with heavy funding from abroad. | 4

Minatom officials claim that plutonium is a valuable energy resource. Yet by their own estimates, plutonium-based nuclear energy will be more expensive than uranium-based nuclear energy for at least several decades. US officials say that MOX is not being pursued for its energy value but rather that it has been chosen to facilitate quick disposition of plutonium in Russia. However, immobilization is likely to be a much faster and cheaper method of plutonium disposition than MOX. | 5

Finally, we are told that the MOX program is a non-proliferation measure. But under pressure from nuclear establishments in both countries, the goal of stabilization and immobilization of plutonium has been undermined by a program which threatens to push both countries into a plutonium economy. Money makes policy. The larger the investment into plutonium facilities under the auspices of a disposition program, the more likely it is that these facilities will continue to be used for other purposes once the disposition program is completed. Furthermore, it is apparent that international plutonium companies such as Cogema (France) and British Nuclear Fuels, Ltd. are seeking to serve their own financial interests by pushing MOX.

Fresh MOX fuel in commerce presents a proliferation threat as the plutonium in it can be removed and used for weapons purposes. A 1997 DOE non-proliferation assessment of plutonium disposition found "that fresh MOX fuel remains a material in the most sensitive safeguards category, because plutonium suitable for use in weapons could be separated from it relatively quickly and easily." | 4

It is clear to us that rather than solving the problem of placing plutonium into safe and secure forms, a MOX program is likely to promote further plutonium processing and use, something that is undesirable on environmental, safety, economic, and non-proliferation grounds.

Therefore, we call on the US and Russian governments to stop MOX disposition programs in both countries. Instead, emphasis should be placed on safe storage and development of immobilization programs.

Plutonium disposition programs must include significant and meaningful public input, including access to all information, including costs and operating records of the various actors involved in a disposition program. The public in the communities most directly affected should have ample opportunity for meaningful input into the decision-making process. All US funding of Russian programs should be contingent on compliance with the appropriate environmental and public process laws. | 3

DCR008

DCR008–4 **Nonproliferation**

The *Joint Statement of Principles* signed by Presidents Clinton and Yeltsin in September 1998 provide general guidance for achieving the objectives of a future bilateral agreement to disposition surplus plutonium in the United States and Russia. Sensitive negotiations between the two countries have indicated that the Russian government accepts the technology of immobilization for low-concentration, plutonium-bearing materials, but that the MOX approach would be considered for higher-purity feed materials.

Understanding the economic dilemma in Russia, the U.S. Congress has appropriated funding for a series of small-scale tests and demonstrations of plutonium disposition technologies jointly conducted by the United States and Russia. In fiscal year 1999 (starting October 1998), Congress further appropriated funding to assist Russia in design and construction of a plutonium conversion facility and a MOX fuel fabrication facility. This funding would not be expended until the presidents of both countries signed a new agreement. Although the amount appropriated by Congress is not sufficient to fund the entire Russian surplus plutonium disposition program, the United States is working with Russia and other nations to resolve this issue.

DOE agrees that plutonium oxide and fresh MOX fuel are proliferation concerns and would only ship these materials in SST/SGTs as discussed in Appendix L. To avoid proliferation concerns at the proposed plutonium disposition facilities, they would be built to meet DOE and/or NRC's highest security standards, guarded by heavily armed security forces, and surrounded by state-of-the-art security equipment. However, DOE does not agree that MOX presents a larger proliferation concern than immobilized plutonium. A nonproliferation assessment was completed by DOE on the various alternatives for disposing of surplus plutonium. This assessment, *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives* (DOE/NN–0007, January 1997), concluded that "Each of the options for disposition of excess weapons plutonium that meets the Spent Fuel Standard would, if implemented appropriately, offer major nonproliferation and arms reduction benefits. . ."

Signatories to the Statement of Non-Governmental Organizations on Plutonium Disposition
June 15, 1999

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DCR008

Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose of this proposed action is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard. The Spent Fuel Standard, as identified by NAS and modified by DOE, is to make the surplus weapons-usable plutonium as inaccessible and unattractive for weapons use as the much larger and growing quantity of plutonium that exists in spent nuclear fuel from commercial power reactors. Consistent with the U.S. policy of discouraging the civilian use of plutonium, a MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. For reactor irradiation, the NRC license would authorize only the participating reactors to use MOX fuel fabricated from surplus plutonium, and the irradiation would be a once-through cycle with no reprocessing.

DCR008–5 **Alternatives**

DOE has identified as its preferred alternative the hybrid approach as discussed in response DCR008–1. As shown in the cost report, *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998), it is expected that the hybrid approach would be more expensive than the immobilization-only approach.

STATEMENT OF NON-GOVERNMENTAL ORGANIZATIONS ON PLUTONIUM DISPOSITION
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Signatories to the Statement of Non-Governmental Organizations on Plutonium Disposition June 15, 1999

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Signatories to the Statement of Non-Governmental Organizations on Plutonium Disposition
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Signatories to the Statement of Non-Governmental Organizations on Plutonium Disposition
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Atlanta, Georgia

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Kevin Kamps
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Appendix A
Transcript of Public Meeting on Mixed-Oxide Fuel

A.1 TRANSCRIPT OF PUBLIC MEETING ON MIXED-OXIDE FUEL HELD IN COLUMBIA, SOUTH CAROLINA ON JUNE 24, 1999

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5
6
7 PUBLIC MEETING ON
8 MIXED-OXIDE FUEL
9
10
11 **CONDENSED**
12
DATE: Thursday, June 24th, 1999
13
TIME: 6:38 p.m.
14
LOCATION: Gressette Building
15 Columbia, SC
16 REPORTED BY: LISA D. JETER
Court Reporter
17
18
19
20
21

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22 COMPUSCRIPTS, INC.
A Full-Service Court-Reporting Agency
23 Post Office Box 7172
Columbia, SC 29202
24
25

MEMBERS ON PANEL:

SENATOR PHIL P. LEVENTIS
SENATOR JOHN COURSON
MR. ETHAN BROWN
MS. ABBY WOODWARD
MR. DAVID NULTON
MR. BERT STEVENSON
MR. CHARLIE ANDERSON
DR. ARJUN MAKHIJANI
MS. MARY OLSON
MR. ROBERT C. SELBY
MR. DENIS HUGELMAN
MR. R.H. IHDE
MR. STEVE NESBIT

SENATOR LEVENTIS: Good evening. I'm Phil Leventis, and I have convened this meeting to meet several purposes.

I want to expand the record and create a record, an additional record, on the MOX proposal that the Department of Energy has initiated for the Savannah River Site.

I want to offer the Department of Energy and contractors an opportunity to make statements they may want to make. And they have also agreed to answer questions, which is the primary purpose for all of our being here.

Then as time permits, I would like to permit you to ask questions, as well. But from the number of people who have indicated they are interested in asking questions, I hope we can accommodate as many as possible. I don't know how many that will be.

We have a variety of folks with us this evening, and I appreciate everyone's being here.

Let me, before I recognize anyone, tell you that we're going to conduct a relatively informal meeting. However, if you would like to speak, be recognized, please come

to the podium, and state your name clearly for the recorder.

Our recorder this evening is Ms. Lisa Jeter, and she will be recording the proceedings, and we also have a tape recording of the proceedings.

The scenario I would like to follow is, I would like to recognize first those folks who are here from the Department of Energy, from Cogema, from Westinghouse, and also from Duke, and several others who are here whom I would like to acknowledge. Then I'm going to turn the meeting over to Mr. Nulton for some comments from DOE.

Because of the technical nature of the issues that I would like to deal with, I would like for the folks who are speaking to be able to complete their presentations before we start asking any questions.

I have a series of questions that I would like to ask before we open it up to the public, so if you have questions, please write them down.

I've already recognized Ms. Jeter, who is our recorder. I'd like to recognize

several members of the legislature that are here. I've mentioned myself; Senator John Courson, from Columbia; Representative Bill Clyburn. He's sitting in the back with some folks from his district, which is near the facility.

I'd also like to recognize Ms. Abigail Woodward, who has joined us this evening. She is representing Representative Nan Orrock, who is a member from Georgia, representing the downtown Atlanta area. Due to a traffic jam, I guess she wasn't able to be here.

MS. WOODWARD: Actually, she's in Washington right now.

SENATOR LEVENTIS: That's just a little joke because of the quality of life in South Carolina versus the quality of life in Georgia. We appreciate your being here and your interest.

I'd like to recognize those that I understand are here from DOE, and Dave, if there are others, please point them out.

First, Mr. Bert Stevenson; Dave Nulton, who I talked about; Mr. Bob Sel.

1 also from Duke is Mr. Steve Nesbit; and from
2 Duke, Cogema, Stone and Webster, Mr. Bob Ihde.
3 And also joining us from Europe -- and I hope I
4 pronounce your name correctly -- Mr. Dennis
5 Hugelman with Melox.
6 We also have from the Institute for
7 Energy and Environmental Research, Dr. Arjun
8 Makhijani, who has joined us, in addition to
9 some other folks from that organization.
10 Is there anyone else here whom I
11 should have recognized that I didn't? Ethan is
12 with us also. We appreciate your being here.
13 Anyone else? Oh, I'm sorry.
14 Mary Olson with Nuclear Information and
15 Resource Council from Washington.
16 Anyone else? Mr. Hank Stallworth is
17 with the Governor's office now dealing with
18 environmental issues and is just here to
19 listen.
20 Okay. All of those preliminaries
21 have been taken care of. Let me turn the
22 meeting over to Dave Nulton to make what
23 comments you'd like and to recognize those
24 people from DOE.
25 MR. NULTON: Thank you, Senator.

1 I'll be brief, so that we can get into the main
2 part of the meeting and try to address the
3 issues that you have raised.
4 We came prepared tonight with
5 representatives of the Duke, Cogema, Stone and
6 Webster team, that has been selected by the
7 government for the mixed-oxide fuel fabrication
8 and irradiation services program.
9 SENATOR COURSON: Excuse me. It may
10 be helpful on the microphone if --
11 SENATOR LEVENTIS: He's got his own.
12 SENATOR COURSON: I'm sorry about
13 that.
14 SENATOR LEVENTIS: I'm sorry.
15 MR. NULTON: I'll get closer to the
16 microphone.
17 We've tried to bring with us
18 representatives of the MOX fuel team that can
19 respond to questions that were raised by
20 Senator Leventis in a June 8th letter that he
21 sent to the Department of Energy.
22 Very briefly, the Department in
23 January of 1997 chose a hybrid approach for the
24 disposition of surplus weapons plutonium that
25 would come out of weapons here in the United

1 States.
2 That hybrid approach has two
3 technical approaches: One is to immobilize a
4 portion of the surplus plutonium in a ceramic
5 form, and then embed that ceramic form into
6 high-level waste containers that are being
7 produced at the Savannah River Site. And the
8 second approach is to use some of the plutonium
9 in mixed-oxide fuel to be burned in commercial
10 reactors.
11 We conducted a procurement last year
12 and awarded the contract in the spring of this
13 year to the Duke, Cogema, Stone and Webster
14 team, which we will refer to tonight as DCS.
15 They will design and construct and
16 operate a facility to fabricate mixed-oxide
17 fuel. And then on their team are utilities,
18 Virginia Power and Duke Power, that will
19 provide reactors that will burn that
20 mixed-oxide fuel, and we'll say more about
21 those reactors later.
22 We have ongoing a negotiation with
23 Russia. This is the result of a number of
24 discussions and agreements that were reached
25 between Vice-President Gore and Prime Minister

1 Kiriyenko, and also between Presidents Clinton
2 and Yeltsin in a number of meetings that
3 occurred over the past two to three years.
4 In September of 1998, there was a
5 summit meeting at which Presidents Clinton and
6 Yeltsin charged their officials in their
7 countries to develop a bilateral agreement
8 between Russia and the United States to dispose
9 of surplus plutonium from weapons.
10 That negotiation is ongoing, and our
11 goal is to have a bilateral agreement in place
12 at the end of this year -- actually, at the end
13 of this fiscal year.
14 So by the end of September, our goal
15 is to have a bilateral agreement in place that
16 will address a number of things: The amount of
17 material to be dispositioned in each country,
18 the means by which it will be dispositioned.
19 That agreement will also address a
20 number of transparency arrangements, that is to
21 show how each country will assure that the
22 other country is indeed getting rid of their
23 material in a way that they have identified in
24 this agreement, so that is ongoing.
25 We are also in the process of

1 completing an Environmental Impact Statement
2 and analysis that is the second of two that
3 we've done on this subject.
4 The first was a programmatic
5 Environmental Impact Statement that was
6 completed in December of 1996. And this -- the
7 more recent document that we are preparing now
8 identifies or evaluates specific sites where
9 these disposition activities will be conducted,
10 the amount of material that would go to either
11 immobilization or mixed-oxide fuel, and then,
12 of course, the impacts of the various
13 technologies to be used for that purpose.
14 At this point in time, the
15 Department has identified Savannah River as the
16 preferred site for the construction of three
17 facilities: One for immobilization of a
18 portion of the surplus weapons plutonium; one
19 for converting the weapons pits into an oxide
20 material that can be used to feed these other
21 facilities that will be used for disposition;
22 and the third would be a facility to fabricate
23 mixed-oxide fuel, which would then go to the
24 reactors that I mentioned earlier for
25 disposition.

1 ask you some questions.
2 So I'll go through a series of these
3 questions and then also may have some
4 additional information that we'd like to bring
5 up.
6 I discussed the issues with the
7 gentlemen from DOE and the other places before
8 we started, and since the purpose of the
9 meeting is to create a record, if they have
10 anything they would like to bring up or add
11 that they feel would help our understanding or
12 help in creating a record, then I invited them
13 to do that. So let me start with the series of
14 questions.
15 First of all, how long would the
16 immobilization of all 50 tons take if that were
17 the effort?
18 MR. NULTON: We are developing the
19 capability to immobilize or convert to MOX fuel
20 all 50 tons either -- you know, using a
21 combination of both or immobilizing all, in a
22 period of 10 to 15 years, and that's also the
23 time frame -- 10 years, I believe, is the time
24 frame being addressed in the bilateral
25 agreement with Russia.

1 There were a number of questions
2 raised about the contract that the Department
3 has entered into with the Duke Cogema team with
4 regard to cost and fuel offsets and things of
5 that nature. We're prepared to respond to
6 those questions tonight.
7 Also, there were a number of
8 questions raised about Cogema and their record
9 in Europe at the La Hague plant and the Melox
10 plant. I believe we can answer most of those
11 questions tonight. We also have
12 representatives from Duke Power to answer
13 questions on reactors.
14 I think, with those brief comments,
15 we should move forward.
16 SENATOR LEVENTIS: Thank you very
17 much. What I'd like to do is go through a
18 series of questions that I have put together,
19 and I have provided those for folks for DOE,
20 from DCS.
21 I did not talk with anyone from
22 Duke. But if you would like to, Mr. Nesbit,
23 we've got some questions we'd like to ask, as
24 well. I know you did not necessarily come
25 prepared, but if you would like, we'd like to

1 SENATOR LEVENTIS: And that's from
2 the point of startup?
3 MR. NULTON: The point of startup,
4 that's correct.
5 SENATOR LEVENTIS: That really
6 addresses the second question. You're saying
7 that either immobilizing all of it or using the
8 combination should take 10 to 15 years from the
9 startup?
10 MR. NULTON: That's correct.
11 SENATOR LEVENTIS: How long do you
12 think it will take, from your best information,
13 for Russia to complete the use of their 50 tons
14 of plutonium in their reactors?
15 MR. NULTON: The time frame being
16 addressed in the agreement is 10 years.
17 SENATOR LEVENTIS: And that's from
18 the time they start up?
19 MR. NULTON: Yes. Correct.
20 SENATOR LEVENTIS: Do you have any
21 ideas at this time when they're projected to
22 start up?
23 MR. NULTON: Well, the schedule that
24 we're working on right now, as we get the
25 facilities up and operating, is in the 2006

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1 time frame.
2 SENATOR LEVENTIS: And that is about
3 the schedule that you all have projected. Are
4 there any changes in that projection for our
5 startup?
6 MR. NULTON: Not at this point.
7 That is our schedule right now.
8 SENATOR LEVENTIS: Is it true that
9 the Department is beginning to design these
10 facilities that you've described even before
11 testing is complete on these projects?
12 MR. NULTON: There is preliminary
13 design work going on right now. In the case of
14 mixed-oxide fuel, there is no development work
15 to be done.
16 The MOX fuel process that is being
17 proposed for use and that will be used is
18 essentially the same as the one that's being
19 used in France. It's a process that's been
20 used for a number of years successfully. The
21 fuel has been used successfully in French
22 reactors, so there is no development work to be
23 done there.
24 SENATOR LEVENTIS: Excuse me. Is
25 that weapons-grade fuel that's reprocessed?

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1 MR. NULTON: It is not weapons-grade
2 fuel, but we're prepared to talk about the
3 differences in those two, if you'd like to do
4 that.
5 SENATOR LEVENTIS: Well, go ahead
6 and finish. I'm sorry I interrupted you.
7 MR. NULTON: Okay. In the case of
8 immobilization -- well, let me go to pit
9 conversion. The pit conversion process
10 involves taking a weapons pit, separating it
11 into two hemispherical pieces, and then
12 converting that hemisphere into an oxide form,
13 plutonium oxide.
14 We currently have a demonstration
15 line, a full-scale demonstration line,
16 operating at the Los Alamos National
17 Laboratory, so that is proceeding.
18 There's really two purposes of that
19 facility: One is to demonstrate the process,
20 most of the pieces of which have been
21 demonstrated in the past, but what we've done
22 is integrated it into a single line, and that
23 work is ongoing.
24 The second purpose of that is to
25 process several of the different types of pits

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1 that were produced during the Cold War to show
2 that we can handle these different kinds of
3 pits, so that activity is ongoing.
4 In the case of immobilization, we're
5 in the final stages of demonstrating the
6 technical process that's going to be used for
7 immobilization.
8 SENATOR LEVENTIS: Is it absolutely
9 necessary to go through the conversion of the
10 weapons pits to go to immobilization?
11 MR. NULTON: Yes. They have to be
12 converted to a feed form that can be used for
13 that immobilization process.
14 SENATOR LEVENTIS: I know that the
15 plan is to use that conversion of the weapons
16 pits for both immobilization and for
17 preparation to fabricate the MOX.
18 Is that the only process that could
19 be used for immobilization, for preparation for
20 immobilization, or are there other processes
21 available?
22 MR. NULTON: We have to convert it
23 to a feed form. Now, we probably don't
24 necessarily need to do it with a pit conversion
25 facility. There are chemical processes that

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1 can be used, but they also would require new
2 facilities. So we would propose to use the pit
3 conversion facilities if we were allowed to do
4 that.
5 SENATOR LEVENTIS: Are they similar
6 in cost when you're talking about the other
7 alternatives for immobilization, beginning the
8 immobilization process?
9 MR. NULTON: We, in our analysis,
10 concluded that the quickest and least expensive
11 way to build is with the pit conversion
12 facility, yes.
13 Considering the other activities
14 that are planned for the facilities that are
15 already in existence at Savannah River, the
16 commitments made to shut those facilities down
17 in a certain time frame, the fact that we would
18 have to make modifications to those facilities,
19 we felt that pit conversion facility was --
20 designing was the way to go, yes.
21 SENATOR LEVENTIS: Isn't it true
22 that with several programs, including the ITP,
23 that unfortunately has just failed, that the
24 Department has authorized design, even
25 construction, before testing was complete?

1 MR. NULTON: Charlie, can you answer
2 that?
3 MR. ANDERSON: Just a little bit on
4 the intank precipitation, ITP, that you talked
5 about. There actually was testing that was
6 conducted for ITP. It was conducted in a lab
7 and in a demonstration prototype scale form.
8 The difficulty with ITP has been
9 taking that technology and putting it into a
10 production mode inside a high-level waste tank.
11 Of course, that was the cost savings feature
12 for the intank precipitation process also.
13 One of the alternatives being
14 considered for that process is a smaller
15 version in a smaller tank, so that you can
16 control the process. The process was approved
17 in laboratory process.
18 So there was testing there. And in
19 a lot of these projects, particularly first of
20 a kind, it's in the conversion of that testing
21 at a lab scale, and then a prototype scale,
22 onto a full production scale.
23 In some cases, as in DWPF, some
24 portions of that system were tested at full
25 scale. Dave just mentioned the pit disassembly

1 used to produce MOX consists of mixing some
2 borders -- (inaudible) uranium border and
3 plutonium border, under processes exactly the
4 same.
5 It's different from the release of
6 plutonium, civilian plutonium or military
7 plutonium. Oxide -- you mix it with uranium --
8 (inaudible). It's exactly the same process.
9 But we don't use military plutonium in France.
10 SENATOR LEVENTIS: Right. And we
11 expect some differences, I suppose.
12 The question is: Have we already
13 started designing this plant before we've
14 demonstrated on a scale of about 5 tons per
15 year that we can extract the pits?
16 I take it you're saying, David, that
17 out in Los Alamos they are doing a production
18 rate of about 5 tons a year. And my concern
19 and my question is: Have we started designing
20 full-scale plants yet, and where are we in the
21 testing of the fabrication of MOX fuel using
22 weapons-grade plutonium?
23 MR. NULTON: Let me be clear on the
24 demonstration at Los Alamos. This is a
25 full-scale line, but there will be multiple

1 is being worked -- that process at a full
2 scale. And there are some processes that can
3 be better done at a full scale than others.
4 I don't know if you had any other
5 examples, but --
6 SENATOR LEVENTIS: I guess what I'm
7 getting at is, those particular programs, no
8 one thought that they would fail to succeed,
9 but unfortunately they did. I'm just wondering
10 how the department is trying to take that into
11 account in terms of the mixed-oxide fuels,
12 which, to my knowledge, the mixed-oxide fuels
13 using weapons-grade plutonium have not on any
14 scale been done before.
15 MR. NULTON: The question is use the
16 of weapons-grade plutonium to do that.
17 MR. HUGELMAN: In France we don't
18 use the military plutonium for MOX fuel. We
19 use only civilian plutonium coming from
20 reprocessing of used civilian fuel coming from
21 the nuclear power plant, VDF from France, the
22 other customers of Cogema, means utilities
23 coming from Japan, Germany, Switzerland,
24 Belgium.
25 And in fact, the process which is

1 lines required in the actual pit conversion
2 facility. So it is not processing 5 tons a
3 year at this point in time. It's just
4 demonstrating with different types of pits that
5 we can take pits apart and convert them into an
6 oxide powder. So we have a larger through put
7 facility that will ultimately be used at
8 Savannah River for processing those pits.
9 Also, in the case of the MOX plant,
10 the through put will be 3-1/2 tons a year as
11 opposed to 5, because we're proposing to use
12 immobilization for the balance of that
13 5-ton-per-year capacity.
14 I think what Mr. Hugelman was saying
15 here is that, from the fabrication point of
16 view, the process is the same using the weapons
17 plutonium or the recycled plutonium for the
18 fabrication of the MOX fuel. Chemically it's
19 the same, as I understand.
20 SENATOR LEVENTIS: What about with
21 the demonstration at Los Alamos and also with
22 the fabrication, are the rates of waste
23 generation consistent with what the '96
24 Environmental Impact Statement said and all th
25 estimates that we have available to us?

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1 MR. NULTON: We have prepared and
2 released a couple months ago a supplement to
3 the draft EIS.
4 The way this process worked was, we
5 prepared a draft Environmental Impact Statement
6 and then in our procurement of a contractor for
7 the MOX program, we asked for environmental
8 data to be submitted as part of their proposals
9 so that we could take actual data from actual
10 facilities and processes that were being
11 proposed for use.
12 We took that environmental data and
13 updated our analysis. We issued -- an
14 environmental critique was prepared, and we
15 issued a synopsis of that critique for public
16 review. Then we also took that information and
17 prepared a supplement to draft EIS, updated it
18 using the most recent data from the
19 procurement.
20 In there we updated our waste
21 streams, and for the most part, the
22 environmental impacts and waste streams were
23 not significantly different. There were
24 some -- in the case of true waste and low-level
25 waste, the numbers went up from -- in the case

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1 of true waste, from .5 liters to 500 liters.
2 In the case of low-level waste, from .3 liters
3 to 300 liters.
4 SENATOR LEVENTIS: For --
5 MR. NULTON: This is waste produced
6 per year. That's transuranic waste produced
7 per year, and low-level waste produced per
8 year.
9 SENATOR LEVENTIS: Five hundred
10 liters?
11 MR. NULTON: Liters, yes. This is a
12 relatively small amount, low-level waste as
13 well. I think Savannah River has a low-level
14 waste processing capacity of 1.9 billion
15 gallons per year. So 300 liters is 75 or
16 80 gallons per year. So it's a relatively
17 small amount compared to what these sites
18 normally produce.
19 Those numbers were different for two
20 reasons mainly. First of all, we now had an
21 actual process that we could use to identify
22 what those waste stream volumes were.
23 Secondly, we added a polishing
24 process on the front of the MOX plant, which
25 added to the waste produced in the MOX plant.

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1 So those numbers were different.
2 Others numbers changed, as well.
3 Some went down. Some went up slightly, but for
4 the most part, the numbers were not
5 significantly different.
6 SENATOR LEVENTIS: Now, is this
7 taking into account -- or tell me now, have you
8 all decided to go with more of a wet process
9 than the originally proposed dry process for
10 production?
11 MR. NULTON: No, one of the chemical
12 constituents in weapons plutonium is a metal
13 called gallium. It was introduced into
14 plutonium at a volume percent of 1 percent. It
15 helps with the fabricability of the weapons
16 pits. It can be a problem for the cladding of
17 the fuel and reactors.
18 So in the procurement, we gave the
19 proposers an option to remove that gallium
20 using a dry process, the pit disassembly,
21 conversion facility, or using a wet process on
22 the front end of the MOX facility.
23 This is not a full-scale chemical
24 processing capability. It's a small chemical
25 plant that will just remove that gallium

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1 material.
2 In the case of the Duke Cogema team,
3 they chose the wet processing step on the front
4 end, so that is what we're using now as our
5 reference case.
6 SENATOR LEVENTIS: And that is what
7 changed the amount of waste?
8 MR. NULTON: That does increase the
9 amount of waste that we have out of the MOX
10 facility, yes.
11 SENATOR LEVENTIS: Are those changes
12 going to affect the startup date?
13 MR. NULTON: No, they're not. In
14 fact, my guess is they actually make the
15 schedule much more achievable because the
16 removal of gallium using a dry process, using
17 what we were calling the TIGR -- I can't
18 remember what TIGR stands for now -- Thermal
19 Induced Gallium Removal. TIGR is what we call
20 it, Thermal Induced Gallium Removal.
21 This would have been a process used
22 in the pit conversion facility. It was very
23 developmental. Although we had done some
24 preliminary work on it, we were not getting the
25 gallium levels down as low as we would have

1 liked. By using the wet chemistry approach, we
2 get them down to extremely low levels which are
3 acceptable to the utilities, so I think in
4 terms of development in time, the dry process
5 would have taken much longer to develop. The
6 chemical process is well understood.
7 In terms of cost, the TIGR process
8 would have cost on the order of $50 million to
9 develop, and although we still need to get some
10 more preliminary design done to get a good cost
11 estimate, it will be on the order of, perhaps,
12 $50 million, as well, so I think it's a wash
13 with the cost.
14 SENATOR LEVENTIS: Pardon the pun.
15 MR. NULTON: Yes. Sorry.
16 SENATOR LEVENTIS: When do you
17 expect testing to be complete for the pit
18 conversions and the immobilizations?
19 MR. NULTON: Do you know? 2002 for
20 the pit conversion.
21 SENATOR LEVENTIS: And the design is
22 taking place now, though, of the production
23 facility?
24 MR. NULTON: In the case of pit
25 conversion, it has not gotten started, but

1 probably started within a month.
2 MR. SELBY: That's right.
3 SENATOR LEVENTIS: Let me proceed.
4 Are there any penalties that DOE or
5 the government have to pay to contractors if
6 parts of this program are not ready when --
7 with the schedule that has been proposed or
8 contracted for, I should say?
9 MR. SELBY: You're right. We need
10 to explain that there is -- at least in the MOX
11 fuel fabrication facility, part of the
12 plutonium disposition -- a base contract that
13 is laid out for preliminary design and final
14 design of the MOX fuel fabrication facility and
15 also at the reactor sites.
16 That program would go through about
17 2003 before we're ready to move to a new
18 option, which is the option for construction,
19 and we will not move into the option for
20 construction until such time that the Secretary
21 makes a decision that the processes that will
22 support it -- the Russian program that will
23 support the MOX disposition is in place -- so
24 we do have what I would call the offramp, if
25 there are major problems there at the end of

1 the design effort in the MOX disposition
2 contract. We do not have to proceed to option
3 one.
4 SENATOR LEVENTIS: I don't want to
5 take you all too far afield from technical
6 matters, but is it fair to say that the impetus
7 for this program is diplomatic and deals with
8 our relationships with Russia more than it does
9 with a technical decision that this was the
10 avenue that we should take?
11 MR. NULTON: I think the impetus for
12 this program is primarily the concern over the
13 Russian plutonium materials, getting them
14 initially into safe, environmentally sound
15 storage, but then getting them into some
16 disposition path, so they cannot be reused with
17 weapons or be converted to another nation where
18 they can be used as weapons.
19 SENATOR LEVENTIS: We've got a
20 series of questions we'll ask you on that on
21 the second page, but let me get back to the
22 questions before us.
23 As part of this process, is the
24 Department of Energy or the government going to
25 pay the uranium industry for any declines in

1 sales of fuel prices that they may experience
2 as a result of the replacement of uranium fuel
3 with the MOX fuel?
4 MR. SELBY: It's such an
5 insignificant amount. Considering the total
6 amount of nuclear reactors that are used in the
7 uranium field, there should be no impact for
8 the six reactors using 40-percent MOX fuel,
9 because they are also using uranium fuel at the
10 same time.
11 SENATOR LEVENTIS: So you don't
12 believe that there will be an impact?
13 MR. SELBY: No, I don't.
14 SENATOR LEVENTIS: Let me ask a few
15 questions. Mr. Hugelman, I'll ask these
16 questions of DOE first and then give you an
17 opportunity to talk at a later point about
18 these things so if you have some points you'd
19 like to make, we'll get to that.
20 From the perspective of DOE, do you
21 believe that Cogema's record of compliance with
22 the laws in its home country is relevant for
23 its potential compliance to the United States
24 law?
25 MR. NULTON: Yes, and we reviewed

1 those as part of the process.
2 SENATOR LEVENTIS: Have you made
3 those public? Do we have available to us the
4 records that you looked at about Cogema's
5 compliance?
6 MR. STEVENSON: Yes sir, you do, in
7 the form of an environmental synopsis, which
8 takes the environmental information that was
9 provided to us by DCS, which we independently
10 assessed and verified and presented to the
11 decision maker, Mr. Howard Canter, who's the
12 person who was the source selection official.
13 And that synopsis said to him that we had
14 reviewed the environmental -- or the potential
15 environmental -- impact of this contract, and
16 we recommended in that synopsis that he approve
17 the contract.
18 SENATOR LEVENTIS: Now, in making
19 those recommendations, did you review
20 information about Cogema's record of compliance
21 in the European facility?
22 MR. SELBY: During the proposal
23 period we -- first of all, we were unable to
24 release anything to the public because we were
25 in a procurement process.

1 The procurement looked at the NRC
2 regulations -- the recognition. The
3 procurement recognized the Cogema plant, the
4 Melox plant, would be transferred to the United
5 States, and would be required to follow all of
6 our internal NEPA requirements, our EPA
7 requirements, and the NRC requirements.
8 We also requested the environmental
9 information as a result of discharges, of
10 whatever the discharges were to the environment
11 from the Melox plant. Those were evaluated as
12 part of the RFP process and were used in
13 preparing the environmental synopsis.
14 SENATOR LEVENTIS: Is that
15 information anywhere available to the public
16 now?
17 MR. SELBY: That information is
18 going to be made available, as I understand it.
19 MR. STEVENSON: Excuse me. The
20 environmental synopsis has been published. It
21 is on our electronic or worldwide web site and
22 also is available upon request by mail.
23 SENATOR LEVENTIS: Now, if it were
24 requested by mail, is it the synopsis or is it
25 the full information?

1 MR. STEVENSON: The synopsis, as it
2 turns out, because we only had -- let me
3 explain one thing about the difference between
4 computing and synopsis.
5 MR. NULTON: I'd like to say
6 something. I think the quick answer here, the
7 bottom line, is this information is available,
8 and I think when we hear Cogema speak later in
9 the meeting, they will. In fact, in the
10 answers to the questions that were sent to you,
11 Senator, we gave you some of this information,
12 and we have more this evening.
13 There are web sites, reports, a
14 number of things that have been prepared by the
15 French government that speak to the releases
16 from both the La Hague and the Melox plant and
17 to what extent they meet the standards and
18 release limits in France, so I think we have
19 some of that. I think, in the public domain,
20 and we have more that we will speak to this
21 evening.
22 SENATOR LEVENTIS: Do they meet the
23 release limits in France?
24 MR. NULTON: Yes, they do.
25 SENATOR LEVENTIS: Do they meet the

1 international treaty limits set in the 1980s?
2 MR. NULTON: Yes.
3 MR. HUGELMAN: Speaking around the
4 releases of Cogema, we can speak around the two
5 plants, La Hague and Melox, exactly the same
6 rules in France. To be allowed to run such a
7 plant, we have to have an authorization for
8 releases. The authorization for releases is
9 given by the two ministries in France. The
10 F ministry and the intergovernmental ministry.
11 For example, for La Hague
12 reprocessing plant, we have two authorizations.
13 One is along the liquid discharge, and the
14 other is along the air discharge. This is for
15 reauthorization.
16 When we have such an authorization,
17 we have to have a public inquiry. We have to
18 have documents given to people who can read it,
19 keep the information, ask the questions.
20 We have to give such a procurement
21 to the open community because we are in Europe
22 under the European rules, something which is
23 named Article 47. The European community has
24 to give them advice around the authorization,
25 discharge authorization, and around the impact

1 of these releases.
2 Upon this information is disclosed
3 for this procedure in France and Europe. After
4 that when we have authorization, each month we
5 give all of the information along what was
6 released first to the authorities and second to
7 the public. And we give these each month
8 around each site. I have one for one site of
9 Cogema. We disclose -- with all the
10 information, all the readings in the
11 atmosphere, in water, if we are -- on all the
12 analyses we do on all the results of the
13 analyses.
14 For example, for oxides, we would
15 take around 20,000 samples per year. We do
16 around 80 analyses of the samples. We give the
17 information on paper. We send it. We print
18 several thousand of this document. We send it
19 to people, to the elected people, to all the
20 communities around the plant, but we don't put
21 that very often on the web because we have
22 since 20 years in France a national system,
23 Minitel. On Minitel, it's very used in France.
24 In fact, we put information on Minitel.
25 On the web it's becoming more and

1 more popular. I think now month after month,
2 we are getting more and more information on the
3 web sites of Cogema. But the Minitel system is
4 public. Everybody in France has a Minitel at
5 home and can ask them questions.
6 On the other side, there is another
7 thing which is very important that we have what
8 we name CLI. This is an information
9 commission. On the inside the information
10 commission, there are some elected people,
11 generally the president is a mayor or he's a
12 deputy, a member of parliament.
13 Inside the commission there are some
14 trade union representatives. There are some
15 anti-trade association representatives. There
16 are some elected people. And once every three
17 months, there is a meeting, and we go to give
18 all of the information to the local information
19 commission to these people.
20 Each year, to finish with this
21 topic, we disclose an informal report, and we
22 give all of this information. These documents
23 are public, that we give to people.
24 So in fact, all of the information
25 around what we release is disclosed to the

1 public around all of the sites of Cogema,
2 La Hague and around Melox. This is the same
3 rule.
4 SENATOR LEVENTIS: Thank you. Has
5 your company at either one of those plants been
6 cited for violations of the discharges?
7 MR. HUGELMAN: Never, sir. We can't
8 do that. If we did that, the French
9 authorities would stop the plant. We can't do
10 that.
11 SENATOR LEVENTIS: How about the
12 1980 discharge permit that you received? Have
13 you received an update since then, or are you
14 still operating under that permit?
15 MR. HUGELMAN: No. The permit we
16 had was -- for the La Hague plant was in '84.
17 That was for the La Hague site. I will look.
18 The one for Melox was in '94, because Melox is
19 a much more recent plant, in fact. And for
20 La Hague, the last year, meaning in '98 of all
21 the graduated amounts because we have
22 authorization for the graduated amounts.
23 For example, for emissions last year
24 on the air, it was 3.3 percent of the
25 authorization. For the -- 0.06 percent. I

1 have all the information here. I have a slide.
2 Perhaps we can show it if you want.
3 SENATOR LEVENTIS: We just need to
4 make it available so folks can get it if they'd
5 like.
6 MR. HUGELMAN: It was the same year
7 after year. For Melox it's around 0.5 percent
8 of the authorization.
9 SENATOR LEVENTIS: Did the company
10 not have a proposal for a plant in Germany?
11 Did you all bid on a plant to construct a plant
12 in Germany to do reprocessing?
13 MR. HUGELMAN: Construct a plant in
14 Germany? I think the German project a long
15 time ago -- it was German people, a German
16 company. It wasn't Cogema.
17 SENATOR LEVENTIS: Was Cogema going
18 to be a part of a consortium there as you are
19 here, or do you recall?
20 MR. HUGELMAN: I don't know because
21 I have to say who I am. I am the Director of
22 the Melox plant in France -- produce the MOX
23 fuel for EDF in the next future for the
24 Japanese utilities. I was before the Deputy
25 Director of La Hague processing plant. I'm

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1 here today to answer your question around
2 Melox.
3 SENATOR LEVENTIS: So you're not
4 aware how much of Cogema is owned by the French
5 government? Do they have an ownership?
6 MR. HUGELMANN: Yes. A part of the
7 French government is a little more than
8 80-percent. The name of the party is Total,
9 which is another company.
10 SENATOR LEVENTIS: Thank you.
11 Let me shift the focus to the folks
12 from DOE and talk about the agreement that you
13 talked about earlier that was made between
14 President Clinton and Vice-President Gore and
15 Russian officials. Let's talk about that for a
16 while, if you don't mind.
17 Is there any agreement with Russia
18 that obligates the United States to use the MOX
19 process?
20 MR. NULTON: The only agreement that
21 will determine how much material gets
22 dispositioned and how much will be by MOX or
23 other means is this bilateral agreement that I
24 spoke of earlier that will be concluded in
25 September.

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1 At this point, it is going to result
2 in MOX being used in Russia and MOX being used
3 for a portion of material in this country.
4 The Russians, when we first talked
5 with them, their preference was to store their
6 plutonium and to save it for a number of
7 decades and use it in advanced breeder
8 reactors.
9 As a result of this Clinton/Yeltsin
10 summit that I mentioned in September of '98,
11 the agreement was made that they wouldn't do
12 that, they'd get rid of it sooner using some
13 more expedient means, and that's what focused
14 the attention on the use on commercial reactors
15 and MOX.
16 So the bilateral agreement, as we
17 call it, that will be concluded in the fall.
18 We'll have the final agreements on how much
19 material and what means will be used to get rid
20 of it, and it will involve MOX.
21 SENATOR LEVENTIS: So do you think
22 that that agreement will obligate the United
23 States to use the MOX process?
24 MR. NULTON: It will. I mean, it
25 will say how much we are going to get rid of

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1 and how much will go to MOX versus
2 immobilization.
3 SENATOR LEVENTIS: I know you
4 weren't there, but I think you keep up with it.
5 Has Russia stated that they will not pursue a
6 disposition program if we do not pursue MOX?
7 MR. NULTON: They've certainly made
8 those statements to us as we've talked with
9 them over the years, yes.
10 SENATOR LEVENTIS: Is Russia
11 planning to use the MOX process in their
12 light-water reactors? Is that something that
13 we're trying to compel them to do through the
14 agreement, or where did that come from?
15 MR. NULTON: As I said earlier, it
16 came from the fact that their real preference
17 was to save the plutonium, to stockpile it, and
18 to use it in breeder reactors in perhaps one to
19 two decades, and then use those breeder
20 reactors to make even more plutonium.
21 It was the Clinton/Yeltsin agreement
22 in September of '98 that drove us towards a
23 nearer term conclusion using the commercial
24 reactors and MOX in these commercial reactors.
25 SENATOR LEVENTIS: So is it our idea

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1 that they should use it in their light-water
2 reactors or is that something they --
3 MR. NULTON: I think it's their idea
4 and it's our idea collectively.
5 SENATOR LEVENTIS: Are we going to
6 pay for their use of MOX fuel in their
7 light-water reactors?
8 MR. NULTON: The Russians do not
9 have the money to implement this program, and
10 they have said that they would need financial
11 support from the G7 countries, of which we are
12 one: Ourselves, Canada, Germany, France,
13 Britain, Italy, Japan. We will not pay for it
14 all, but we will pay for a portion of it.
15 SENATOR LEVENTIS: And that's that
16 same agreement that's being worked out, the
17 bilateral?
18 MR. NULTON: Yes. That bilateral
19 agreement will have some -- and again, I'm not
20 negotiating the agreements. I don't know the
21 specific terms. There will be provisions in
22 there or statements by the Russians that they
23 will need financial support from the other
24 countries.
25 SENATOR LEVENTIS: I know it's not

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1 finished, but to date, is it true that they are
2 allowed to reextract left-over plutonium from
3 MOX spent fuel after the passage of some time?
4 MR. NULTON: After the passage of
5 some time, yes. There are provisions in the
6 agreement, being negotiated in the agreement,
7 that the Russians will not be allowed to
8 reprocess any spent fuel that was made with
9 weapons plutonium until all of that weapons
10 plutonium has gone through the disposition
11 process.
12 SENATOR LEVENTIS: At the present
13 projection, that would be sometime after 2015?
14 MR. NULTON: It would be after 2015.
15 It would be at least 10 years after whenever
16 they began to disposition this material, which
17 would start in 2006.
18 SENATOR LEVENTIS: Will the delay in
19 reprocessing the MOX spent fuel negatively
20 affect Russia's current reprocessing program?
21 MR. NULTON: I don't know that they
22 have a current reprocessing program at this
23 time. They don't have the money to get a
24 reprocessing program going at this point.
25 SENATOR LEVENTIS: Do they have to

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1 do substantial changes in their light-water
2 reactors to use MOX fuel?
3 MR. NULTON: At the rate that they
4 will be using the MOX, they do not need to make
5 substantial changes to their reactors.
6 If they want to increase the amount
7 of material that goes into those reactors, they
8 would need substantial changes, as I understand
9 it.
10 SENATOR LEVENTIS: Have there been
11 any discussions of liabilities for any
12 accidents that happen while the MOX program is
13 in use over there?
14 MR. NULTON: That's part of what's
15 being negotiated in this contract, how
16 liabilities will be handled.
17 SENATOR LEVENTIS: Do you know the
18 current status of that?
19 MR. NULTON: I don't know the status
20 at this point.
21 There is language that's been
22 proposed on both sides. I just don't know what
23 the status is at this point. It's probably
24 being negotiated literally as we speak.
25 SENATOR LEVENTIS: You mentioned

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1 earlier something about an escalator out of the
2 process if it was required. Do you think
3 that -- do we have the ability or are we
4 committed to stop the MOX program if there are
5 difficulties, for example, if the Russians
6 don't enter into the bilateral agreement?
7 MR. NULTON: Absolutely. If the
8 Russians don't enter into the bilateral
9 agreement, then we will not proceed into
10 construction and disposition of our own
11 material. The idea is that we will move
12 forward roughly in step with the Russians. We
13 both get rid of our material or neither of us
14 do.
15 SENATOR LEVENTIS: Has DOE agreed,
16 or in this agreement is there anything that
17 will allow Russia to make MOX fuel for its
18 breeder reactors as part of the disposition
19 program?
20 MR. NULTON: There is, as part of
21 the agreement to convert the BN600 reactor,
22 which is a reactor built by the Russians for
23 the purpose of breeding. But before it would
24 be used, it would be converted into a burner --
25 it is a liquid metal reactor, but it would be

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1 used to help increase the amount of material
2 that the Russians could disposition. But it
3 would be used as a non-breeder reactor for that
4 purpose.
5 SENATOR LEVENTIS: So the agreement,
6 as you understand it to date, doesn't allow
7 them to --
8 MR. NULTON: It does not allow them
9 to breed in that reactor. That's correct.
10 SENATOR LEVENTIS: So as you look at
11 my sheet, question number 14 is obvious, that
12 we're not allowing them to, according to the
13 agreement, as it's stated now, create any
14 additional quantities of plutonium.
15 MR. NULTON: That's right. The
16 Russians have also proposed an additional
17 liquid metal reactor, and we will not agree to
18 do that. Since this one already exists, and it
19 can be used as a burner, we are negotiating
20 whether the -- the use of that reactor burning
21 plutonium.
22 SENATOR LEVENTIS: We talked a
23 little bit about -- or we talked a lot about
24 the state of our program and its development
25 and the design of our facilities.

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1 Where are the Russians? Are we
2 exporting our technology to them? Where are
3 they in their process of trying to set up
4 fabrication facilities, extraction facilities,
5 et cetera?
6 MR. NULTON: We have been working
7 with the Russians in technical studies and
8 developments and demonstrations for about
9 three, three and a half years, actually working
10 with them on immobilization as well as other
11 technologies.
12 We are also working with the
13 Russians to do a demonstration for pit
14 conversion, probably with a different process
15 than we're using, but we are working with them
16 to get a pit conversion demonstration up and
17 running. That will later be expanded so they
18 can handle more pits, larger additional lines
19 to handle their pit conversion.
20 There is also some discussion going
21 on between ourselves and the French and the
22 Russians regarding design of a facility for MOX
23 fuel fabrication.
24 SENATOR LEVENTIS: Before we leave
25 that subject, I need to ask Mr. Selby, because

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1 I passed it up and didn't ask him that. We
2 talked about the ITP, the problems that
3 happened there for whatever reason. I'm
4 certainly not technically capable of
5 understanding it, except that it seemed that
6 large-scale intank precipitation didn't work
7 because of controlling heat or whatever, and
8 we've talked about multiple lines as opposed to
9 one line that runs a large capacity -- several
10 lines that run in a capacity to produce.
11 Are there any problems that are
12 inherent in several lines in a nearby area
13 versus one line as we have now out in
14 New Mexico?
15 MR. NULTON: The only thing that --
16 and these kinds of considerations are taken
17 into account when you design the plant, would
18 be practicality concerns. You don't want to
19 get too much material --
20 SENATOR LEVENTIS: Too close?
21 MR. NULTON: -- too close. That is
22 part of the design process is to make sure that
23 you have adequate space and lines and so forth.
24 SENATOR LEVENTIS: Before I leave
25 that, is there anything else you all would like

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1 to say about the proposed negotiations that
2 would help us consider these issues?
3 MR. NULTON: I can't think of
4 anything I would want to add.
5 SENATOR LEVENTIS: Well, at any
6 point you want to add something, please let me
7 know.
8 MR. NULTON: Okay.
9 SENATOR LEVENTIS: Let me shift the
10 focus now to storage because it has a lot of
11 implications for South Carolina, and there's a
12 lot of interest in those things.
13 Did DOE fail to fulfill a commitment
14 it had made to the Defense Nuclear Facilities
15 Safety Board to build a special storage
16 facility called the APSF facility for plutonium
17 at the Savannah River Site? You may know what
18 I'm talking about.
19 MR. ANDERSON: Yes, actually, the
20 commitment was to stabilize and put into
21 long-term storage plutonium materials from
22 Savannah River Site, and also would be Rocky
23 Flats, and Hanford at some point.
24 And a part of that commitment then
25 would -- was the construction and operation of

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1 the APSF, Actinide Packaging (sic) and Storage
2 Facility, which would have stabilized both the
3 plutonium materials at Savannah River, and we
4 were also looking at the stabilization of
5 materials from other sites at Savannah River,
6 even though the baseline plan was to stabilize
7 those materials at Rocky Flats before shipping
8 to Savannah River or stabilizing at Hanford.
9 We went into an evaluation process
10 in the December time frame, largely due to the
11 three new missions, and taking a look at this
12 facility, and what we were planning to do with
13 it, to make sure we were going to be designing
14 and constructing an appropriate facility.
15 SENATOR LEVENTIS: Has anything come
16 from Rocky Flats to Savannah River Site?
17 MR. ANDERSON: None of the material
18 that was planned for that stabilization
19 process. There are some materials from Rocky
20 Flats that are going through the canyons now,
21 as we speak, are being stabilized in the
22 canyons at Savannah River.
23 SENATOR LEVENTIS: Are they in the
24 same chemical form in containers that they
25 arrived at at Savannah River Site?

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1 MR. ANDERSON: I just got your
2 question. You had a series of questions there.
3 I'm going to try to answer a couple of those.
4 SENATOR LEVENTIS: Please.
5 MR. ANDERSON: The materials that
6 are going to be stored at Savannah River will
7 be received in accordance with a storage
8 standard, which is for long-term storage. And
9 that would be the same standard that is used
10 for the materials that we would stabilize. It
11 would require stabilization material in those
12 containers. And it also sets up requirements
13 for the containers themselves, which are double
14 containers, double type containers.
15 Materials that are not received in
16 that condition will be processed and stabilized
17 either right now at this point, through the
18 Canyons, or we won't be receiving them in
19 another process if we don't have another
20 disposition path for stabilizing that material.
21 SENATOR LEVENTIS: The ones that are
22 received in satisfactory condition, how long
23 can they be stored there at Savannah River Site
24 before they have to be removed from the
25 containers and processed or immobilized?

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1 MR. ANDERSON: The ones that are in
2 satisfactory condition --
3 SENATOR LEVENTIS: When they arrive.
4 MR. ANDERSON: -- when you say that
5 would meet the standard, the standard is
6 referred to as a 3013 standard, and that's a
7 50-year standard. Materials that are
8 stabilized according to a 3013 standard and
9 packaged according to that standard are good
10 for at least 50 years.
11 SENATOR LEVENTIS: I wish I were. I
12 don't feel like I'll make it another 50.
13 Anything else you'd like to comment
14 on that because I'd like to turn my attention
15 to Mr. Nesbit, if you don't mind.
16 MR. ANDERSON: The only other
17 comment on the APSF material storage was, the
18 receipt of those materials at Savannah River
19 Site was dependent on the record of decision
20 for the disposition path. So Savannah River
21 was not receiving materials that it did not
22 have a disposition path for.
23 SENATOR LEVENTIS: And the ones that
24 you received that you judged not to be
25 appropriately stored -- and I know that happens

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1 on occasion -- what do you do with those?
2 What's the process there?
3 MR. ANDERSON: Currently they are
4 run through the canyon processing facilities,
5 which is a chemical processing facility for
6 those materials.
7 SENATOR LEVENTIS: Let me turn my
8 attention to Mr. Nesbit with Duke Power. We
9 appreciate your coming. I've got a series of
10 questions I'd like to ask you. Do you have
11 those?
12 MR. NESBIT: I have a sheet here I
13 got a couple of minutes ago with questions
14 there.
15 SENATOR LEVENTIS: It's got Duke in
16 the middle?
17 MR. NESBIT: That's the one.
18 SENATOR LEVENTIS: Okay, how much
19 confidence do you have in the Department of
20 Energy's overall performance in meeting their
21 contract obligations? And of course, we're
22 talking about some specific matters in terms of
23 waste fuels and the like?
24 (Laughter.)
25 MR. NESBIT: Well, whenever we enter

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1 into a contract with any other person or
2 organization, we always expect them to live up
3 to their contractual obligations, just as we
4 intend to.
5 SENATOR LEVENTIS: But has that been
6 the record, especially in terms of waste
7 matters to this point in time?
8 MR. NESBIT: Problems sometimes
9 arise in these types of relationships.
10 SENATOR LEVENTIS: Are you all --
11 you all being Duke Power -- presently involved
12 in a legal action against the department in
13 terms of the waste?
14 MR. NESBIT: Yes, we are.
15 SENATOR LEVENTIS: Have you all
16 looked into technical failures that the
17 Department has experienced in recent years,
18 such as the ITP, the Pit 9 project in Idaho,
19 and the vitrification pilot plant in Ohio? Do
20 those things concern you?
21 MR. NESBIT: We're aware that the
22 Department of Energy has a daunting task in
23 front of it throughout the weapons complex. As
24 they've strived to deal with the problems that
25 they face, there's been successes and failures.

1 We're also aware of some successes they've had,
2 but with respect to this program, I want to
3 emphasize that our confidence is in the ability
4 of the Duke, Cogema, Stone and Webster
5 consortium, primarily with the knowledge and
6 technology of Cogema to design, build, and
7 operate a successful mixed-oxide fuel
8 fabrication facility. We know they can do it
9 because it's been done.
10 SENATOR LEVENTIS: If the material
11 is not ready in 2006, will you have incurred
12 costs that you won't be able to recover until
13 you actually use the fuel?
14 MR. NESBIT: We can adjust our fuel
15 procurement and planning process to have
16 flexibility so that up to approximately a year
17 prior to actually putting the fuel into the
18 reactor, we won't incur costs.
19 SENATOR LEVENTIS: Has your company
20 been in contact with the Public Service
21 Commission here in South Carolina about the
22 financial implications of the proposed contract
23 with DOE?
24 MR. NESBIT: I don't know. That's
25 not my department. I personally have been in

1 touch with the people in our company who handle
2 that liaison responsibility, but I don't know
3 for a fact whether they have or have not had
4 discussions with the Public Service Commission.
5 SENATOR LEVENTIS: Would you please
6 let us know when you can the status on that
7 particular issue because that's what most
8 directly affects the folks of South Carolina in
9 terms of any costs or savings they may expect?
10 MR. NESBIT: Certainly, I'd be glad
11 to.
12 SENATOR LEVENTIS: What would be the
13 impact if the Department is unable to pay the
14 expected fees involved on Duke?
15 MR. NESBIT: Well, I'm not sure
16 that -- I guess the question is more like if
17 the Department is not capable of delivering the
18 fuel because we anticipate paying the
19 consortium for the fuel.
20 We will have a contract. We have a
21 contract and will have a contract with the
22 Duke, Cogema, Stone and Webster consortium. We
23 don't have a contract directly with the
24 Department of Energy in this program, and we
25 don't anticipate having one, so the impact will

1 be, if we don't get the fuel, we don't pay for
2 it.
3 SENATOR LEVENTIS: If you're
4 familiar with this part of the contract, please
5 tell me. If you're not, then I'd like for you
6 to see if you can determine it for us.
7 Do you feel that your company is
8 contractually bound to pay fuel offset credits
9 to the government?
10 MR. NESBIT: I think, as I
11 understand the question, we are. The fuel
12 offset credit is what you refer to as the value
13 of the displaced uranium fuel that would have
14 been used had we not loaded mixed-oxide fuel in
15 the reactor, and we will pay for the
16 mixed-oxide fuel, so that is essentially the
17 value of the fuel to us, which --
18 SENATOR LEVENTIS: The value of
19 uranium has varied substantially in the last
20 several months, years. What if the value of
21 uranium is such that the mixed-oxide fuels are
22 an expensive proposition, vis-a-vis uranium, at
23 that point in time? How will ratepayers of
24 South Carolina be affected by that?
25 MR. SELBY: Senator, maybe I could

1 help you with that.
2 SENATOR LEVENTIS: Sure.
3 MR. SELBY: In the formula you may
4 have seen in the contract, the ratepayers of
5 South Carolina are not at a risk with that.
6 The fuel offset is the offset of the
7 40-percent MOX fuel that is being used by Duke
8 and Virginia Power in their reactors.
9 There is a savings if you -- and I
10 do have a chart on it to show the rest of the
11 audience -- F factor is between .5 and .9.
12 That F factor allows for the ratepayers not to
13 have to pay full value for the LEU offset. In
14 other words, they get the MOX fuel at a
15 slightly decreased price over the current LEU
16 fuel at that particular moment in time.
17 SENATOR LEVENTIS: Since the LEU
18 fuel has decreased in cost recently -- and of
19 course, we don't know what it will do in the
20 future -- but since that's happened, does that
21 make the program more expensive for the
22 Department of Energy now?
23 MR. SELBY: As LEU fuel prices
24 decrease, and if they do, the offset, yes, will
25 be more expensive for the Department.

1 However, in any program -- this is a
2 program to dispose of materials -- you're going
3 to have a price. The taxpayers, not the
4 ratepayers, are the people who do pay for both
5 the fabrication of the weapons, and now we
6 unfortunately will be paying for the
7 disposition of the weapons.
8 There is a, as I said before, only a
9 slight offset that we'd give the ratepayer --
10 would not allow the ratepayers to pay any
11 higher utility bills if they were using MOX
12 versus LEU.
13 SENATOR LEVENTIS: This is a little
14 more technical question, but please follow me
15 if you can.
16 In the material that you've sent,
17 the fuel fabrication facility was, I believe,
18 listed at a cost of 250 million. Was that
19 after you had subtracted the 930 million
20 projected fuel displacement credits from the
21 1.18 billion?
22 MR. SELBY: I'm not sure where that
23 number came from. I think our design-only CDR
24 estimates the cost of the MOX fuel fabrication
25 facility, I believe, at around 450, 480.

1 additional costs.
2 Now, remember the first two -- the
3 first two phases, the base contract and
4 option 1 are cost reimbursable contracts.
5 Option 2A, which is the hot startup,
6 is also a cost reimbursable contract, and then
7 never go into the operation of the facility in
8 option 2B.
9 SENATOR LEVENTIS: What is the
10 likelihood that the NRC may not be as excited
11 about MOX fuel as everyone else? I mean, is
12 there any likelihood that NRC would change the
13 cost structure to Duke in a way that we haven't
14 projected with their requirements? How much
15 are you planning for NRC requirements to cost,
16 which are reimbursable, I take it?
17 MR. NESBIT: Well, we certainly
18 anticipate -- the licensing costs are
19 reimbursable under the contract. We certainly
20 anticipate the Nuclear Regulatory Commission
21 will be a vigilant oversight organization as
22 they've always been with our reactors. I don't
23 anticipate anything other than that.
24 With the public interest that's
25 involved with this program, they will be

1 The fuel offset is still the fuel
2 offset credit. I mean, we're going to be
3 offsetting LEU fuel with MOX fuel. It's going
4 to be a number based on whatever the price
5 uranium is at the particular time.
6 That full offset will not be,
7 though, available to offset the cost of
8 operation, complete cost of operation of MOX
9 fuel, because part of that offset will go to
10 the -- to assure that the utility ratepayers
11 will pay no more than the price of LEU fuel.
12 SENATOR LEVENTIS: Than they
13 otherwise would have paid on other costs to the
14 utilities, besides the cost for fuel, any other
15 changes in the facility, administrative costs,
16 et cetera?
17 MR. SELBY: The changes in the
18 facility are addressed in what we call --
19 there's a clause H11 in the contract. In that
20 clause, we address that if there's a cost to
21 the utility that is caused specifically by the
22 use of MOX fuel, whether it's a change in
23 equipment, because of the use of MOX fuel, or
24 whether it's increased regulatory oversight or
25 inspection, the Department will pick up those

1 careful, and I'm sure they'll discharge their
2 responsibilities appropriately.
3 We certainly anticipate that we'll
4 need some minor modifications at our plants in
5 order to demonstrate that we can safely operate
6 with mixed-oxide fuel, both to our own
7 satisfaction and to the satisfaction of the
8 Nuclear Regulatory Commission.
9 SENATOR LEVENTIS: Have you all
10 already made that application?
11 MR. NESBIT: No, we're going -- our
12 current plans are to submit the application for
13 a batch scale utilization of mixed-oxide fuel
14 at the end of 2003. So there's quite a bit of
15 time between now and then.
16 We're going to use that time to do
17 the detailed plant-specific studies in order to
18 quantify the impacts of using MOX fuel, and
19 identify any required modifications, and to
20 design those modifications.
21 SENATOR LEVENTIS: We've been going
22 for quite awhile. What I'd like to do is to
23 give Ms. Jeter a rest and to recognize those
24 folks, such as Senator Courson, who have been
25 very patient, Representative Clyburn, to see if

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1 they have any questions. Then I'd like to take
2 about five minutes to give her a chance to
3 catch up, and then reconvene, and we should be
4 ready to discuss some things from the audience.
5 There are also issues dealing with
6 the cost factors in the Environmental Impact
7 Statement, and I'd love to give you all a copy
8 so we'll all be reading off the same sheet. I
9 don't want you to have to guess where we are,
10 and try to lead us through some of those steps.
11 Senator Courson?
12 SENATOR COURSON: I have just one
13 basic question involving the DOE, I guess.
14 You mentioned the three and a half
15 years we've had bilateral negotiations between
16 the United States and Russia. Does that
17 include -- are we having similar negotiations
18 with other provinces -- former provinces of the
19 Soviet Union, like Ukraine, Belorussia, and
20 others that possess nuclear capabilities, or is
21 this just isolated to bilateral between the
22 U.S. and Russia?
23 MR. NULTON: It's just between the
24 U.S. and Russia at this point.
25 SENATOR COURSON: Follow-up would

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1 be: Do you anticipate any negotiations between
2 the United States and other former Soviet Union
3 provinces that have nuclear capability and
4 nuclear weapon systems?
5 MR. NULTON: My understanding is the
6 weapons all came back to Russia. That's why we
7 are negotiating.
8 SENATOR COURSON: All the weapons
9 are back in Russia?
10 MR. NULTON: That's our
11 understanding.
12 SENATOR COURSON: All the weapon
13 systems, nuclear weapon systems formed in the
14 Soviet Union are back now in Russia?
15 MR. NULTON: That's my
16 understanding. There may be some materials
17 still in these other countries, but I believe
18 the weapon systems are back in Russia. There
19 are no negotiations at this point in time with
20 any other provinces.
21 SENATOR LEVENTIS: Thank you,
22 Senator Courson.
23 Representative Clyburn, did you have
24 any questions you'd like to ask?
25 REPRESENTATIVE CLYBURN: I do not

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1 have any questions. I just wanted to observe.
2 SENATOR LEVENTIS: Well, we
3 certainly appreciate your presence and
4 everyone's patience. We appreciate your
5 sitting through this, and we'll get to some of
6 your questions after the break.
7 It is now, by the clock on the wall,
8 five minutes to eight. I'd like for us to get
9 back together at five minutes after eight.
10 (A recess transpired.)
11 SENATOR LEVENTIS: Thank you, I
12 appreciate your patience. We didn't start on
13 time, but that's my fault.
14 I'd like to pursue a line of
15 questioning now regarding some financials. I
16 wanted to recognize Ethan Brown to go over some
17 of the financial information that was in the
18 EIS, and I think the draft EIS.
19 Then I'd like to recognize
20 Dr. Makhijani for a couple of questions. We
21 will reassemble our thoughts, and then we'll
22 proceed from there.
23 And of course, I've invited the
24 gentlemen from DOE or Duke or Cogema to make
25 any comments that they'd like to make if they

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1 feel it would help the process.
2 MR. BROWN: Thank you, Senator
3 Leventis, for having me here.
4 I just want to try to clarify my
5 understanding of some issues as they were
6 addressed tonight and as they have been
7 addressed in public documents that DOE has
8 presented.
9 I hope you guys have a copy of --
10 this is the EIS technical summary supporting
11 document. I think they're passing those out
12 right now.
13 This gives a value of 930 million
14 for the fuel displacement credit. And my
15 question is -- I guess two parts to it -- the
16 first is: What level of certainty would be
17 required to include that as the 930 million
18 dollar offset credit given the price of uranium
19 fluctuating?
20 And the second: Why is there no
21 mention in the EIS of this fraction F that will
22 allow the reactors to withhold up to
23 465 million dollars from the government,
24 thereby increasing the total cost of the MOX
25 program by that amount?

1 MR. SELBY: Okay. The first point
2 is, the contract has just been recently, as you
3 know, negotiated. March 22nd is when we
4 completed the negotiation.
5 There will be a revised cost report
6 that comes out with the final EIS that will
7 reflect the negotiated agreements.
8 MR. BROWN: If I were to take the
9 .5, then I would be correct in adding to the
10 250-million-dollar net lifecycle cost,
11 465 million dollars?
12 MR. SELBY: As I said before, the .5
13 to .9 are the ranges. I can't tell you the
14 exact number.
15 MR. BROWN: Just go with half?
16 MR. SELBY: Yeah.
17 MR. BROWN: So I would add that
18 amount to the cost of the fuel fabrication?
19 MR. SELBY: The .5 would be --
20 exactly, the credit would be increased.
21 MR. BROWN: Okay. My second
22 question relates to the decision in the EIS
23 literature to exclude the payments of annual
24 fees, even though those in the contract are
25 presented in the very same equation that the

1 MR. SELBY: Again, I'm sure those
2 cost estimates were prepared prior to the
3 contract being negotiated.
4 Let me tell you about -- so there's
5 no misconception -- this cost containment
6 formula starts, as you're probably aware, at
7 option 2B, when we start getting the full
8 operation of the MOX fuel fabrication facility.
9 The fabrication costs would include
10 whatever the operating costs are. These are
11 the operational costs, with the LEU as being
12 revenue, being the offset minus the percentage
13 of the formula, either the .5 to .9 that I
14 talked to you about, so that was what we
15 negotiated. I can't speak to the cost.
16 MR. BROWN: Okay, but I guess just
17 what I want to make clear is, in the final EIS,
18 then this annual fee and its value would be
19 included in the total cost.
20 MR. SELBY: The annual fee actually
21 hasn't been negotiated yet.
22 MR. BROWN: But it will be included
23 at --
24 MR. SELBY: Some number for that
25 annual fee is what you're asking?

1 fuel displacement credit is discussed, and it
2 reminded me a little bit of folks who run into
3 problems on Wall Street, where they go ahead
4 and present to the SEC their accounts
5 receivable as certain but discount away their
6 accounts payable. I'm wondering what the
7 decision was to include a potential credit to
8 the government but exclude a potential cost
9 when they're both contained in the exact same
10 payment equation. What was the reasoning
11 behind making the difference between the two?
12 MR. SELBY: I guess I'm not sure
13 exactly your question. Would you repeat it?
14 MR. BROWN: Sure.
15 SENATOR LEVENTIS: Do you have the
16 equation in front of you?
17 MR. NESBIT: Bob, I think he's
18 talking about the 1996 cost report.
19 MR. BROWN: I'm trying to reconcile
20 that with the contract.
21 MR. NESBIT: The 1999 contract.
22 MR. BROWN: Right, the payment
23 formula has included it in this annual fee.
24 I'm wondering why that was excluded from these
25 cost estimates.

1 MR. BROWN: Would it be fair to say
2 that the estimated, what, 300 million that the
3 Department has put out in two separate
4 documents is an accurate estimate of how much
5 that annual fee will be over the lifecycle?
6 MR. SELBY: What our estimate has
7 been, at least in terms of what we did for the
8 negotiations was, that we estimated that the
9 cost of operating the MOX fuel fabrication
10 facility would be somewhere between 55 and 60
11 million dollars a year.
12 MR. BROWN: I think I'm speaking
13 about the fee as opposed to the cost. I know
14 in the contract they draw a distinction between
15 the two, and they estimate in two documents,
16 one, this '96 technical summary, and two, the
17 one coming out of Oakridge, I think, in April
18 of '97, that says the value of the potential
19 annual fee will be 300 million dollars, and
20 that's included nowhere in the official cost
21 estimates. I'd just like to know whether
22 that's going to be anywhere.
23 MR. SELBY: I don't recognize that
24 number.
25 MR. BROWN: Okay.

1 MR. SELBY: What we plan, the cap on
2 fee, as far as the Department is concerned, is
3 10 percent. At 50 to 55 million dollars a
4 year, we're talking maybe 5 million dollars,
5 maximum 5.5 million dollars.
6 DR. MAKHIJANI: I think there's a
7 miscommunication going on. If I might try to
8 clarify. I think Ethan is asking about the fee
9 to the utilities, this annual fee in the cost
10 formula regarding fuel reimbursement.
11 MR. SELBY: Oh, the production --
12 DR. MAKHIJANI: The annual fee to
13 the utilities you would pay them for the MOX
14 irradiation services, how much is that, and the
15 fact that it's not in the EIS. I think you're
16 misunderstanding.
17 MR. SELBY: I'm sorry. Yes, pardon
18 me. I am off base on that.
19 What we've done is, we've done a
20 sample calculation. I chose the mid-point of
21 F equals 0.7. You can choose 0.5 to figure out
22 what it is that we're talking about.
23 On an annual basis, the reload of
24 40-percent MOX core will offset -- a total
25 reload will cost about 42 million. About

1 40 percent of that then would be the LEU -- the
2 MOX fuel. And if you use the -- I use, again,
3 the .7 for my calculation, I come out with
4 about 5 million dollars a plant, out of the
5 42 million that would be spent on a core as a
6 reduction in cost for the utility.
7 Now, if you take that on the total
8 cost of nuclear operation, which includes O&M
9 costs and other costs like depreciation and
10 taxes, et cetera, the actual savings in nuclear
11 generation, I calculated, is about 18 percent,
12 that five 104 -- 5.04 million or about 2.1 in
13 overall savings to a utility for using MOX
14 fuel. Again, I used it based on a
15 42-million-dollar reload.
16 The numbers I used to calculate the
17 O&M cost were about 14 percent for O&M,
18 15 percent for other costs, 6 percent for
19 nuclear fuel.
20 And if I want to put in the
21 transmission costs, which are, again,
22 65-percent of the total cost for the consumer
23 to receive electricity, in terms of seven mills
24 per kilowatt, seven cents per kilowatt hour, I
25 come up with reduction on the overall plan of

1 only about .8 percent. If you take the total
2 value of what it takes to produce electricity
3 and transmit it to the --
4 MR. BROWN: I appreciate your
5 thoroughness, but I think -- I had a much more
6 simple question, and that is: The Department
7 knew in 1996 that this annual fee may be
8 required, and the annual fee they estimated at
9 300 million dollars to pay out to the reactors
10 to participate in this program.
11 MR. SELBY: Uh-huh.
12 MR. BROWN: I want to know why they
13 didn't include that in the official cost
14 estimate, and why they decided to include the
15 930-million-dollar fuel offset credit.
16 MR. NULTON: I think, first of all,
17 we need to -- the cost estimate we did back in
18 the past was based on our best guess at how
19 this fuel was going to work at that time.
20 Now we have actual numbers and
21 contracts in place. I think we ought to focus
22 on what the current arrangement is because this
23 is more accurate.
24 Can you say, Bob, what the maximum
25 fee to the utility would be a year, based on --

1 MR. SELBY: Well, this is, again, a
2 5-million-dollar offset based on a
3 42-million-dollar core replacement. That five
4 million, though, then has to be compared to
5 what is the total overall -- I mean, if we're
6 concerned about utilities having a windfall, I
7 mean, you've got to really compare that 40 --
8 MR. NULTON: Is the number anywhere
9 near 3 hundred million?
10 MR. SELBY: The number at -- let's
11 see. It could be about -- if you take it over
12 the life of the 13 years.
13 MR. BROWN: So can I just then
14 recalculate the cost -- or in this EIS to
15 update it to the level of knowledge and
16 understanding we have now? If I take .5, which
17 is just saying we'll split the factor in the
18 middle, right, then I get --
19 MR. SELBY: No. The factor runs
20 between .5 and .9.
21 MR. BROWN: Okay. Fine.
22 MR. SELBY: You're taking the worst
23 case, and that's okay.
24 MR. BROWN: Well, I didn't know the
25 value of that.

1 MR. SELBY: No, no, no.
2 MR. BROWN: I'm just saying 495.
3 I'm going to add that to the 250, right? Then
4 I'm going to go ahead and add the 300 million.
5 So that's a much more expensive program than
6 initially estimated. That's like four times
7 the cost of the immobilization program.
8 MR. NESBIT: You're including an
9 incentive fee of 300 million, plus a fuel
10 discount. That's double counting.
11 MR. SELBY: You can't do that
12 because the fuel discount is their incentive.
13 MR. BROWN: Okay. That's not how
14 it's laid out in this. So the total incentive
15 payment or annual fee to the participating
16 reactors would be something like 300?
17 MR. SELBY: No. On an annual basis,
18 on an annual basis --
19 MR. BROWN: Over the course --
20 MR. SELBY: -- per core load, it's
21 about 5 million dollars.
22 MR. BROWN: Okay.
23 MR. SELBY: Per core load.
24 MR. NULTON: Which is every 18
25 months.

1 understanding.
2 MR. NULTON: -- for the whole 10 to
3 15 years, not per year.
4 SENATOR LEVENTIS: Right.
5 MR. BROWN: And that's what I just
6 wanted added --
7 MR. NULTON: Big difference.
8 MR. BROWN: So we're in agreement.
9 That's fine. So it's going to be roughly
10 double over the lifecycle of the program is my
11 understanding, based on what you said.
12 MR. SELBY: I --
13 MR. BROWN: For the actual reactor
14 component you have 290 million; and I'm saying,
15 given the fact you'll be paying out over the
16 lifecycle 300 million in fees that weren't
17 included in this estimate, given that
18 consideration, it's going to be roughly double.
19 MR. SELBY: I don't think I would
20 agree. I think that if we -- let's walk
21 through the formula. We know that we're going
22 to spend 50 million dollars to 60 million
23 dollars a year for the MOX fuel fabrication
24 facility. That includes the fee for the
25 consortium, 60 million a year.

1 MR. SELBY: But on average, it's
2 going to be three to four --
3 MR. BROWN: So it would be fair to
4 say then it's going to be approximately double
5 the cost of what was in the EIS estimate, if
6 you take that --
7 MR. SELBY: I'm not -- I've got to
8 look at the EIS. I'm not --
9 SENATOR LEVENTIS: I think what
10 would be reasonable to do would be to ask you
11 to take a look at that and provide for us, if
12 you would, when you can, what you think
13 lifecycle cost would be, vis-a-vis, this '96 --
14 MR. SELBY: Absolutely. It's going
15 to be revised in issue with the EIS. It is --
16 SENATOR LEVENTIS: When -- do you
17 have any guesses?
18 MR. NULTON: Yes, September.
19 SENATOR LEVENTIS: No, not when the
20 EIS is --
21 MR. NULTON: I think what Mr. Selby
22 was saying was, it isn't 300 million -- you
23 said it's possible it could be 300 million, but
24 that would be over the life of the program --
25 MR. BROWN: That was my

1 We know we have an LEU offset. We
2 produced 58 -- as you know, the plant runs
3 at -- I think it's about 58,000 -- let's get
4 the numbers here, 58 metric tons per year.
5 With that, you can do the
6 calculations using either F of somewhere
7 between .5 and .9. You can choose .5, since
8 that's the worst case. You know the LEU offset
9 value. It's 40 percent of the total core load,
10 which is approximately 42 million dollars.
11 So you know what the utility would
12 get. You know what the MOX fuel fabrication
13 facility costs are. You can use the
14 10 percent -- less than 10 percent for the
15 annual fee MOX fuel, which adds up to a
16 60-million-dollar MOX fuel fabrication cost.
17 So what we're looking at for a
18 maximum liability to the government -- let's
19 say the uranium prices are at -- again, I used
20 an F factor. I'll give you an example of .5.
21 We'll end up paying on an annual basis about
22 34 million dollars over a 15-year life.
23 MR. BROWN: Can I ask one other
24 question?
25 SENATOR LEVENTIS: Please.

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1 MR. BROWN: I just wanted to clarify
2 a discussion that we had about the cost of the
3 plutonium polishing addition.
4 It was suggested there was going to
5 be no increase in schedule and no increase in
6 cost. I think it was said it was going to be a
7 wash.
8 I'm just having trouble reconciling
9 that with a number of statements in the
10 different DOE documents that listed anywhere
11 from costing an additional 50 million to
12 costing up to 250 million.
13 What am I not seeing in the
14 documents that you're seeing?
15 SENATOR LEVENTIS: What documents
16 are you taking about, Ethan?
17 MR. BROWN: The technical summary
18 report for surplus weapons usable plutonium,
19 October '96; then the 1997 study that Oakridge
20 did.
21 I mean, does that pretty much
22 directly suggest there's going to be an
23 additional cost and a schedule increase?
24 MR. SELBY: I think, first of all,
25 we don't believe that there will be a schedule

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1 increase. I think we looked at that when we
2 were analyzing the schedule that was proposed
3 by Duke, Cogema, Stone and Webster for the
4 project.
5 What does happen is, we reduce the
6 length of the time of the fuel qualification
7 program, as Dave Nulton stated, by removing the
8 gallium and other potential impurities in the
9 weapons-grade material.
10 So I think it -- although we haven't
11 had a design done as yet of the polishing
12 facility -- there's no indication that the
13 design will require a longer schedule in terms
14 of construction, nor that the cost will be
15 significantly increased from the estimate.
16 MR. BROWN: I just want to read then
17 for the record this DOE document says, The sunk
18 cost of the -- the dry processing would be,
19 approximately 50 million, and then an
20 additional 50 million for establishing the wet
21 polishing line, and a two-year increase in
22 schedule. It says, Articles in trade press
23 suggested the cost be as much as 250 million or
24 higher. And that's Dr. Reed and Dr. Miller,
25 April '97, Oakridge.

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1 MR. NULTON: I don't know where the
2 article -- the number of the trade press came
3 from. I don't think it was one of our numbers.
4 MR. BROWN: That's fine. Just go
5 with 100 million.
6 MR. NULTON: My point earlier, my
7 comment was, when you look at the dry gallium
8 removal process, it involved a substantial
9 amount of R&D work and time to do that. It
10 involved a substantial amount of fuel testing
11 in the ATR reactor. We no longer have to do
12 that, so there's a lot of cost savings there.
13 We also would have had to produce a
14 larger number of lead test assemblies, which we
15 now don't have to do.
16 So when you look at the savings and
17 lead test assemblies, which each one of them
18 has a fairly significant cost, the fact we
19 don't have to do the R&D, and we don't have to
20 do the test and ATR, there's an enormous cost
21 savings there.
22 That's going to be offset by the
23 fact that we do have to design and build this
24 AVS acqueous polishing, so I'm saying they
25 offset each other somewhat.

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1 MR. BROWN: Can you just explain,
2 though, how the sunk costs becomes a wash?
3 MR. NULTON: The sunk costs are
4 there. We can't go back and cover those. We
5 hadn't sunk very much that would have been a --
6 we never did any work on TIGR. We never got
7 that up and started. So we didn't spend any
8 money on that. We didn't design the NPDCF,
9 because we didn't design the facility yet. So
10 I'm saying those costs were never expended.
11 MR. BROWN: So there was no
12 50 million --
13 MR. NULTON: No.
14 SENATOR LEVENTIS: Dr. Makhijani, do
15 you want to proceed?
16 DR. MAKHIJANI: I had some questions
17 about the Russian or clarification about some
18 parts of the Russian program.
19 Mr. Nulton, you said that you're not
20 aware of a Russian reprocessing program. So
21 far as I'm aware, there's a reprocessing plant,
22 a military plant, operating approximately as of
23 the 26th.
24 MR. NULTON: I'm not aware of a
25 civilian reactor --

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1 DR. MAKHIJANI: There is a military
2 plant, Thomas 7, and there is a civilian plant,
3 RT1 at Mayak in Southern Europe. And that is
4 the reprocessing plant, in fact, where not only
5 Russian fuel is reprocessed, but a fair amount
6 of foreign fuel has been reprocessed. All of
7 the foreign contracts are in some jeopardy
8 because of cost consideration, but they're
9 still negotiating with the Bulgarians, for
10 instance, for taking their spent fuel, new
11 process in RT1.
12 RT1 has long been their commercial
13 reprocessing plant. Isn't that right?
14 MR. NULTON: I don't know. I was
15 not aware of it.
16 DR. MAKHIJANI: Well, I'm a little
17 bit surprised because one of the greatest
18 security concerns that has been widely
19 expressed by us and by many people in the
20 official capacity has been the 30-odd tons of
21 commercial plutonium that has already been
22 separated from Russian commercial plants and
23 foreign commercial plants -- but I think it's
24 primarily from Russian plants -- that are
25 stored there in separated form, plutonium

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1 dioxide form, in 12,000-some bins in Mayak.
2 I believe the Department has had
3 some security concerns around this and that
4 there is an operating reprocessing program.
5 One of the reasons this whole
6 agreement is a source of concern to many of us
7 is that the Department has gone back from the
8 original idea that in Russia and the United
9 States it will be a once-through program, and
10 not allow reprocessing.
11 But now, as I understand it, the
12 Russians have a reprocessing program. They've
13 got a backlog of spent fuel to reprocess. So
14 does it make any difference that MOX fuel would
15 be reprocessed 10 years from now as opposed to
16 now or ten years from 2005? Will it stop their
17 reprocessing program in some way or upset it?
18 MR. NULTON: I think they clearly,
19 at some point in the future, would like to
20 reprocess this material, and the agreement that
21 is being negotiated is that they won't initiate
22 that until the disposition activity is
23 completed.
24 I think the thought there is that
25 the weapons-grade material will at least be

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1 degraded to a reactor-grade form at that point.
2 DR. MAKHIJANI: Well, degraded
3 reactor fuel can be made into weapons. It's my
4 understanding -- I don't know if it quite
5 confirms with your understanding -- that the
6 main threat from Russian plutonium is not that
7 the Russians are going to use their plutonium
8 again in weapons. The main threat is that it
9 will wind up in black markets and be sold to
10 third countries or terrorist groups and so on.
11 Isn't that the main problem about
12 Russian plutonium?
13 MR. NULTON: That is a concern about
14 Russian plutonium.
15 DR. MAKHIJANI: It's not that both
16 the U.S. and Russia have plenty of surplus
17 plutonium, so they wouldn't use degraded
18 plutonium in their weapons, but degraded
19 plutonium can be used to make weapons.
20 So my problem is that the -- my
21 concern that we're having, and I'm wondering
22 why the Department doesn't share it is, the
23 Russian reprocessing program will be going on
24 as it is now, and is not affected in any
25 significant way, so far as nonproliferation

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1 issues are concerned, by delaying the
2 reprocessing of MOX fuel. It just simply seems
3 like some kind of paper satisfaction for the
4 American side at having given away a very big
5 negotiating point to allow the Russians to
6 reprocess their MOX fuel. It doesn't
7 accomplish a disposition purpose, right?
8 MR. NULTON: It delays it. There is
9 some net destruction of plutonium by using it
10 in reactors. And it does degrade it to
11 reactor-grade form, which is much less
12 desirable for weapons, so there is that gain.
13 SENATOR LEVENTIS: And some of the
14 concerns that I think we ought to acknowledge
15 that -- some of the concerns you've shared,
16 while they're very valid, are not DOE policy
17 issues because they're being negotiated and
18 dealt with at a different level than that.
19 I understand completely what you're
20 saying, but these gentlemen may not have a hand
21 on that particular throttle. I think that if
22 you can reflect on it, it would help us, but I
23 know there's some that you can't reflect on.
24 DR. MAKHIJANI: I have some
25 questions about the regulatory system in Russia

1 and how their relicensing or licensing
2 activities would work.
3 What's the condition of their
4 Nuclear Regulatory Commission in terms of their
5 authority over their power plants, their
6 authority to require changes, their budgetary
7 situation?
8 MR. NULTON: Well, I'm not sure, and
9 I don't think we have the right people here to
10 answer that. I can say that GAN, which is
11 their Nuclear Regulatory Agency, will regulate
12 the facilities that use this MOX fuel.
13 Our NRC works with their GAN to try
14 to help in their regulatory process, but I
15 don't know the details. We can answer those
16 questions. We just don't have the right people
17 here this evening to do that.
18 MR. STEVENSON: The funding of GAN,
19 in order to perform their regulatory functions,
20 is also part of the subject of negotiations,
21 because we have to make sure that what is
22 negotiated is a complete program, and therefore
23 the regulation of the Russian reactors to
24 disposition of weapons-grade plutonium is part
25 of that negotiation.

1 DR. MAKHIJANI: Thank you very much
2 for that clarification because we had heard
3 their regulatory commission, which is GAN, is
4 sometimes not able to pay their electricity
5 bills, much less regulate anybody, so it has
6 been a concern, so thank you very much for
7 clarifying that.
8 Their reactors, as I understand, are
9 not -- were their reactors designed for use of
10 MOX fuel? Are you assuming that they would use
11 40-percent MOX fuel also?
12 MR. NULTON: No, they're not going
13 to use 40 percent. They will use much less
14 than that.
15 Again, I don't know that we have the
16 right people here to get into the details of
17 their reactor designs, but we do have our
18 laboratory experts working with theirs to
19 determine how much they can burn safely, what
20 modifications would be required for those
21 reactors and so forth.
22 SENATOR LEVENTIS: How many reactors
23 do you believe will be involved in their MOX
24 process?
25 MR. NULTON: Seven.

1 SENATOR LEVENTIS: Seven?
2 MR. NULTON: Yes.
3 SENATOR LEVENTIS: They're going to
4 expend all of their fuel using -- I mean,
5 they're going to MOX all of their fuel instead
6 of stabilizing any of it?
7 MR. NULTON: They're going to MOX
8 almost all of their weapons-grade material.
9 That's correct. They have some chemical
10 solutions and waste materials that they will
11 probably immobilize. That's part of what we're
12 negotiating in this contract, or in this
13 bilateral agreement.
14 SENATOR LEVENTIS: Then it must not
15 be simple math because we have six plants that
16 are going to use MOX fuel for 10 to 12 years
17 and do away with 30-some-plus tons, and they
18 have seven that are going to use it for a
19 similar period of time and do away with a lot
20 more.
21 MR. NULTON: Except we need some
22 additional capacity in Russia because they're
23 going to put less plutonium into their
24 reactors.
25 SENATOR LEVENTIS: Right.

1 MR. NULTON: So we need to identify
2 additional reactor capacity.
3 SENATOR LEVENTIS: Which hasn't been
4 done yet.
5 MR. NULTON: Right. That would have
6 to come from European reactors or Ukraine
7 reactors, or we also have a program that we're
8 working with the Canadians, where they might
9 possibly burn some of the Russian plutonium.
10 So that would provide the additional reactor
11 capacity if the Russians don't.
12 DR. MAKHIJANI: Finally, I really
13 have been very, very concerned about the
14 liability questions. It is my understanding
15 that Russia did not consider the use of MOX in
16 light-water reactors as part of their program
17 until the disposition question came up, and it
18 was brought up by the American side. Is that
19 right?
20 MR. NULTON: I don't know. I don't
21 believe their reactors were designed
22 specifically for MOX. I'm not sure that means
23 that they can't burn some amount of MOX in
24 those reactors.
25 DR. MAKHIJANI: No, no, it's my

1 understanding that they never considered it
2 because they didn't consider it a desirable
3 thing to do with plutonium, as to use it in
4 light-water reactors.
5 MR. NULTON: I think that initially
6 they did not want to burn it in their reactors.
7 I don't think that we talked them into it. I
8 think this was part of the joint negotiations
9 that we had with them.
10 What they wanted to do, as I
11 mentioned, was store it and build more breeder
12 reactors. What they wanted was aid from the G7
13 countries to build a series of breeder
14 reactors. We said we would not do that so that
15 led us logically to the use of their existing
16 reactors.
17 I don't think it was a matter of
18 talking them into it. It's just we worked out
19 the joint agreement.
20 SENATOR LEVENTIS: At the bilateral
21 negotiations and discussions, are there high
22 level DOE officials and GAN officials as well
23 as the vice-president and the president? Who's
24 doing the negotiations?
25 MR. NULTON: The negotiations are

1 being done by the State Department and the
2 Department of Energy.
3 We have a team of negotiators made
4 up of individuals from the State Department and
5 Laura Holgate, who is the Director of the
6 Office of Materials Disposition, member of
7 that, Deputy Negotiator on the U.S. side, and
8 on the Russian side we're negotiating with them
9 now.
10 DR. MAKHIJANI: Thank you very much.
11 SENATOR LEVENTIS: Gentlemen, thank
12 you. You've been very patient, and I'm going
13 to recognize some folks from the audience now
14 and hope that we have time to recognize as many
15 as possible. I'd ask you to identify yourself
16 for Ms. Jeter, and please come forward. Make
17 sure that red light in that little machine is
18 on there.
19 Certainly, if you'd like to make a
20 statement, that's fine. I'd like for you to
21 ask questions. In consideration of the other
22 folks who have been so patient, please try to
23 be prompt.
24 Actually, I was going to recognize
25 Ms. Thomas first.

1 SPEAKER: I'm sorry.
2 SENATOR LEVENTIS: It's not
3 McDonald's. I'm sorry.
4 SPEAKER: Is there a list?
5 SENATOR LEVENTIS: Ruth Thomas with
6 Environmentalists, Inc., would like to make a
7 statement and ask some questions.
8 MS. THOMAS: I had some --
9 SENATOR LEVENTIS: Is the red light
10 on, Ms. Thomas?
11 MS. THOMAS: Yes, but my voice is
12 not doing too well.
13 SENATOR LEVENTIS: You might have to
14 lean down a little bit so we can all hear you.
15 MS. THOMAS: I'm getting smaller.
16 I've been getting smaller anyway as I get
17 older.
18 We agree with the Department of
19 Energy that plutonium must be kept from
20 terrorists. However, the draft Environmental
21 Impact Statement does not adequately explain
22 how the proposed options could accomplish this.
23 And Mr. Makhijani, he got in ahead
24 of me the questions about how -- if you go
25 ahead and irradiate mixed-oxide fuel at

1 commercial reactors, this is only a temporary
2 approach, and a ban on reprocessing could
3 easily be changed, not just in Russia. It
4 could be changed in this country.
5 We've addressed that, but I did want
6 to bring it up to you because it's one of our
7 concerns. And incidentally, Environmentalist,
8 Incorporated has been involved in these issues
9 for 27 years, and we have raised questions and
10 tried to bring about awareness and to get
11 answers to our questions.
12 The draft EIS appears to address the
13 security and health problems associated with
14 plutonium, but it's very difficult to find
15 answers to questions due to the -- there's not
16 much footnoting, and the connections are not
17 made between specific references and places in
18 the text where there are statements and
19 conclusions.
20 And you have to go from one part to
21 the other, and back and forth, and look at
22 charts. I'm hoping this will be corrected in
23 the final.
24 Some of the options suggested appear
25 to be in conflict with what is known about

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1 plutonium. So much moving around -- I was
2 going to try to take all those moving around
3 because it not only seems to be moving
4 materials from Texas to South Carolina, and
5 then from there to nuclear reactors, but they
6 have to get special materials from other
7 places, and I thought it would be good to have
8 a visual to see all of those routes
9 intersecting and how many different areas of
10 the country would be affected and exposed to
11 the problems with transportation and accidents.
12 There's not enough justification for
13 the proposal for mixed-oxide fuel in terms of
14 factual data. Only a limited amount of
15 information is included about the past history
16 of operations which are related to other
17 facilities which involve plutonium,
18 particularly reprocessing plants.
19 There's nothing about nuclear fuel
20 services, New York State, Cogema, British
21 reprocessing, and all the hearings lately that
22 went on about the bio-nuclear fuel reprocessing
23 plant in which our organization was involved
24 over a period of five to seven years.
25 These documents have information

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1 that need to be included in references, and
2 I've seen none of this.
3 Then there's the defense waste
4 processing facility. What is the status of
5 that, and is that available for identifying
6 both high-level and plutonium?
7 As I understand it, the problem with
8 the Savannah River defense waste processing
9 facility is the intank precipitation process.
10 The releases of benzene, for
11 example, in the development of the salt cakes,
12 which leaves not only a fraction, as I
13 understand it, of the sludge available for the
14 defense waste processing. There's inadequate
15 information regarding reprocessing and how a
16 change in nuclear policy would affect security
17 issues.
18 Is it possible to recover plutonium
19 once the plutonium goes through the
20 vitrification process?
21 I haven't given you time to answer
22 these questions.
23 Options which might offer a better
24 chance for accomplishing the goal of protecting
25 against the theft of plutonium by terrorists or

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1 used by other countries are not included in the
2 draft EIS. I feel that it does not come up to
3 the standard of the National Environmental
4 Policy Act.
5 And I've got 100 other questions,
6 but I know I want to give other people a
7 chance. Thank you.
8 SENATOR LEVENTIS: Thank you,
9 Ms. Thomas. Let me just say that you've raised
10 a number of questions, and we appreciate that.
11 We do want to try to get everyone in,
12 especially if the questions have been asked
13 before, please take those answers.
14 As far as specific issues in the
15 document that are difficult to follow, I think
16 that you need to raise some specifics to these
17 gentlemen so that they can hopefully address
18 those.
19 Some of the other questions I'd
20 certainly defer to DOE, but I think it's
21 important to recognize -- and I forget which
22 one of the gentlemen said it -- the direct
23 question about how the program was initiated
24 for MOX, that it definitely was initiated by
25 the administration at the State Department as

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1 opposed to DOE although, I know there must have
2 been consulting on the issue, but I'll defer to
3 DOE to answer questions about the defense waste
4 processing, security, et cetera, vitrification
5 and reclamation.
6 MR. NULTON: I'll just try to hit
7 some of the high points if I can.
8 The EIS does not address
9 reprocessing because we don't propose to do any
10 reprocessing of fuel.
11 The purpose of the program is to
12 have a once-through fuel cycle, so this
13 plutonium, once it is used in MOX fuel, would
14 go to a geological repository and would not be
15 reprocessed.
16 At this point, the United States has
17 a policy not to reprocess fuel from commercial
18 reactors.
19 With regard to the defense waste
20 processing facility at Savannah River, the
21 immobilization approach that we've described in
22 the EIS does propose to use a high-level waste
23 immobilization facility, either at Hanford or
24 at Savannah River.
25 At this point in the EIS we have

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1 identified Savannah River as the preferred site
2 for immobilization because the DWPF is already
3 built and is already operating, and it's less
4 expensive and more timely to use it for
5 immobilization.
6 The process that we've proposed is
7 to take the plutonium and to immobilize it into
8 a ceramic form, about the size of a hockey
9 puck. Then we stack these hockey pucks in this
10 stainless steel can, and those cans are
11 imbedded in the high-level waste canisters that
12 are produced in the DWPF.
13 We cannot mix the plutonium directly
14 in with the immobilized waste without having to
15 make either a new facility or substantial
16 changes to the DWPF.
17 And also, there were questions on
18 the chemistry of the glass, whether or not we
19 could come up with a suitable chemistry if we
20 were to mix plutonium in with the rest of the
21 waste materials.
22 So the less expensive and more
23 scheduled effective way of doing this is to
24 immobilize it separately, and then imbed it in
25 the high-level waste.

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1 SENATOR LEVENTIS: Didn't you also
2 tell me earlier about reclamation after
3 immobilization that it was economically more
4 expensive to do than just to process plutonium
5 to weapons-grade quality to begin with?
6 MR. NULTON: I'm not sure if I
7 understand the question. Certainly we don't
8 intend that we'd ever take it back out of the
9 immobilized --
10 SENATOR LEVENTIS: No, we don't, but
11 if we needed that quality plutonium, wouldn't
12 it be easier just to process?
13 MR. NULTON: Oh, produce new
14 plutonium?
15 SENATOR LEVENTIS: Right.
16 MR. NULTON: I don't know, but I
17 suspect it would be less expensive to dissolve
18 the ceramic pucks.
19 SENATOR LEVENTIS: I misunderstood
20 that.
21 MR. NULTON: I think you could
22 dissolve it fairly quickly, but I don't know.
23 Charlie, you may want to comment on
24 that.
25 MR. ANDERSON: I'm not sure.

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1 Can you recover plutonium from
2 immobilized waste? Yes, you can. You can
3 dissolve the glass. You can move the plutonium
4 back out of the immobilized form. That's one
5 of the concerns the Russians have raised in our
6 negotiations with the use of immobilization.
7 Nonetheless, we do plan to use
8 immobilization as one of the two approaches.
9 I would mention here because I may
10 not have made it clear before, the purpose of
11 the hybrid approach of having both MOX and
12 immobilization was to make sure that we had at
13 least one -- I mean, we think both will work.
14 We intend on a track to implement both. The
15 idea of having at least two was, if you had
16 problems with one, you would have at least one
17 successful technology.
18 As you've mentioned, Ms. Thomas,
19 we've had problems with the intank
20 precipitation at Savannah River. I think we'll
21 get those resolved but it's concerns of that
22 type that drove us from the beginning to have
23 at least two technologies available to us so
24 that if one ran into problems, we would at
25 least have one remaining that would work.

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1 MR. NULTON: You need a reactor to
2 make new weapons-grade plutonium. We don't
3 have one right now that can do that.
4 SENATOR LEVENTIS: Thank you.
5 I'm going to call on Mary Olson.
6 After Ms. Olson, Jim Kearse, so if you would be
7 ready.
8 MS. OLSON: I'm just going to be
9 brief tonight, but tracking this process and
10 looking at the numbers in the supplemental EIS
11 on reactor impacts -- this would be a question
12 for the Department of Energy -- the
13 supplemental EIS shows that in the rather rare
14 event that we've had Chernobles, we've had it
15 happen -- of a reactor accident that were to
16 expel core materials, as in fuel, to the
17 environment, that using plutonium fuel in
18 reactors does increase the number of latent
19 cancers that would be expected from that event,
20 which clearly there would be cancers from
21 uranium being dumped in a similar way, but
22 there would be an increase in the number
23 associated with using plutonium fuel.
24 An independent study done by Dr. Ed
25 Lyman has also estimated this number and shown

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1 a significant increase of risk.
2 Working for an organization that
3 tracks the status of the operating reactors in
4 the United States, we're well aware of the
5 influence of both aging on reactors, and the
6 impact of intense heat and radiation, degrading
7 the metals that the reactors are made of, and
8 also the impacts of the deregulated utility
9 environment, in terms of the needs for
10 corporations to cut their costs and become
11 competitive.
12 And those things combined with the
13 difference between the fission physics of
14 plutonium and the difference compared to
15 uranium lead us to feel that there is an
16 increased risk in the possibility of accidents,
17 incidents, releases above what operating
18 uranium in reactors currently demonstrates, so
19 increased chance of an accident or incident
20 coupled with increased consequences of such an
21 accident or incident, we are in a need for
22 process here. I would like a clear statement
23 from the Department of what the justification
24 is for exposing the reactor communities to this
25 increased hazard.

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1 MR. NULTON: Okay, I may ask Duke to
2 jump in here, if you feel you have to.
3 I think, first of all, the events
4 that Mr. Lyman addressed in his study were
5 beyond design basis events. Let me see if I
6 can put this in layman's terms. These are not
7 normal operating kinds of events. They are
8 very, very low probability events,
9 one-in-10-million, one-in-100-million kind of
10 events.
11 There are two or three of those
12 events which would result in a release of
13 plutonium.
14 In most events that occur in a
15 reactor, you release fission gasses, but you
16 don't release the actual plutonium or uranium
17 metal that's in the fuel.
18 However, there are these very, very
19 low probability events that would release
20 plutonium, and as Ms. Olson points out, there's
21 already plutonium in normal reactor fuel that
22 is built into that fuel as it is irradiated in
23 the reactor.
24 If those very rare events occur,
25 there are some increases in latent cancer

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1 fatalities, and our own numbers show that, and
2 they're, I think, fairly consistent with
3 Mr. Lyman's.
4 As someone pointed out in one of our
5 earlier meetings, the fuel that we use in
6 reactors today has very, very few failures.
7 There's almost no failures, so these are
8 extremely low probability events.
9 As far as the degrading materials,
10 the reactor components, the reactor vessel, and
11 so forth, the utilities, as I understand it --
12 and you may want to jump in here -- will use a
13 fuel cycle or a fuel -- they will put the MOX
14 fuel in the core in a way that it does not
15 degrade their reactor vessel or materials.
16 I assume they're going to put the
17 fresh fuel in the center of the core, and as it
18 burns down, they'll move it into the outer
19 regions, but it will be managed at the fuel
20 location. The location of the MOX fuel will be
21 managed in a way that will have minimal impact
22 on the materials and systems in that reactor.
23 As far as deregulation pressures,
24 you know, I can't speak for the utilities, but
25 I will say that part of our procurement process

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1 was to look for reactors that were financially
2 healthy, that had good operating records with
3 the NRC, and we believe that the Duke reactors
4 and the Virginia Power reactors fit that bill,
5 that they are well run and some of the best
6 reactors that operate in this country today
7 with a very good safety record.
8 So we feel that this is a safe
9 program, and again, it will be regulated by the
10 Nuclear Regulatory Commission, as will the fuel
11 fabrication plant. We could have regulated
12 that within the Department, but we felt that we
13 wanted to use the Nuclear Regulatory
14 Commission. They're an independent agency.
15 They regulate other fuel fabrication
16 facilities, so we believe that this is a very
17 safe endeavor.
18 SENATOR LEVENTIS: Thank you. After
19 Mr. Kearse, Dr. Mary Kelly.
20 MR. KEARSE: I'm Jim Kearse,
21 Barnwell County Council.
22 How many of these people on this
23 panel to the right are from South Carolina?
24 I'm just curious.
25 SENATOR LEVENTIS: Mr. Brown is from

1 Charleston. Ms. Pierce is our research
2 director.
3 MR. KEARSE: The reason being is,
4 the committee from South Carolina, Barnwell,
5 Aiken, Senator Brad Hutto, Representative
6 McCade -- we went and talked with DOE, Dave,
7 and begged them to bring this process to
8 South Carolina.
9 What I'm hearing here tonight is
10 some people that doesn't understand what we're
11 going to get from this.
12 When I was riding up here, I saw a
13 beer can roll across the road, and I thought
14 about the bad things that come out of it. One
15 was death, and the other is split families.
16 Innocent people die, but then there's some good
17 things that come out of them beer cans. You
18 end up with maybe a lawn chair to sit on the
19 beach with after it's recycled.
20 When you look at plutonium going
21 into MOX fuel, we'll end up with electricity in
22 South Carolina, New York, Washington, wherever.
23 We'll have something coming back to us that
24 we've already paid for. We used it as a weapon
25 of war, and now we're going to use it for peace

1 money to build those reactors. However, the
2 other factor involved is the aging of these
3 reactors so that they are no longer safe.
4 At a recent meeting, I believe it's
5 the one -- there was a recent meeting in
6 Augusta with a subcommittee of the National
7 Science Foundation, and I was able to ask some
8 questions over there.
9 I was told on this question of --
10 the reactors are reaching the end of their
11 lives and are slighted to be decommissioned,
12 that they had picked reactors that have as much
13 life in them as they need, and now people are
14 talking about 10 to 12 years over which this
15 MOX fuel is to be burned, but the figure that I
16 was told over that meeting was six years.
17 That's one of the things that I find troubling.
18 The other one is the question of
19 criticality. We don't often hear anybody
20 talking about criticality, but it is an
21 important issue. We talked about it tonight in
22 terms of the lines from the -- I believe from
23 the tanks.
24 However, we are assembling a
25 tremendous amount of nuclear material at the

1 times.
2 All I'm wondering is when we're
3 going to get started. Dave, do you have an
4 answer for that one?
5 MR. NULTON: Yes, as we touched on
6 very briefly earlier, we are now in the process
7 of initiating design of the fuel fabrication
8 facility. Construction will start in the
9 2002/2003 time frame and will begin fabricating
10 fuel around the 2006 time frame.
11 MR. KEARSE: Thank you.
12 SENATOR LEVENTIS: Dr. Kelly?
13 After Dr. Kelly, Mr. Lewis Zeller.
14 DR. KELLY: My name is Mary Kelly,
15 and I have been following these nuclear
16 issues -- I hate to tell you this -- but since
17 before the bombs dropped in Japan.
18 As a chemist, I have been kind of
19 tuned in, and a lot of what goes on I find
20 deeply troubling.
21 I am aware of the fact that the
22 nuclear reactors that we now have a finite time
23 frame during which they can operate.
24 I've seen places where it says --
25 that had to do with the ability to borrow the

1 Savannah River Site, and something that kind of
2 lit a light bulb in my head was an article I
3 read in the Wall Street Journal some months ago
4 talking about North Korea.
5 North Korea, according to the Wall
6 Street Journal, is almost in a situation where
7 they can blackmail the rest of the world
8 because who is going to go in and bomb nuclear
9 facilities? No one in their right mind.
10 However, we live in a world filled
11 with terrorists and countries that might get
12 the capacity to deliver a missile. What is
13 going to happen if one gets dropped on the
14 Savannah River Site? You know, that is
15 something that does occur to me, so I think
16 there are a great many troubling questions
17 about this whole thing, and we do need some
18 candid evaluations and the belief that we can
19 really trust what we are being told. Thank
20 you.
21 SENATOR LEVENTIS: Mr. Nulton, I
22 think one of the issues that Dr. Kelly has
23 raised might be invited by saying, are any of
24 the proposed plants that are going to burn the
25 plutonium, the MOX fuel, scheduled to reach

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1 their service life end before 2020?
2 MR. NESBIT: Do you want me to take
3 that, Dave?
4 MR. NULTON: Go ahead.
5 MR. NESBIT: We've got six mission
6 reactors proposed for plutonium disposition.
7 Of those, two have licenses which expire before
8 2020 or in 2020. That's North Anna Unit One in
9 2018 and North Anna Unit Two in 2020. The
10 McGuire and Catawba Units licenses expire
11 between 2021 and 2025.
12 We have an irradiation plan for
13 accomplishing the plutonium disposition mission
14 that would accomplish it in the six mission
15 reactors without relying on any extension of
16 that license lifetime beyond the original
17 40 years.
18 We've also done evaluations to
19 address aging, specifically on the reactor
20 vessels, which is one of the primary concerns.
21 As Dave alluded to earlier, when
22 responding to Ms. Olson's question, due to the
23 field management schemes that we use, there's
24 relatively no or close to no impact on the
25 aging of the reactor vessel due to using

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1 mixed-oxide fuel, and we'll be able to
2 demonstrate a large safety margin in that area,
3 so we're not relying on license extension to
4 accomplish the program. However, I will add
5 that at Duke Power we are in the process of
6 applying for and obtaining a license extension
7 for our Oconee reactor in South Carolina.
8 We're very optimistic about getting that
9 license and using that reactor for up to 60
10 years.
11 SENATOR LEVENTIS: The security
12 concerns at Savannah River Site, without
13 breaching any security, do they include
14 airborne as well as surface threats?
15 MR. ANDERSON: (Nodding head.)
16 MS. CARROLL: Can you put a nod on
17 the record?
18 SENATOR LEVENTIS: I used to fly
19 over that place in a plane carrying bombs all
20 the time. It was one of ours.
21 All right. Next is Mr. Louis
22 Zeller. After Mr. Zeller, Ernie Chaput.
23 MR. ZELLER: Thank you,
24 Senator Leventis. My name is Lou Zeller. I'm
25 on the staff of the Blue Ridge Environmental

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1 Defense League since 1986.
2 The Blue Ridge Environmental Defense
3 League opposes the use of plutonium fuel in
4 commercial power reactors. The plant's use of
5 mixed-oxide or MOX fuel is unsafe,
6 uneconomical, and unnecessary.
7 MOX fuel use in reactors operated by
8 Duke Energy and Virginia Power would set a
9 dangerous precedent in the nuclear industry by
10 needlessly exposing many people to the risk of
11 additional radiation exposure from a plutonium
12 fuel power plant accident.
13 The program is experimental, in that
14 no reactor has ever been operated with fuel
15 derived from weapons-grade plutonium.
16 I'd read an excerpt from a letter
17 written on May the 17th of 1999 from the
18 advisory committee on reactor safeguards to the
19 chairman of the Nuclear Regulatory Commission.
20 It states that, quote, The
21 U.S. Department of Energy is proposing to
22 dispose of some fraction of the nation's excess
23 weapons-grade plutonium by converting this
24 plutonium into MOX for use in commercial
25 nuclear power plants. There is, however,

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1 rather limited operational or regulatory
2 experience with the use of MOX in the U.S.
3 Even the experience in other countries is not
4 extensive.
5 Safety margins will be reduced
6 because reactors designed for uranium fuel
7 will be using plutonium fuel. These are my
8 words. Without modifications of the plant,
9 containment vessel, inspection schedules, and
10 maintenance procedures, the increased danger of
11 a reactor will be hidden by an outwardly normal
12 appearance. It's like a land mine which could
13 go off when least expected.
14 I want to dwell on just two points
15 here tonight: One is the transportation of
16 plutonium fuel and also issues of reactor
17 safety.
18 The transportation hazards in
19 emergency response to a rail or a highway
20 accident must be well prepared and rapid.
21 Delays in response to accidents which involve
22 the release of radioactive materials would
23 expose unknown numbers of people to negative
24 health effects.
25 In 1996, a Department of Energy

1 Transport and Safeguards Division, Safety-Co
2 transport trailer carrying nuclear weapons slid
3 off a road and rolled over in rural Nebraska.
4 Four hours elapsed before DOE
5 headquarters were notified, and it was 20 hours
6 before a radiological assistance program team
7 determined there was no release.
8 A similar delay in response to a MOX
9 fuel accident could make effective emergency
10 response dangerous and cleanup impossible.
11 The following comment by the Georgia
12 Environmental Protection Division cites,
13 Vehicular tests of materials deposited on
14 roadways, it takes issue with the DOE's
15 approach to emergency response to accidental
16 plutonium fuel releases.
17 It says, quote, "After a passage of
18 about 100 cars, only a small fraction of the
19 original contamination remained on the road
20 surface. Unless emergency officials promptly
21 closed the accident scene to vehicle traffic,
22 an unlikely situation, emergency responders may
23 face an incident scene that is, unknown to
24 them, extremely hazardous due to respirable
25 plutonium. Post-emergency actions may also be

1 complicated due to the enhanced spread of
2 contamination by vehicular traffic."
3 These are the words of the Georgia
4 Environmental Protection Division from their
5 comments to the Department of Energy.
6 SENATOR LEVENTIS: I appreciate your
7 concerns, and we'd be happy to put anything in
8 the record.
9 What, I think, would be of more
10 significance this evening would be to pose
11 questions that these gentlemen can respond to
12 because their expertise is available to us, so
13 if we could sort of go in that direction, it
14 would help.
15 MR. ZELLER: Yes, sir. I
16 understand. In fact, I was just about to get
17 to some questions, which might be to the liking
18 of the representative from Duke Energy and from
19 Cogema with regard to reactor safety.
20 French test results suggest that
21 plutonium fuel is more unstable than uranium
22 fuel.
23 In 1997, a MOX fuel rod violently
24 ruptured when subjected to test conditions
25 designed to simulate an accident. The uranium

1 fuel rod in that same test did not rupture.
2 Again, the letter from the advisory
3 committee to the chairman of the NRC stated
4 that, We're aware of experimental studies that
5 show there to be enhanced release of fission
6 gasses to the fuel cladding gap during reactor
7 operations with MOX relative to conventional
8 fuels.
9 We're also aware of anecdotal
10 accounts from the results of Laquores test in
11 France dealing with the release of volatile
12 radionuclides, such as cesium, from MOX under
13 severe accident conditions.
14 The results of these tests revealed
15 that during the early stages of core
16 degradation, releases of volatile radionuclides
17 from MOX are more extensive than from
18 conventional fuels at similar levels of burnup.
19 Does anybody care to address those
20 test results?
21 MR. NESBIT: We're aware of the
22 Capri tests in France. One of the team
23 participants, Electricity to France, is a
24 sponsor of those tests. They happen to be the
25 world's largest user of mixed-oxide fuel. I

1 believe they have 17 reactors in France now
2 loaded with mixed-oxide fuel and using it.
3 I make that point to emphasize that
4 this is not an experimental program. It's a
5 mature, proven technology. It's been done
6 safely for years and years.
7 The performance of mixed-oxide fuel
8 in nuclear reactor cores over decades,
9 primarily in Europe, but also in the United
10 States and Japan, has been comparable to that
11 of uranium fuel.
12 Concerning the Capri tests
13 specifically, the tests involved nine
14 reactivity insertion accident simulations in a
15 sodium cooled reactor core. The intent of the
16 test was to fail some specimens in order to
17 determine when the specimens would fail.
18 Six of the tests were uranium fuel.
19 Three were MOX fuel. One of the uranium fuel
20 tests experienced failure, so did one of the
21 mixed-oxide fuel tests.
22 Our evaluations indicate that the
23 energy deposition rates at which the
24 mixed-oxide fuel failed were significantly in
25 excess of any that could be seen in one of our

1 cores operating from mixed-oxide fuel in the
2 extremely unlikely event that this accident
3 took place in the first place.
4 All in all, I want to reiterate and
5 point out that the performance of mixed-oxide
6 fuel has years and years of experience behind
7 it in Europe, and it has been exemplary.
8 If we thought otherwise, Duke Energy
9 would not be involved in the program. We have
10 a tremendous financial investment in these
11 plants. Our workers work there. We live in
12 the plant communities. We'd be crazy to do
13 something that we didn't think was safe.
14 By the time we'd get to the point of
15 actually irradiating mixed-oxide fuel in our
16 reactors, we will have thoroughly evaluated the
17 entire spectrum of potential accidents that
18 could occur, we will have submitted these
19 evaluations for Nuclear Regulatory Commission
20 review and approval, and they have to give us
21 their specific regulatory approval before we
22 can go forward with the program.
23 MR. ZELLER: I hope that's some of
24 the concerns of the advisory committee on
25 reactor safeguards regarding the limited

1 experience of MOX fuel, that you would help
2 provide some information to them, because
3 apparently, they feel that this experience is
4 rather limited.
5 With regard to reactor safety, once
6 again, at the Catawba plant and the McGuire
7 plant, safety hazards in such plants are a
8 combination of human and technical error. Both
9 types of error are noted in the Nuclear
10 Regulatory Commission's most recent plant
11 performance review of the McGuire, Catawba, and
12 the North Anna reactors.
13 The NRC's plant performance review,
14 which was completed on March the 25th of 1999
15 says that, Unit One experienced forced outage
16 of approximately three weeks in duration due to
17 blocked flow channels in portions of the ice
18 condenser, which is part of the containment
19 structure.
20 Problems in maintenance programs and
21 processes included examples of surveillance
22 deficiencies for ventilation systems and ice
23 condensers.
24 And the third one is, the
25 engineering performance decline was a result of

1 deficiencies in auxillary filling ventilation
2 system testing, overheating a vent in the upper
3 surge tank, and degraded conditions in the
4 Unit One ice condenser.
5 While the issues were ultimately
6 resolved properly, each had its roots in poor
7 engineering performance. These are the words
8 of the Nuclear Regulatory Commission in their
9 review.
10 The NRC has a mandate to protect
11 public health and safety. The findings from
12 the Cook plant, which uses also ice condensers,
13 indicate that both of its units may not have
14 protected the public had there been an
15 accident.
16 SENATOR LEVENTIS: Mr. Zeller?
17 MR. ZELLER: Yes.
18 SENATOR LEVENTIS: I have to ask you
19 to get to a question. These things that you're
20 pointing out certainly are a matter of record
21 and are important, and we'd be more than happy
22 to hear them. But we really have no access to
23 any kind of resolution of those. If you have a
24 question that you could ask, it really would be
25 helpful.

1 MR. ZELLER: Sure, the Catawba and
2 McGuire both utilize the ice condensers, which
3 I mentioned, which absorb energy to allow
4 smaller physical containment structures to
5 contain accidental releases from its reactors.
6 The ice condensers must work in a
7 reactor emergency, similar to an air bag in an
8 automobile. You don't get a second chance.
9 The Donald Cook plant, like I
10 mentioned, uses similar technology and has been
11 shut down since 1997 because of ice condenser
12 problems. This is a fundamental problem with
13 the containment in the case of an accident
14 within -- in the reactor.
15 Is it wise to proceed at Catawba or
16 McGuire with the MOX fuel before the ice
17 condenser problems are solved?
18 MR. NESBIT: The NRC has no
19 regulatory issues with the design or operation
20 of our ice condensers at McGuire and Catawba.
21 That's why our plants are up and running. And
22 yes, we think it is wise to proceed with the
23 mixed-oxide fuel program at McGuire and
24 Catawba.
25 MR. ZELLER: Well, then, in closing,

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1 I guess I should add one more point from the
2 advisory committee on reactor safeguards.
3 She said that public attention has
4 been drawn to the higher actinide inventories
5 available for release for MOX banned from
6 conventional fuels. She states, "Significant
7 releases of actinides during reactor accidents
8 would dominant the accident consequences.
9 Models of actinide release now available to the
10 NRC staff indicate very small releases of
11 actinides from conventional fuels under severe
12 accident conditions." In other words, MOX fuel
13 is more dangerous and will cause more harm to
14 the general public in the case of an accident.
15 Senator Leventis, I appreciate the
16 opportunity to talk to you today. A total of
17 3.7 million people live within 50 miles of the
18 McGuire and the Catawba nuclear power stations,
19 and another one and a half-million live within
20 50 miles of the North Anna reactor, yet the
21 Department of Energy did not see fit to have
22 public hearings in those communities -- but to
23 hold a long hearing in Washington DC on a
24 weekday during working hours. Our written
25 request to the Secretary of Energy for

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1 additional hearings met with rejection.
2 The unprecedented veil of secrecy
3 which envelops this civilian project threatens
4 to undermine free debate on important issues of
5 public policy.
6 Senator Leventis, on behalf of the
7 Blue Ridge Environmental Defense League, I want
8 to express our gratitude to you for holding
9 this public meeting in Columbia, and I
10 appreciate the inquiry to the DOE's plutonium
11 fuel program, which you have initiated. Thank
12 you for the opportunity to address these people
13 today.
14 SENATOR LEVENTIS: Thank you,
15 Mr. Zeller.
16 Could you address the notion of
17 public hearings? I know that's been an issue.
18 You all were kind enough to come at my request,
19 but could you go over that just a little bit?
20 MR. NULTON: We will consider these
21 requests as we get them, but we have set up at
22 this point that there will be a public process
23 related to the license modification that will
24 be required for each of these reactors to burn
25 MOX fuel. That will be conducted by the

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1 Nuclear Regulatory Commission. And we believe
2 that will provide the public with the
3 opportunity that they need.
4 SENATOR LEVENTIS: Thank you,
5 Mr. Zeller.
6 MR. ZELLER: I have additional
7 remarks in writing. I will hand them to the
8 reporter or --
9 SENATOR LEVENTIS: I think if you
10 will hand them to Ms. Pierce, that will be
11 fine. Thank you.
12 After Mr. Chaput is Rita Kilpatrick.
13 Mr. Chaput? I hope I pronounce that correctly.
14 MR. CHAPUT: Thank you, Senator.
15 With a name like Chaput, we answer to almost
16 anything. Thank you, very much.
17 SENATOR LEVENTIS: Before you begin,
18 I'm looking at about 20 people who would like
19 to speak, and I would like to hear them, and we
20 will stay, but in deference, please see if we
21 can focus on questions that this panel can
22 answer.
23 MR. CHAPUT: Yes. I do have a
24 statement I'd like to submit. I will skip the
25 statement and just go right to the questions.

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1 SENATOR LEVENTIS: Thank you.
2 MR. CHAPUT: I'm with the Economic
3 Development Partnership in Aiken, South
4 Carolina. We've made extensive studies of the
5 activities being conducted and proposed were
6 being conducted at Savannah River Site to make
7 sure it meets the community's expectations with
8 regard to the types of programs that can be
9 conducted safely at that site.
10 We had an important role in winning
11 the Cold War. We want to have an important
12 role in sort of the next step as the Cold War
13 winds down, as the National Academy says
14 disposing of excess plutonium constitutes a --
15 you know, that those materials constitute a
16 clear and present danger to national and
17 international security.
18 We want to have a role, and we think
19 we have the right capability to assist in that
20 important national goal.
21 If the overall objective is to make
22 100 metric tons -- 50 in our countries, 50 in
23 Russia -- of weapons-grade plutonium less
24 attractive or ideally unusable for weapons,
25 nuclear weapons, then that can equate to, as I

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1 understand the literature, as many as 20,000
2 nuclear weapons, 20,000 nuclear weapons.
3 What is the best form for that
4 plutonium to be in? You know, is the form of
5 that material better off as weapons-grade
6 plutonium or reactor-grade plutonium?
7 I think, as this panel said, you can
8 make a weapon out of reactor-grade plutonium,
9 but which is the better form, whether you're a
10 national state making weapons or a terrorist
11 group who wants to make one weapon? Which is
12 the better form of the material to make that
13 weapon? That's my question.
14 MR. NULTON: That would be the
15 weapons-grade material.
16 MR. CHAPUT: As I understand it,
17 there would probably be three reasons for that:
18 Number one, reactor-grade material is more
19 difficult to deal with. Secondly,
20 reactor-grade material is more sensitive and
21 more difficult to make critical. And third, if
22 you have the same amounts of material, you get
23 less of a nuclear yield with weapons-grade
24 plutonium; is that correct?
25 MR. NULTON: Yes.

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1 MR. CHAPUT: In all three cases.
2 So you're better off, the world is
3 safer with reactor -- all that plutonium being
4 reactor-grade as opposed to weapons-grade, so
5 what we ought to be doing is reducing the
6 threshold, the attractiveness, and the
7 usability of that material, the ability for
8 people to use it and to make modern weapons,
9 small weapons, reduce the ability to do that by
10 denaturing that material, isotonically altering
11 it and making it reactor-grade plutonium.
12 My second question is -- I don't
13 know if you specifically addressed it or not,
14 Dave Nulton, but if the -- there is a concern
15 on the part of the Russians, as I understand
16 it, about the U.S. plans for disposition.
17 If the U.S. goes 100-percent
18 immobilization -- and I think you said you can
19 recover weapons-grade plutonium from the
20 immobilized form; is that correct?
21 MR. NULTON: Yes.
22 MR. CHAPUT: If the U.S. goes
23 100-percent immobilization, will the Russians
24 sign up to this program and dispose of their
25 material?

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1 MR. NULTON: No, they would not, if
2 we go 100-percent immobilization.
3 MR. CHAPUT: So if we insist on
4 100-percent immobilization, the program falls
5 apart, none of the material gets dealt with,
6 the world does not -- we don't end up disposing
7 of any of our materials either in this country
8 or in Russia; is that correct?
9 MR. NULTON: That would be correct,
10 yes.
11 MR. CHAPUT: I think if we looked at
12 it from the standpoint of what's the right
13 thing to do for our generation and the future
14 generations, let's take the steps that we can
15 take. Take that material. We'll go through a
16 once-through cycle, keep jawboning the
17 Russians, let them -- hopefully they will step
18 away from reprocessing, address some of these
19 other concerns, but the world is better off
20 going MOX than going nothing. And if you
21 insist on total immobilization, you get
22 nothing.
23 SENATOR LEVENTIS: I think that
24 probably is a question for the administration
25 to ask because they may come back with a

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1 bilateral agreement that might be different
2 than that. We have already heard the
3 Department of Energy say that if the Russians
4 step away from the program, that they will do
5 away with MOX, but we also would have to be
6 under the impression that if the Russians step
7 up to a different program and accept our
8 immobilization, that we would do that, so I
9 don't know that we're going to resolve those
10 issues right here, Mr. Chaput.
11 MR. CHAPUT: But everything I have
12 heard, that is consistent with the answers I
13 got tonight, is that the Russians will not
14 accept a program where they believe the U.S.
15 government can go back in and surreptitiously
16 take the weapon grade plutonium out of the
17 immobilized form. They don't trust us frankly
18 probably any more than we trust them.
19 You know, there are hardliners in
20 Russia, just like there are hardliners over
21 here. They want to be assured. They may be
22 looking for some excuse to put their program
23 back.
24 I guess the important thing is:
25 What are we trying to achieve? We're trying to

1 take as much of this material and reduce it and
2 its potential for application in nuclear
3 weapons to the maximum extent possible. MOX
4 seems to be the only way which that's going to
5 happen. Let's not lose sight of that. For the
6 sake of not necessarily us, but our future
7 generations.
8 SENATOR LEVENTIS: Thank you.
9 MR. CHAPUT: Thank you, and here's
10 my statement.
11 SENATOR LEVENTIS: Thank you very
12 much. Ms. Kilpatrick. Then after her,
13 Ms. Julia Pearson.
14 MS. KILPATRICK: Yes, good evening,
15 and thank you for this opportunity to ask a
16 couple questions. I will try to make them very
17 brief, but we haven't had an opportunity like
18 this to ask such questions.
19 I work for and am the director for
20 an organization campaign for Prosperous
21 Georgia. We're an energy consumer based
22 organization.
23 I wanted to follow up on an issue
24 that the fellow who laid out for us earlier the
25 idea that MOX may significantly boost the

1 energy supply to South Carolina -- I want to
2 better understand what actually is estimated to
3 be the amount of electricity in terms of
4 capacity and demand that Duke Power, for
5 example, would expect to generate from MOX
6 fuel, and what is that in comparison to your
7 total capacity demand per year?
8 MR. NESBIT: Okay, our system is
9 approximately 60-percent nuclear right now, of
10 which about two-thirds of which would be
11 Catawba and McGuire, so about the time the
12 program would be in place, we would be
13 generating, depending on electricity demand,
14 growth, et cetera, at the time the program were
15 to start, maybe 30 to 40 percent of our
16 electricity from units that have some
17 mixed-oxide fuel in the cores.
18 I'd like to point out that in the
19 case of Catawba, Duke is a 12-1/2 percent owner
20 in that plant, and that the remainder of the
21 plant is owned by four municipalities and
22 co-ops that were not the complete owner of that
23 plant. The electricity actually goes to other
24 organizations.
25 MS. KILPATRICK: Do you know the

1 actual electricity output that the MOX itself
2 would generate?
3 MR. NESBIT: It would be
4 approximately 1,050 megawatts per unit, so if
5 all four units are operating, that's on the
6 order of 4,000 megawatts of electricity.
7 SENATOR LEVENTIS: But wouldn't it
8 be fair to say that it's no different than
9 they're doing now, or that they would do
10 subsequent to --
11 MR. NESBIT: Yes, sir, absolutely.
12 Those units will be operating irrespective of
13 whether this program is in place or not.
14 SENATOR LEVENTIS: Is it your
15 question, is it going to be a greater output?
16 MS. KILPATRICK: That's my question.
17 What contribution does it actually have?
18 MR. NESBIT: Oh, the power generated
19 by the station will not change.
20 MS. KILPATRICK: All right, that's
21 what I had understood, and I just wanted to
22 make sure I had the right understanding.
23 Another question has to do with
24 polling. I know I asked you at the break time,
25 and you didn't know the answer to the question

1 of whether Duke Power has done any customer
2 polling.
3 It's occurring more frequently now
4 across the country where utilities are
5 concerned when they face deregulation what
6 their customers would choose in the way of a
7 utility provider, fuel types, or concern in
8 environmental impacts, cost impacts, et cetera.
9 I don't know if there's anyone from
10 Duke Power here in the audience who might be
11 able to speak to whether the company has
12 carried out any polling of its customers to
13 determine if any customers are showing a real
14 strong interest in purchasing electricity
15 generated by plutonium based MOX.
16 MR. NESBIT: As I indicated, I'm
17 unaware of any such polling, but I can't
18 guarantee that it hasn't taken place.
19 MS. KILPATRICK: Do you have
20 anything to offer along those lines, either for
21 Virginia Power, Duke Power customers? The
22 polling information that we have is showing
23 what we're understanding to be fairly
24 consistent results, that when given a
25 preference, the majority of consumers are

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1 indicating that they would prefer to buy energy
2 that is drawn from renewable energy, energy
3 conservation sources, rather than fossil fuels
4 and certainly more than nuclear power.
5 So is there a -- what we would like
6 to have a sense of is whether there's been any
7 customer demand assessment polling done yet; or
8 if not, is that anticipated in your plans?
9 MR. NULTON: I'm not aware of any
10 polling that's been done. Utilities certainly
11 know, and I don't know if they intend to do it.
12 MR. NESBIT: I don't think there has
13 been. I can check and get back with you,
14 Senator.
15 SENATOR LEVENTIS: In that regard,
16 not Duke, but DOE -- Dave, I know that the
17 Department of Energy gave a fairly substantial
18 grant to the medical university to look into
19 the matter of our acceptance of nuclear waste
20 in the state.
21 So if you would -- it may be a part
22 of the agency that looks into the those things,
23 please let us know, and we can let
24 Ms. Kilpatrick know.
25 Next would be Ms. Julia Pearson, and

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1 after her Mr. Kawaguchi.
2 MS. PEARSON: My question was
3 already answered, if you'd like to go ahead.
4 SENATOR LEVENTIS: Thank you very
5 much. In that case, Tomo. Then after him,
6 Mr. Bob Guild.
7 Please pronounce your name
8 correctly, and accept my apologies.
9 MR. KAWAGUCHI: Good evening. My
10 name is Tomo Kawaguchi. I'm just a concerned
11 citizen, also. I'm a marine biologist.
12 My first question is I think an
13 issue of credibility of DOE. I recently read a
14 newspaper article on waste treatment facility
15 at the SRS, 500 million dollar total facility
16 have failed, but basically I still haven't
17 digested sort of the article itself.
18 In other words, that's lots of
19 money, and so many people could have been hired
20 by this money, but I guess we are not ready to
21 sort of proceed a new project, I think. I
22 think we still need a lot of time to really
23 digest this sort of particular incident,
24 because SRS is particularly designed for
25 containment of those wastes, nuclear wastes.

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1 I've seen almost -- first time that
2 radioactive fish, contaminated fish in Savannah
3 River, so I think -- can we really trust the
4 DOE to do this project? That's the first
5 question.
6 The second question is: If this
7 project is to start, are we -- in Columbia, are
8 we getting plutonium contaminated clothes at
9 INS located South of Edisto Avenue? That's
10 second question.
11 And I guess the last question is the
12 security issue. I think the U.S. taking dual
13 position that -- one is immobilization, and the
14 other one is this MOX fuel issue, MOX fuel, but
15 I think you said that if one of them failed,
16 you can choose one of them. But if the MOX
17 fuel failed means not only the safety -- I
18 mean, environmental safety, but also if
19 terrorists gets this, it is sort of the end of
20 the world in my concern.
21 So I think transporting this MOX
22 fuel into three different locations to me means
23 triple the sort of safety concern and the
24 danger, so I think we really need to go slow on
25 that, and so those are three sort of my

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1 concerns, and also the questions I'd like to
2 know.
3 SENATOR LEVENTIS: Thank you very
4 much. The question of proceeding, question of
5 waste, especially as it applies to us here, and
6 then the question of security and transport
7 after it's MOX.
8 MR. NULTON: The first question --
9 can you trust DOE, well, I think you can. I
10 certainly hope that you can.
11 Again, the Nuclear Regulatory
12 Commission will license and regulate both the
13 fuel fabrication facility and the reactors that
14 will irradiate the MOX fuel.
15 Secondly, can you expect plutonium
16 contamination. I don't think there will be any
17 plutonium contamination, any measurable
18 plutonium contamination from these facilities.
19 Thirdly, terrorists have not -- are
20 more of a concern, I think, in Russia than in
21 this country, but I think to the extent that
22 terrorism is a concern, it's going to be a
23 concern for both immobilization and MOX.
24 There's transportation associated
25 with each of these technologies in getting the

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1 materials from their current location to the
2 Savannah River Site, where this work will be
3 done.
4 It is true that there will be the
5 additional transportation of the fuel that is
6 fabricated at Savannah River to the reactor
7 site.
8 At that point, the plutonium is
9 mixed with uranium. It's then pressed into
10 pellets. Those pellets have been centered.
11 They're in beveled tubes. The tubes are in
12 fuel assemblies. The fuel assemblies are in a
13 cast. The cast is in an SST truck. The chance
14 for any diversion of material at that point is
15 extremely remote.
16 I also want to say -- and this may
17 respond to an earlier comment that was made --
18 that all transportation of materials will be
19 conducted in the department safe, secure
20 transport trailers.
21 And as Mr. Zeller pointed out, there
22 was a situation in Nebraska where a truck went
23 off the road, but these are extremely rare
24 situations. In over 94 million miles of
25 transportation of materials around the country,

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1 communities most directly affected by this
2 proposed program and address the public's
3 concerns. So thank you, again, Senator.
4 I want to just state
5 unequivocally -- Bob Guild is my name. I'm an
6 environmental lawyer. I was involved in the
7 licensing proceeding for the Catawba reactor,
8 so I have some familiarity with some of the
9 quirkiness of their designs, as referred to by
10 Mr. Zeller earlier. I share his concerns.
11 I wanted just to state that my view
12 is that the government should be pursuing with
13 full zeal the immobilization program
14 exclusively.
15 I think it's just outrageous to
16 suggest that the Russians are dictating terms
17 of the program we're going to follow,
18 particularly since we're paying the bill for
19 whatever program they choose to adopt.
20 It seems to me we have all the cards
21 here, and it's absolutely outrageous to suggest
22 that somehow we're driven to a second best
23 program, a program that involves
24 experimentation and undue environmental risk
25 because the Russians insist on it, so I

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1 in many cases, perhaps most cases, transporting
2 the weapons that the Senator mentioned were on
3 his plane, we have had no release of
4 radioactive materials.
5 These materials are transported in
6 containers that are very, very robust. They go
7 through a number of tests, fire. They're put
8 in very hot temperatures, where they're dropped
9 from pipes onto concrete pads, slammed into
10 walls. They're put under water at high
11 pressure. They are designed not to break open
12 under even extraordinary circumstances. Then
13 they are put into these SST trucks.
14 So we believe that the
15 transportation of these materials is very safe.
16 SENATOR LEVENTIS: Thank you.
17 Bob Guild and then Mr. Peter Sipp.
18 MR. GUILD: Thanks, Senator. I very
19 much appreciate, as do all of us, your
20 willingness to invite the Department and others
21 to address these important issues.
22 I would note that the Department
23 would not be here had it not been for your
24 request, despite the fact that the public has
25 been clamoring for some time that DOE come to

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1 encourage us to forget that notion that we have
2 no choice in the matter and negotiate more
3 toughly with the Russians until we come up with
4 a program that involves the minimal handling of
5 this material, the minimal processing of this
6 material, the minimal plumbing, the minimal
7 dilution with the aqueous solutions or acid
8 solutions, the minimal opportunities for
9 environmental release, instead of the maximum
10 exposure of the public, maximum handling, the
11 maximum opportunities for diversion and
12 environmental risk, which is the MOX program.
13 I frankly am just absolutely
14 astounded that it takes a democratic
15 administration with an environmental
16 vice-president for us to embark on this idiocy.
17 It takes Duke Power Company to
18 volunteer to step up to invite the public to
19 wonder what on earth are they doing inviting
20 mixed-oxide fuel to power their commercial
21 reactors which are in trouble enough.
22 Now, I heard the discussion about
23 beyond design base accidents, and I read with
24 interest the supplement to your Environmental
25 Impact Statement that finally gets around to

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1 even touching on the subject of reactor
2 accident risks, and does so in my judgment
3 wholly inadequately.
4 But will the gentleman from Duke and
5 DOE acknowledge, as I understand the case to
6 be, that the people of Charlotte, North
7 Carolina because they are surrounded by four
8 ice condenser units, McGuire at Lake Norman
9 17 miles north of downtown Charlotte, and
10 Catawba on Lake Wylie in South Carolina
11 17 miles south -- the people of downtown
12 Charlotte are exposed to a higher risk of the
13 beyond design basis accident fatalities than
14 any other community in the entire United
15 States.
16 Am I accurately recalling what
17 either the reactor safety say or the NRC's
18 comparative assessment of relative risk of
19 people in reactor communities have concluded
20 with respect to the people of Charlotte? Does
21 anyone want to address that?
22 MR. NESBIT: Yes, I think your
23 conclusion is an error.
24 The reactors at McGuire and Catawba
25 meet a series of very strict regulatory

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1 standards that are imposed by the Nuclear
2 Regulatory Commission.
3 We showed the NRC that we met those
4 standards when we got them licensed back in the
5 early 1980s, and they've operated safely ever
6 since then.
7 In addition, in the mid 1980s, the
8 Nuclear Regulatory Commission promulgated
9 safety goals for nuclear power plants.
10 To summarize the goals briefly,
11 those goals were that the risk to someone in
12 the population surrounding the plant of a
13 prompt fatality should be no greater than half
14 of 1 percent of the overall risk of such
15 fatalities.
16 In addition, the risk of cancer
17 fatalities from the nuclear power plant
18 operation should, again, be no greater than
19 half of 1 percent of the overall risk of cancer
20 fatalities. The NRC --
21 MR. GUILD: I don't think --
22 MR. NESBIT: Excuse me. Could I
23 complete my question?
24 MR. GUILD: I don't think you're
25 responding to my question. If I could simply

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1 restate the point.
2 Of the communities in the
3 United States, is it not the case that the
4 people of Charlotte face the greatest risk of
5 death from beyond design basis accidents; and
6 if they don't, what ranking is Charlotte? Is
7 Charlotte number two, number three, number
8 four, or is it indeed number one as I recall
9 reading? That's the question I have for you,
10 sir, not a soliloquy about how safe Catawba
11 reactors are.
12 Relatively speaking, where does
13 Charlotte stand with respect to the risk of
14 fatalities from a beyond design basis accident?
15 SENATOR LEVENTIS: There's nothing
16 inconsistent with what either one of you are
17 saying, because I doubt seriously if there's a
18 major metropolitan area with two reactors on
19 the north and two reactors on the south so
20 positioned.
21 Bob, what you're saying has to be
22 probably correct if that's true, and the fact
23 that it's highly unlikely probably is correct,
24 as well, but from a statistical standpoint, are
25 there millions of people so located in relation

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1 to four reactors anywhere else?
2 MR. NESBIT: Sir, I've not done the
3 demographical studies to respond to that
4 question, but I'd just like to complete my
5 statement and say that --
6 SENATOR LEVENTIS: Sure.
7 MR. NESBIT: -- the NRC's own
8 studies indicate that the risks from operations
9 at Catawba and McGuire are one to two orders of
10 magnitude lower than the NRC's own safety goal,
11 with or without MOX fuel.
12 SENATOR LEVENTIS: But the question
13 then becomes: Did the NRC have a probability
14 of accidents among the reactors in the old
15 Soviet Union? What was our take on that, and
16 were we surprised when Chernoble went boom?
17 MR. NESBIT: I don't think the NRC
18 studies at that time even considered the
19 different Soviet designed reactors.
20 SENATOR LEVENTIS: Did they, Dave?
21 MR. NULTON: I don't know. But let
22 me just say that the Chernoble reactors are a
23 different design than the VVR1000 reactors that
24 are the seven that I mentioned.
25 SENATOR LEVENTIS: I understand

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1 that. The point is: Did the NRC or DOE try to
2 quantify what they thought were the
3 probabilities of those reactors with those
4 designs having a problem, and did this meet our
5 expectation in terms of the incident and its
6 intensity?
7 Those are valid questions because if
8 the DOE, NRC, whomever, applied the same logic
9 to the different technology and came up with a
10 probability, and then there was an occurrence,
11 then it would be useful to apply that same
12 rationale to ours.
13 Nobody wants a problem. Everybody
14 works to avoid a problem, but these are highly
15 complex kind of things, so we have to do some
16 kind of statistical approach to see where we
17 ought to be applying a little more paint or
18 glue or whatever it is that we're going to do.
19 But like I say, I don't think
20 there's a difference of opinion. It's just the
21 difference that you're looking at those
22 particular things.
23 So can we move on to another
24 question?
25 MR. GUILD: Well, of course, the

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1 cancers, as compared to 14,000.
2 That's an acknowledgment of an
3 excess of 1,600 prompt and latent fatalities
4 associated with a beyond design basis accident
5 at Catawba. That's according to the DOE's own
6 study, associated with the choice by DOE and
7 Duke to subject us to this increased risk for
8 mixed-oxide fuel.
9 Now, President Clinton adopted an
10 environmental justice Executive Order where, as
11 part of the compliance process with the
12 National Environmental Policy Act, he required
13 government agencies, such as DOE, to assess
14 whether or not actions you proposed to take
15 will embody a disproportionate and adverse
16 impact potentially on minority communities and
17 communities with low income.
18 And you purport to do such an
19 analysis that I find will be inadequate at
20 Appendix M to your supplement to the EIS. And
21 there you simply conclude that since there will
22 be no bad impacts on anybody, there won't be
23 many bad impacts on people of color or people
24 of low income.
25 My question for you, sir, is:

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1 3-mile Island accident was a beyond design
2 basis accident, as well. The loss of coolant
3 circumstance of TMI was not contemplated in the
4 design of that reactor, nor was it contemplated
5 in the design of the Catawba reactors.
6 Ice condensers, of course, address
7 only the possibility of a steam explosion and
8 the condensing of that steam. They don't
9 address the concern of a hydrogen buildup in
10 the containment for which Duke Power had to
11 jerry-rig a glow plug design with the hopeful
12 intention that the buildup of hydrogen would be
13 burned off in a controlled burn as opposed to
14 an uncontrolled explosion that would result in
15 loss of containment.
16 Your supplement to the Environmental
17 Impact Statement for this proposed program,
18 page K24, addresses these beyond design basis
19 accidents and, as the previous speaker alluded
20 to, acknowledges that for a mixed-oxide, MOX,
21 core there will be some 15,600 prompt and
22 latent cancer fatalities projected from the
23 operation of the Catawba reactor. In the event
24 of a beyond design basis accident, 15,560 --
25 15,600, excuse me, prompt fatalities in latent

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1 Having concluded that there will be an
2 additional 1,600 fatalities in the event of a
3 beyond design basis accident at Catawba, what
4 analysis have you made of a population that
5 will suffer those fatalities with respect to
6 environmental justice considerations?
7 In other words, the people who will
8 die of the 15,600, what proportion of they are
9 persons of color and low income in downtown
10 Charlotte, and how does that square with the
11 President's Executive Order on environmental
12 justice, and how are you going to address that
13 in the thus far inadequate E.J. Appendix to
14 your Environmental Impact Statement?
15 May I have an answer from DOE,
16 please?
17 MS. WHERLEY: I know that the
18 demographics were reviewed around the sites,
19 and I know that that conclusion that you
20 quoted, I believe, stated -- the conclusion was
21 made with the concept of probability of the
22 accident taking into account. There was no
23 intention to say that any of those cancer
24 fatalities were an insignificant impact.
25 MR. GUILD: I'm sorry. I missed the

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1 last part.
2 MS. WHERLEY: There was no intention
3 for there to be any implication that any of the
4 latent cancer fatalities was considered an
5 insignificant impact.
6 MR. GUILD: Your environmental
7 justice analysis simply looks at the proportion
8 of a population within 50 miles that meet the
9 description of being minority or low income.
10 But of course, that's not the same
11 population that will suffer the immediate
12 fatalities or latent cancer facilities in the
13 event of a beyond design basis accident because
14 that population is in the plume exposure
15 pathway. They're the ones that are going to
16 get the airborne release fission products.
17 My question for you is: Who in that
18 plume exposure pathway meets the requirements
19 under the President's environmental justice
20 Executive Order of being low income and
21 minority, what proportion, and will they be
22 disproportionately impacted?
23 MR. STEVENSON: That certainly was
24 taken into consideration because the guidelines
25 that are given to us when we do environmental

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1 justice studies do include a requirement for
2 plume studies.
3 So when that conclusion was reached,
4 it did, in fact, take into consideration wind
5 directions. There are certain wind roses to be
6 used so that we can determine what are the most
7 common directions of the wind as a function of
8 time of year, and all of that supporting data
9 is used in order to achieve the conclusion to
10 which we have.
11 MR. GUILD: Well, I'd ask you to
12 look at page M6 of your supplement, and I'd
13 suggest to you that there's no such breakdown
14 whatsoever in your environmental justice
15 appendix. It's simply a gross characterization
16 of the 50-mile radius, and no effort to focus a
17 wind rose or to determine a plume exposure
18 pathway.
19 If I'm mistaken, after the record is
20 closed, I'd be pleased to be corrected, but I
21 read it carefully.
22 MR. NULTON: We'll take just a
23 minute to go back and look at that section, put
24 more information in there.
25 MR. GUILD: I'd appreciate that.

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1 MR. STEVENSON: Certainly, we wanted
2 to make sure that you understand that a great
3 deal of data and analysis went into making sure
4 that that was a correct and accurate statement.
5 MR. GUILD: Well, that analysis is
6 not reflected in the text of your appendix, I
7 might note, a couple of specific questions,
8 please.
9 Once the MOX fabrication facility at
10 Savannah River, if it ever is to take place,
11 is -- finishes its useful life for this
12 program, is there a current plan for its
13 disposition or future use? And what is the
14 risk that you will find the Department of
15 Energy producing commercial mixed-oxide fuel
16 for the commercial nuclear power industry after
17 they've done their national plutonium
18 disposition duty?
19 MR. NULTON: We have indicated from
20 the beginning of the program that this would be
21 a single mission facility.
22 The contract with DCS requires them
23 to deactivate the facility at the end of their
24 mission. It then reverts back to the
25 Department. We will do the R&D on that

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1 facility, the decontamination and the
2 decommissioning.
3 At that point, a determination will
4 be made whether to tear the facility down or
5 use it for some other mission. There is no
6 chance that it will be used for commercial
7 fabrication of mixed-oxide fuel --
8 MR. GUILD: I'm sorry. What other
9 missions might those be?
10 MR. NULTON: Well, at the Savannah
11 River Site, at that point in time, will be
12 cleanup missions, so it might have some role in
13 some site cleanup activity.
14 MR. GUILD: Once mixed-oxide fuel
15 has been irradiated in the reactors, if it ever
16 is, the Catawba reactors, McGuire, North Anna,
17 must it be managed any differently than uranium
18 based fuel? Will it be for any period of time
19 stored in on-site fuel storage facilities at
20 the subject reactors? Is there a capacity in
21 those pools if such a requirement is needed?
22 Is there a need for modifying on-site storage
23 to manage those assemblies once they leave the
24 reactor?
25 MR. NESBIT: That's a series of

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1 questions. Let me make sure I try to get them
2 all.
3 MR. GUILD: Sure.
4 MR. NESBIT: The plans are to manage
5 the mixed-oxide fuel similar to the way that
6 we'll manage the uranium fuel.
7 Depending on what's going on with
8 the overall spent fuel program at the time the
9 mixed-oxide fuel is discharged, initially --
10 well, we would treat the mixed-oxide fuel the
11 same as the uranium fuel initially. It will go
12 into the pool.
13 The fuel stays in the pool for some
14 number of years. If there's a shortage of pool
15 capacity, then what we would do is eventually
16 discharge the fuel from the pool into dry
17 storage on-site. We're in the process of
18 developing such a facility at McGuire. We've
19 already developed such a facility at Oconee.
20 Our plans for mixed-oxide fuel are
21 essentially to keep it in the pool. The
22 mixed-oxide fuel long-term decay heat is higher
23 at a given point in time than uranium fuel, so
24 therefore, in order to put it in dry storage,
25 we'd have to let it cool longer anyway, but our

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1 anticipation is just to keep it in the pool
2 until we can ship it off-site.
3 MR. GUILD: Just to be clear, so if
4 you needed extra space, you'd simply take out
5 uranium based assemblies and dry-store them
6 on-site to make room for the mixed-oxide
7 assemblies. Is that what you're saying?
8 MR. NESBIT: That's correct. I
9 should add that, during the course of the
10 program, there's not a substantial increase in
11 the number of total discharge fuel assemblies.
12 There's a slight increase in the number of
13 discharge fuel assemblies, so the generation of
14 spent fuel is essentially the same with and
15 without MOX fuel.
16 MR. GUILD: Do the mixed-oxide
17 assemblies, spent assemblies, require any
18 greater amount of storage space in the pools?
19 Do they pose additional criticality issues than
20 the uranium?
21 MR. NESBIT: We don't see any at
22 this time, but that's one of the system studies
23 that we will be performing over the next few
24 years as part of our DOE based contract, and
25 we'll establish what limitations we need to in

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1 order to ensure safe storage of the spent fuel
2 assemblies.
3 MR. GUILD: I heard a gentleman from
4 DOE speak to transportation of the fuel prior
5 to irradiation of mixed-oxide fuel. I
6 understood that -- one of my questions was
7 answered. You will be using your DOE -- I
8 think you called it your SST's.
9 MR. NULTON: Yes.
10 MR. GUILD: Not supersonic
11 transport.
12 These are the arm-guarded DOE
13 transport vehicles that carry weapons material.
14 Is that basically the case?
15 MR. NULTON: Yes.
16 MR. GUILD: I mean, I just want to
17 make a point to you that I was a participant in
18 a transportation monitoring project some years
19 ago, and I must tell you, I met one of these
20 trucks, these SST's, at a steakhouse at the
21 intersection of Interstate-20 and
22 Interstate-26, and I followed it off the
23 interstate, pulled into the parking lot, and
24 watched while the crew all went in and had
25 steaks for an hour and a half, and the truck

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1 with presumably nuclear weapons material -- the
2 guys who were guarding it sure looked like they
3 were on the job -- these guys took turns going
4 and eating steak for an hour and a half while
5 the truck sat in a parking lot at a public
6 steakhouse within the city limits of Columbia,
7 South Carolina.
8 So I'm a little concerned and not
9 particularly comforted to hear that it will be
10 the Department of Energy, the SST trucks, that
11 are going to be hauling this stuff up and down
12 the highways.
13 That's not a question. That's just
14 an observation. You answered the question
15 earlier. Thank you.
16 SENATOR LEVENTIS: Do you know how
17 much longer you're going to be?
18 MR. GUILD: I have one more
19 question.
20 SENATOR LEVENTIS: We're going to
21 take a break and allow Ms. Jeter some time to
22 get her thoughts together.
23 Everyone has been more than
24 considerate, and we're going to stay until
25 everyone who would like to say something does

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1 and is allowed to, but go ahead.
2 MR. GUILD: I'll finish mine. Thank
3 you very much, Senator.
4 The last question I have is: The
5 Price-Anderson Act insulates commercial nuclear
6 utilities from -- for the exposure to liability
7 for the consequences of your commercial
8 activity.
9 If someone is killed as a result of
10 a radiation accident at the Catawba Nuclear
11 Station, one of those 15,600 people in the
12 hypothetical beyond design basis accident, they
13 literally have no right to sue Duke Power
14 Company because the Price-Anderson Act that you
15 successfully defended before the Supreme Court
16 insulates you from liability.
17 The question is: Will receipt of
18 mixed-oxide fuel at the Catawba and McGuire
19 reactors require any change in the
20 Price-Anderson Act? Will the Price-Anderson
21 Act give you -- will it extend your insulation
22 from liability for the marginal 1,600
23 additional deaths that are projected to occur
24 if there were a beyond design basis accident?
25 Are you going to need additional liability

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1 insurance, Mr. Duke Power Company?
2 SENATOR LEVENTIS: Do you know the
3 answer to that about the Price-Anderson Act?
4 MR. NESBIT: I'm not an expert in
5 that area, but I think that -- the way it was
6 characterized may not be entirely accurate.
7 The Price-Anderson Act, as I
8 understand it, puts a limitation on liability.
9 It does not insulate us completely from
10 liability.
11 We are required to hold nuclear
12 insurance up to close to a billion dollars, I
13 believe, which we do. We've had informal
14 discussions with our insurers, and they've seen
15 no need to increase our insurance premiums in
16 the event that we transition to a different
17 fuel source that's MOX fuel instead of uranium
18 fuel.
19 SENATOR LEVENTIS: Would you, for
20 us, submit that question to the folks who may
21 know about whether or not the Price-Anderson
22 Act would require any modification to --
23 MR. NULTON: It does not.
24 MR. NESBIT: Does not.
25 SENATOR LEVENTIS: All right.

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1 MR. GUILD: Again, I appreciate your
2 indulgence in answering my questions. And I
3 just would encourage DOE to really rethink this
4 program. I think it's wholly misguided, and I
5 appreciate very much that you are now answering
6 some of our questions about this. Thank you.
7 SENATOR LEVENTIS: We'll take a
8 break and try to be a little bit more prompt
9 and try to reconvene at a quarter after.
10 (A recess transpired.)
11 SENATOR LEVENTIS: I'd like to call
12 Mr. Sipp, please, Peter Sipp.
13 MR. SIPP: Thank you. Thank you.
14 I'll make my questions real simple, because
15 simple is best.
16 What I want to know is, what is it
17 going to cost to build this plant, the MOX
18 plant?
19 MR. SELBY: The estimate right now
20 for the construction is approximately 450, 480
21 million dollars.
22 MR. SIPP: Uh-huh. Okay. And the
23 next question is: What would it cost to build
24 the immobilization plant?
25 MR. NULTON: It's about the same

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1 amount of money. Although, that's changing
2 because of an increase in facility size that's
3 recently been projected.
4 SENATOR LEVENTIS: Increased or --
5 MR. NULTON: Increased. So the
6 price is increasing on the immobilization
7 facility right now, but it's on the order of
8 500 million dollars.
9 MR. SIPP: So approximately the
10 same?
11 MR. NULTON: Approximately the same,
12 yes.
13 MR. SIPP: Okay. So then the
14 plutonium, it will still be waste -- it will
15 still be nuclear waste after it's been through
16 a reactor?
17 MR. NULTON: Yes. On both cases,
18 the waste form that's produced will go to a
19 geological repository as high-level waste.
20 From the MOX program, it will go in the form of
21 spent reactor fuel. And in the case of the
22 immobilization program, it will go in these
23 large waste canisters with the plutonium
24 imbedded in the glass waste.
25 MR. SIPP: Yeah. That's simple

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1 enough to understand.
2 The fourth -- I don't really have a
3 question. It's really more of a comment. I
4 was considering investing in Duke Power; but
5 being that you're looking at it like this, I'm
6 not going to.
7 SENATOR LEVENTIS: Thank you,
8 Mr. Sipp.
9 Patricia McCracken. Then after
10 that, Jimmy Mackey.
11 MS. MCCRACKEN: Hi. I want to put
12 on the record that at each meeting I go to, I'm
13 looking for a comprehensive transportation plan
14 that I have failed to find at any of the
15 libraries, and underneath it, I believe that
16 would be required.
17 I didn't get a handout. I don't
18 know if I came in late. It was kind of
19 crowded.
20 The person from Cogema -- I don't
21 have your name, sir -- could you tell me if you
22 have given the DOE the 20-percent ownership of
23 all the people who have ownership in your
24 company?
25 SENATOR LEVENTIS: They have.

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1 MS. MCCRACKEN: If 80-percent is
2 owned by the French, who owns the other
3 20 percent?
4 MR. HUGELMANN: A French oil
5 company, Total, a French oil company.
6 MS. MCCRACKEN: A French oil
7 company. I have a little trouble. By the way,
8 I've not been able to understand you real well.
9 I have a real bad southern accent. So you may
10 want to have an interpreter here at the public
11 hearings.
12 Can you tell me the name of the
13 French oil company?
14 MR. HUGELMANN: Yes. The name is
15 Total, T-o-t-a-l.
16 MS. MCCRACKEN: Okay. And I am
17 glad -- you know, I feel like we could be
18 standing here with just the Russians and the
19 French. Thank you, Duke Power, for being here.
20 What really concerns me, after
21 reading all these documents, is all the things
22 we have done for the nuclear industry. We give
23 them a dump. We subsidize them. We do
24 research and development. They don't appear at
25 the meetings. They don't visit Yucca Mountain.

Page 1

1 They're sitting there just, Okay. They have
2 turned their backs. We've gone to the French.
3 I'm totally embarrassed.
4 I think that these companies should
5 have come forward with at least an advisory
6 board. I think only 12 people made the
7 decision to do this contract. I just think
8 it's a total embarrassment that the American
9 people knew and their customers knew that they
10 had not participated any better in offering the
11 expertise -- I guess that Duke Power has spent
12 some money to do some expertise, to do some
13 research, to work with our government. It is a
14 total embarrassment to have to come here. I
15 want to go in the back and sing America the
16 Beautiful.
17 Again, I mentioned the
18 transportation plan. I will give the rest of
19 my comments, you know, at the -- I assume we
20 can send in written comments.
21 SENATOR LEVENTIS: Well, the written
22 comment period for input is to close when?
23 MR. NULTON: June 28th, but we will
24 take comments as long as we get them and can
25 still incorporate them into the document.

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1 We've always taken comments up to the point
2 where we basically be able to print on the
3 document.
4 MS. MCCRACKEN: I don't know who
5 gives out invitations, but I've been put on
6 every list to come to the meetings. I have
7 called Mr. Nulton's office. I called today
8 just to find out what was going to be going on
9 at the meeting. I couldn't get a list of
10 documents. There was no handouts for the
11 meeting.
12 I think under such a serious subject
13 matter, that we should at least have some
14 handouts so we can follow along the
15 discussions, you know, of the group, you know,
16 that's here, so that we can address the panel
17 and know the names of the people.
18 SENATOR LEVENTIS: How did you find
19 out about the meeting?
20 MS. MCCRACKEN: I saw it in the
21 Augusta Chronicle, because I did not get on a
22 mailing list, of which I have requested, you
23 know, many, many times. Even I called a 1-800
24 number.
25 And I appreciate you having, you

1 know, the meetings, so that we do have an
2 opportunity to come.
3 One more quick question. When
4 you're doing the MOX fuel facility, what kind
5 of energy will be used to run the facility?
6 MR. SELBY: Standard electricity.
7 There will be some gas.
8 MS. MCCRACKEN: I mean, does it use
9 a lot of energy to run this -- to do all these
10 processes?
11 MR. SELBY: I believe the estimate
12 is around, for the total -- do you remember
13 what it is in -- we've estimated it at
14 around -- I think, total energy cost around
15 5 million dollars, maybe.
16 MR. HUGELMANN: I can give you an
17 answer on that. This is not a very analytical
18 process. This is only electricity mainly for
19 the machines, for the equipments, electricity
20 for the venting system, for depression type --
21 this is not analytical process. This is very
22 small concentration (inaudible).
23 MS. MCCRACKEN: Oh, okay. In your
24 country -- you know, DOE meets with like
25 military people. Do you have like clearances

1 and meet with like military people in your
2 country like we do here? You know, you're
3 owned by the government. Do you meet with
4 military people?
5 MR. HUGELMAN: The people who have
6 jobs in the MOX plant and reprocessing plant
7 are all civilian people. We don't meet
8 military people.
9 MS. MCCRACKEN: Okay. But you don't
10 meet with your government military people in
11 any way? Like your plant doesn't deal with,
12 like here, weapons things?
13 MR. HUGELMANN: In France
14 military -- (inaudible) military question is
15 inside a specific organization, but Cogema is
16 only for the civilian use of nuclear energy.
17 It is only civilian used.
18 MS. MCCRACKEN: Oh, okay. I'm not
19 sure I understood all of that.
20 MR. NULTON: What he was saying is,
21 it's a civilian facility for civilian purposes,
22 no military purpose.
23 MS. MCCRACKEN: No. I mean, is he
24 like on an advisory board that meets with
25 military in any way? You know, are you like

1 the leading -- obviously, if you are owned by
2 the government, you do most of the nuclear
3 things. Do you sit on any boards or meet with
4 military people on panels or any, you know,
5 like boards, advisory boards?
6 MR. HUGELMANN: No. This is fully
7 separated in France. Military use of nuclear
8 energy and civilian use of nuclear energy,
9 fully separated.
10 MS. MCCRACKEN: Oh, okay. Because,
11 you know, like here in this country, this
12 started out as a domestic program to take care
13 of domestic waste. It's kind of expanded
14 beyond what I think anybody ever reasoned in
15 looking at why we establish something to help
16 our, you know, American companies.
17 It's a little disturbing to see how
18 far reaching -- what started out to be a
19 repository has now expanded, you know, without
20 more participation of our American nuclear
21 industry.
22 Thank you for the opportunity.
23 SENATOR LEVENTIS: Thank you very
24 much. Mr. Mackey? Then after him, Glenn
25 Carroll.

1 SPEAKER: Mr. Mackey went back
2 earlier.
3 SENATOR LEVENTIS: Okay. I'm sorry
4 that we weren't able to get to him. Glenn
5 Carroll, and then Joan King.
6 MS. CARROLL: Is this the
7 microphone?
8 SENATOR LEVENTIS: Yes.
9 MS. CARROLL: My name is
10 Glenn Carroll. I'm from Atlanta, Georgia. I'm
11 representing GANE, Georgians Against Nuclear
12 Energy, an all-volunteer group.
13 GANE applauds the disarmament
14 efforts in the United States and Russia, which
15 has brought us to the problem of what to do
16 with unnecessary plutonium.
17 We thank you, Senator Leventis, for
18 bringing us together tonight.
19 Plutonium has become nuclear waste.
20 Plutonium is unacceptable as reactor fuel for
21 many reasons, but we emphasize that plutonium
22 for MOX fuel is a dangerous experiment, messy
23 to make, and risky in a reactor.
24 There are environmental hazards
25 attendant to transporting and dismantling

1 nuclear warheads and in subsequent
2 immobilization and storage, even temporary, of
3 retired plutonium triggers, as well.
4 But the work force at Savannah River
5 Site has the talent and needed experience for
6 the honorable mission to immobilize plutonium,
7 and we offer wholehearted support and
8 encouragement for them in that activity.
9 I've heard some things tonight that
10 have made me concerned about the potential of
11 mining immobilized plutonium, which makes me
12 think let's do this technology right. It
13 shouldn't be minable. If we're going to
14 immobilize plutonium, then we have to make it
15 so it can't be mined.
16 But we support taking the plutonium
17 out of the market. We do not support MOX.
18 We understand the allure the MOX
19 project holds for the SRS community. It
20 presents a lofty technical challenge and would
21 provide many jobs.
22 GANE points out that many, many
23 skilled, experienced people are also needed to
24 deal with contamination to the environment and
25 the huge legacy of nuclear waste left from the

1 50-year Cold War.
2 SRS work force has the appropriate
3 experience and facilities to contribute in the
4 humane fields of environmental restoration and
5 nuclear waste containment.
6 We support the plutonium
7 immobilization effort; but in light of recent
8 experience with intank precipitation, we urge
9 that we perfect the technology at a pilot level
10 first.
11 We are calling on Congress to direct
12 funding away from the wasteful, harmful MOX
13 project and give it to projects that support
14 people and the environment we depend on for
15 life and health.
16 Georgia shares the risks and
17 benefits of the Savannah River Site's location
18 on our boarder. We ask the South Carolina
19 legislature to work to protect our people and
20 ecology and to help educate your peers in
21 Congress.
22 We have at long last the most
23 welcome opportunity, jobs for a community that
24 has long proven its patriotism, jobs that
25 promote peace and environmental health for us

1 and for future generations.
2 This has been a really provocative
3 event, and I cannot thank you enough for
4 holding it. It's been very different from the
5 type of hearings I came prepared to address.
6 And I do have a couple of questions.
7 You say that it's not going to be
8 the RBMK trinoble type reactor that will be
9 used. Did you say it was TVRI?
10 MR. NULTON: VVER1000.
11 MS. CARROLL: Do they have
12 containment?
13 MR. NULTON: Yes.
14 MS. CARROLL: Is it square buildings
15 or pressure domes?
16 MR. NULTON: Dome containment.
17 MS. CARROLL: That problem with the
18 safe secure transport in Nebraska, was that the
19 one that happened during the blizzard?
20 MR. NULTON: I believe it was. It
21 slid off the highway, I think, into a ditch on
22 the side of the road.
23 MS. CARROLL: Well, our Georgia
24 Environmental Radiation manager was the one
25 that told me about that accident, and he was

1 concerned about transportation on Georgia's
2 highways of these materials.
3 And one of the things he raised, and
4 something he's working on, and I'd like to add
5 GANE's voice to this is that, the significant
6 problem there was that there was no trained
7 personnel present with the shipment to measure
8 the radiation.
9 So once the accident happened, the
10 call went out, Come here, we don't even know if
11 we've released radiation yet.
12 And we think that you've got to -- I
13 mean, we understand that to deal with this
14 problem we're going to have to transport stuff,
15 but we have got to have trained personnel
16 riding with the shipments.
17 Can you speak to that? Were you
18 aware of that?
19 MR. STEVENSON: My information is
20 incomplete on that, and what we can do is
21 certainly get back to you with that.
22 Yes, I have heard that on certain
23 trips the radiation detection gear was not on
24 the trailers, because it was not required.
25 Okay. That has been reassessed.

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1 What I'm not familiar with is the
2 results of that reassessment, but we can
3 provide you with that.
4 MS. CARROLL: Well, we just want to
5 make sure that every single shipment has
6 trained radiation personnel traveling with it.
7 If Russia doesn't comply with our
8 agreement and they pursue a breeder program,
9 what are we going to do about it?
10 MR. NULTON: Well, the Russians at
11 this point don't have the funding to pursue a
12 breeder program, but --
13 MS. CARROLL: Well, if they redirect
14 our funds and pursue a breeder program, what
15 are we going to do?
16 MR. NULTON: Well, our funds will be
17 provided in incremental fashions. So if
18 they -- I mean, we're not going to give them
19 all the money up front and watch what happens.
20 So the funds will be provided as
21 they complete elements of work. The work we're
22 doing with the Russians right now, they get
23 paid after they do the work, not before.
24 MS. CARROLL: Okay. They trust us
25 to reimburse them. That's interesting.

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1 MR. NULTON: We get to see what
2 we're paying for before we pay for it.
3 MS. CARROLL: I need to make an
4 observation. All night long, there's been
5 emphasis that the ratepayers will not take the
6 hit -- if the expenses are unpredictable, the
7 ratepayers' rates won't go up. And I wanted to
8 say out loud on the record -- we all know this,
9 but let's think about this for a minute. When
10 the department shells out the money, that's us,
11 that's our taxes. The department has no other
12 source of income than us, the taxpayers.
13 MR. NULTON: Let me just say that
14 any of these programs are requiring money from
15 the taxpayers; and continuing to store the
16 material and doing nothing requires a great
17 deal of money. You have to pay for the
18 buildings. You have to pay for the security
19 around those buildings.
20 In fact, over the long hall, that's
21 probably the most expensive alternative,
22 because you never get rid of it, and you're
23 going to be guarding it to the end of time.
24 So we realize that it costs money no
25 matter what we do, and it's all taxpayers'

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1 money.
2 MS. CARROLL: Well, the MOX program
3 ultimately leaves the legacy that it will be
4 guarded forever. So I see it as a very
5 circuitous path that does not take us to the
6 goal, but takes a lot of money that diverts
7 effort.
8 And another interesting point that
9 was just brought up -- and I do want a specific
10 answer -- how many watts of energy will the MOX
11 fabrication plant use?
12 MR. NULTON: We don't have that
13 number off the top of our head. Mr. Hugelman
14 here was saying that -- it's in the EIS. I
15 just don't have it off the top of my head.
16 MS. CARROLL: Well, you have an EIS
17 handy, don't you?
18 MR. NULTON: Not with us here, no.
19 MS. CARROLL: You're kidding? Well,
20 I just remember when TDA wanted to finish the
21 Belfont plant in Northern Alabama, they needed
22 an excuse, somebody to use the excess power
23 that would be generated. And they said, Oh,
24 well, we're going to build a uranium enrichment
25 facility here. It would use half the power we

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1 generate.
2 I'm sure it's a very power-intensive
3 process. So while we have the benefit of
4 generating electricity from it, we will gobble
5 a lot of electricity to do that. So it's --
6 MR. NULTON: Again, the
7 immobilization facility also requires
8 electricity to fire up melters and things of
9 that nature.
10 MS. CARROLL: Good. We need to take
11 this plutonium out of harm's way, if we have to
12 refine the technology, if it's minable in the
13 path we're pursuing, we can't go down that path
14 until we figure this out.
15 I'm not technical. I'm an artist,
16 and Arjun could probably help you design what
17 you need. Could you do that, Arjun?
18 (Laughter.)
19 MS. CARROLL: For a price? I'm
20 sorry. I don't mean to put you on the spot.
21 DR. MAKHIJANI: I appreciate it.
22 MS. CARROLL: All right. Well, I
23 think the most important question that I'd like
24 to know -- I'd like to make an observation on
25 something else I heard you say, because I'm in

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1 Georgia, and the legacy from Jimmy Carter
2 through every governor since has been, we are
3 very concerned about activities over at
4 Savannah River Site. And the policy has been,
5 at the highest office in Georgia, that until
6 cleanup occurs, no new facilities, no new
7 missions. Cleanup of the environment,
8 containment of the environment is the only
9 thing that we will support.
10 And you made the comment, Well, what
11 are we going to do when 10 years pass and we've
12 built this -- we've R&D'ed the facility. I
13 mean, you didn't give that fellow the real
14 figure, because before we construct the
15 facility, there's the R&D to do this. So it is
16 probably twice as much as what you told that
17 fellow.
18 So we're going to do that for 10
19 years. Then for 15 years, we're going to
20 produce MOX, and then we're going to clean up
21 the environment. Yeah, right, you know.
22 So I have a question for you. Our
23 representative, Nan Orrock, who is represented
24 here tonight, asked at a legislative meeting in
25 Georgia, and DOE was present singing the

Page

1 MS. CARROLL: Well, this is my
2 thing. In 1990, that was what we were going to
3 do program wide, and we had a budget, and we've
4 since fallen off on the level of will and the
5 level of money we're putting into cleanup. So
6 I'm kind of baiting the question.
7 MR. ANDERSON: Okay.
8 MS. CARROLL: I know we haven't
9 maximized it, but I want to hear you tell maybe
10 what the maximum is.
11 MR. ANDERSON: Let me try and
12 address that a little bit. I'm not sure I can
13 say whether we've maximized it or not. But the
14 Savannah River Site does have an integrated
15 priority list of all of its activities for the
16 amount of budget that it gets.
17 And the share that the environmental
18 restoration and the cleanup programs are
19 receiving at Savannah River is a higher
20 percentage than it has received in the past.
21 The other activities that are there
22 that are related are stabilization activities,
23 which I referred to earlier. And that makes up
24 most of the Savannah River budget at this
25 point.

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1 praises of this program and the jobs it would
2 bring to the Augusta area -- asked and did not
3 receive an answer. So tonight I give you an
4 opportunity to answer, or the question will be
5 on the record, and you can supply the answer
6 and maybe somehow or another I'll hear about
7 it. I did not get an invitation to this
8 either, but I get all the big books. You know,
9 I got the PEIS. As a volunteer, I don't know
10 when I'll read that.
11 What was said, as an assurance to
12 Georgia, whose stake in this is to have jobs in
13 the Augusta area, was DOE stated we have a
14 very -- a high interest in maintaining the work
15 force at a steady level, and will provide jobs
16 at a steady level. We will need you at a
17 steady level.
18 Ann Orrock's question was, and what
19 we are very interested in the answer to is:
20 Have you maximized your effort, both
21 financially and in personnel, for environmental
22 cleanup?
23 MR. NULTON: I'm not sure -- maybe
24 you need to clarify the question. Maximize in
25 what regard? I mean, how do we plan for it --

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1 MS. CARROLL: Which is 90 percent
2 or --
3 MR. ANDERSON: 90, 95. When I say
4 most, I'm not talking about just the majority.
5 MS. CARROLL: Are you going to
6 maintain spending on cleanup at that level
7 while bringing up the MOX and the
8 immobilization program?
9 MR. ANDERSON: That is the plan.
10 MS. CARROLL: So actually, jobs will
11 increase quite a bit, because everybody working
12 on cleanup will stay working on cleanup, and
13 everything else will be extra on top of that?
14 MR. ANDERSON: If it's related to in
15 peer of people, as far as that's concerned.
16 MS. CARROLL: So people should be
17 moving to Augusta to get these jobs.
18 MR. ANDERSON: Now, the other aspect
19 of this is that these contracts are being
20 let -- you know, with bringing in some new
21 talent, bringing in some additional -- you
22 know, the joint -- I want to call it a joint
23 venture, and that's the wrong term.
24 MR. NULTON: Consortium.
25 MR. ANDERSON: Consortium with Duke,

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1 Cogema, Stone and Webster. So the real intent,
2 as far as the employment levels, we're looking
3 at the longterm employment levels for the more
4 permanent employment at the Savannah River
5 Site.
6 In fact, there was -- on a routine
7 basis, we do demonstrate and show people, you
8 know, where we're doing environmental cleanup.
9 We are making quite a bit of progress in
10 cleaning up the sites and cleaning up waste and
11 taking waste that was in forms and placed into
12 the areas which were thought to be well planned
13 years ago. We're pulling some of those back,
14 vending drums, repackaging, checking. There's
15 cleanup of groundwater systems that's occurring
16 of plumes. There's closure of disposal sites
17 that are occurring. The defense waste
18 processing facility is operating and disposing
19 of high-level waste in a stable form. And the
20 canyons purpose at this point is to stabilize
21 nuclear materials.
22 MS. CARROLL: That's one of the
23 attractive things about the immobilization
24 option. I'd like to see it increase. I mean,
25 if we continue with our disarmament efforts,

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1 there's going to be a steady stream of
2 plutonium triggers that need to be dealt with,
3 and to increase the rate at which we're able to
4 take that stuff out of the deteriorating paints
5 and solidify it. That is a really attractive
6 idea, and we support it. We want to be
7 supportive of South Carolina in dealing with
8 this.
9 So thank you so much for having this
10 opportunity tonight.
11 SENATOR LEVENTIS: Thank you.
12 Joan King, and then Ed Arnold.
13 MS. KING: I found a penny. Do you
14 think it's lucky?
15 SENATOR LEVENTIS: I certainly hope
16 so.
17 MS. KING: There. I'll put that to
18 the DOE. I think they need it at this point.
19 I want to thank everybody here for
20 their patience and for their endurance. I'm
21 Joan King. I've worked on nuclear issues for a
22 number of organizations for many years now.
23 I'm also the spokesperson for WAND, which is
24 Women's Action for New Directions. And I will
25 try to be brief.

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1 I'm going to make some statements of
2 things -- assumptions from what I've heard, and
3 you can just say yes or no.
4 I am part of an activist community
5 working on nuclear issues, and I hear that
6 the -- on one hand, I hear that we're going to
7 do this because we have to do MOX because the
8 Russians want it. Am I hearing correctly?
9 Because I also heard the opposite, that we
10 suggested it to the Russians.
11 MR. NULTON: I think that this is a
12 result of the negotiations with the Russians,
13 where they wanted to do one thing, and we have
14 evolved to this point, that they wanted to use
15 it in breeder reactors.
16 MS. KING: Okay. Well, which
17 Russians? I mean, I'm part of the activist
18 community. They are -- my counterpoint has
19 come to this country, activists who are Russian
20 citizens, and they say, We don't want this.
21 MR. NULTON: Well, we negotiate with
22 the Ministry of Atomic Energy in Russia. It's
23 a government to government --
24 MS. KING: Uh-huh. So government to
25 government. But people to people, the people

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1 don't seem to want it.
2 We have talked about plutonium. Is
3 it true that the amount of commercially
4 produced plutonium, reprocessed plutonium, in
5 the world today is growing?
6 I have read that it is growing so
7 that it will soon exceed the amount of military
8 plutonium from the military reprocessing. Can
9 anybody answer that?
10 MR. STEVENSON: The first statement
11 that the amount of plutonium in the world as a
12 result of civilian reactor operations is
13 growing, yes.
14 MS. KING: Is growing.
15 MR. STEVENSON: That is correct.
16 Whether the amount that's military in
17 weapons-grade and the amount that's at civilian
18 grade, one versus the other, I do not know.
19 MS. KING: Well, I've seen
20 projections that if the amount of commercial --
21 well, I don't -- I've been working on how you
22 phrase it. We'll just say commercial plutonium
23 versus military plutonium. That the amount of
24 commercial plutonium is growing, and if it
25 continues the way it is, it will soon exceed

1 the amount of military plutonium in the world.
2 Does anybody dispute that, or can
3 they answer it?
4 SENATOR LEVENTIS: Yes. If you want
5 to talk to Dr. Makhijani later, he can supply
6 you with the numbers. I don't know that they
7 are --
8 MS. KING: I just wondered if it was
9 true or not. I don't really need the numbers.
10 The point I'm getting to is that I
11 think our problems come with plutonium. I
12 realize that a -- the weapons-grade is probably
13 more desirable on the terrorist market and for
14 Rogue nations. But we also have admitted that
15 we can make nuclear bombs, and that our country
16 has done it as a test from commercial
17 plutonium.
18 So I'm saying that I think the
19 plutonium itself is the problem, and that MOX
20 will not decrease the amount of plutonium in
21 the world. Even as it degrades some of it, it
22 will contribute to the general increase of
23 plutonium in the world. That is why I'm
24 worried, as a citizen and as a member of a
25 number of organizations.

1 Ms. King.
2 Mr. Ed Arnold, and then Mr. Harry
3 Rogers.
4 MS. CARROLL: If I could just give
5 you that figure. I know we're all dying to
6 know how many megawatts we're going to use to
7 make MOX. May I?
8 SENATOR LEVENTIS: Yes.
9 MS. CARROLL: 17,520 megawatt hours
10 a year. I don't know how that translates to a
11 1,000-megawatt plant.
12 SENATOR LEVENTIS: It sounds awful
13 high.
14 MR. NESBIT: There's a lot of hours
15 in a year.
16 MR. STEVENSON: Very low.
17 MS. CARROLL: It's low?
18 MR. NESBIT: It's not that much.
19 MS. CARROLL: There's the facts.
20 SENATOR LEVENTIS: The gentleman
21 from Cogema had said that it's not an
22 energy-intensive process.
23 MS. CARROLL: All right. I wanted a
24 figure. Now we know.
25 SENATOR LEVENTIS: Okay. We've got

1 Then I'm very concerned as a citizen
2 about the amount of money that's going into
3 this, and I would like to ask the DOE about a
4 rather local problem.
5 In Georgia, we're concerned about
6 the contamination of the groundwater from the
7 SRS. And they were doing some testing of the
8 wells, and we had -- apparently there was money
9 from it, and they found things that showed
10 there was tritium in it. I'm not sure about
11 what else they found in the groundwater. Then
12 all of a sudden, there was no money for the --
13 when I asked our department, EPD, they said,
14 the money -- we don't have the money to test
15 the wells anymore.
16 Now, I'm disturbed that -- I mean,
17 I'm a mother and a grandmother, and we have a
18 policy with my -- if you made a mess, you clean
19 it up before you start all over again. I just
20 think we need to clean up what we've got before
21 we begin on another major project that is going
22 to be very expensive and produce more waste.
23 So thank you very much for this
24 opportunity.
25 SENATOR LEVENTIS: Thank you,

1 several more people to hear from, and we will
2 hear from everyone. Please address questions,
3 if you can. And if you have statements, please
4 limit them as may be appropriate.
5 MR. ARNOLD: Senator, this has been
6 really great. Thank you so much.
7 My name is Ed Arnold. I'm the
8 executive director of Physicians for Social
9 Responsibility. Our office in Atlanta serves
10 Georgia, South Carolina, Alabama, and Florida,
11 in terms of staffing in the southeast.
12 Our health professionals and
13 physicians are opposed to the MOX program.
14 They think the risks are too great. And I want
15 to know who are the health professionals and
16 physicians that contributed to the EIS and the
17 supplemental EIS?
18 MR. NULTON: We used the SIC
19 organization to do our environmental analysis,
20 and they have experts on this to do these
21 analyses.
22 MR. ARNOLD: Would it be possible
23 for our health professionals and physicians,
24 numbering over 10,000 across the country, a
25 representation of those, to sit down with your

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1 health professionals and figure out what the
2 differences are, perhaps resolve our positions
3 of difference?
4 MR. NULTON: That's why we've had
5 over 90 public meetings up to this point.
6 That's why we have an Environmental Impact
7 Statement, to put that out, get the comments,
8 and resolve the comments. We do that in the
9 public meetings.
10 MR. ARNOLD: Have your health
11 professionals been onhand to try to resolve the
12 differences --
13 MR. NULTON: Yes. We've had experts
14 at our meetings to answer questions, yes.
15 MR. ARNOLD: So in your view, it
16 would be a repetition of the public events that
17 have already occurred?
18 MR. NULTON: Well, we've had these
19 people at these meetings, and we've had a
20 number of representatives from Physicians for
21 Social Responsibility in our meetings around
22 the country in the northwest and --
23 MR. ARNOLD: But we still have our
24 differences that aren't resolved.
25 Well, I'd like to make a statement

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1 that PSR would be interested in pursuing the
2 issue so that we can -- certainly, the
3 immobilization program has its risks, not
4 burning -- not irradiating rods anymore has its
5 risks, because we might have to use more coal
6 in the interim until we -- (inaudible) --
7 energy sources.
8 I mean, there are risks with
9 everything that we do. I wish I were hearing
10 more about some acknowledgment that risks do
11 exist.
12 But PSR thinks that the risks
13 attendant with the MOX program are more serious
14 than if we went strictly with immobilization.
15 I wish we had the opportunity to sit
16 down with our professional people together to
17 see if we could resolve the differences. And
18 as I'm hearing it, you think that we've run our
19 course on it, and I'm sorry that's the case.
20 SENATOR LEVENTIS: Well, let me just
21 make a comment that what I have heard this
22 evening and what I've heard as I've researched
23 this, is, you may well be true that it's not an
24 absolutely risk-based decision, and that they
25 feel their responsibility is to reduce the risk

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1 as much as possible.
2 And probably the more significant
3 thing you can contribute would be a way toward
4 that end, as opposed to this simple notion that
5 one option may be heavily risk weighted than
6 another, because the idea of simply storing
7 material has its risks, and the idea of
8 allowing the Russians to have no organized
9 disposition has its risks, as well.
10 So I would suggest that that's
11 probably where you need to be, because I don't
12 believe that the facts of your statement,
13 although I think they're true, would change the
14 direction of the department unless you can
15 offer some opportunities that they can
16 understand would reduce the risk. Is that a
17 reasonable statement?
18 MR. NULTON: I'm not sure if I
19 understood the whole statement. I think,
20 again, we accept any and all comments, and we
21 try to respond to each one. We do respond to
22 each one. I think up to this point, we've
23 responded to the comments we received in our
24 previous EIS's, and we'll respond to the ones
25 received in this EIS in our final document.

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1 MR. ARNOLD: Senator, thank you very
2 much. This has been a wonderful meeting
3 tonight.
4 SENATOR LEVENTIS: Thank you for
5 coming.
6 Now we have Mr. Harry Rogers, and
7 after him is Mel Jenkins.
8 MR. ROGERS: I'm Harry Rogers,
9 outreach coordinator for Carolina Peace
10 Resource Center. I appreciate first steps.
11 Thank you, Senator Leventis.
12 I'm going to frame my question with
13 an op-ed piece, and not read the whole op-ed
14 piece.
15 First, from Brad Morris, was at a
16 DOE reorganizing hearing. It's a quote from
17 Warran Rudman, an ex-senator.
18 The focus here and in the Senate is
19 understandably on security. I want to be
20 clear. The security is only a system.
21 Mismanagement and arrogance are pervasive
22 everywhere at DOE.
23 I don't know that I agree completely
24 with what Senator Rudman has said, but I have
25 not felt a part of that public participation

1 process. I think that you should realize that
2 you're going to face significant opposition to
3 the decisions that you've made here that are
4 going to result in unnecessary costs, and I
5 think that you've been dismissive of those that
6 have been against MOX.
7 Mike Tuckman, executive
8 vice-president of Nuclear Generation with Duke
9 Power Company, says he has difficulty
10 understanding why anyone would have a problem
11 with the MOX, mixed-oxide, fuel option of
12 weapons-grade plutonium disposition.
13 This is an arrogant statement. Had
14 Mr. Tuckman attended either the legislative
15 briefing conducted by Senator Phil Leventis in
16 Columbia or the public hearing conducted by
17 local and national groups at the University of
18 South Carolina, he would have heard a panel of
19 six experts outline the economic,
20 environmental, security and health reasons
21 against MOX.
22 Subsequently, I made two telephone
23 calls, at least, to Duke Energy requesting that
24 Mr. Tuckman provide me with contact
25 information. That was two and a half months

1 ago. To this date, they have not replied.
2 Briefly, through my work with the
3 Carolina Peace Resource Center, along with
4 other groups, we will be holding hearings
5 throughout South Carolina concerning nuclear
6 issues. We will hold ourselves answerable to
7 the public. Will you?
8 And last, I work at V.C. Summer
9 Nuclear Generating Station in Jenkinsville, a
10 plant made world-class by its employees. If
11 this were happening at my plant, I would oppose
12 the use of MOX fuel just as vigorously.
13 If I can go back. Dr. Lyman said
14 recently, While Duke Power claims that the use
15 of MOX in France is safe, it does not plan to
16 employ even the minimal safety adaptations used
17 in France. It does not intend to install
18 additional control rods in its reactors, or to
19 place limits on the irradiation time of the
20 plutonium fuel versus the uranium fuel, both of
21 which are done in France. Duke is cutting
22 corners here in a way that could seriously
23 impact safety.
24 Now, I know the representative from
25 Duke Energy is going to be able to give me some

1 prepared answers.
2 What is at issue here is not the
3 fact that you have the answers. It's what was
4 brought out earlier. It's that an aggressive
5 attempt to involve the public in such a
6 significant decision is absent, and we should
7 have had the opportunity to ask these
8 questions. And it's unfortunate that you've
9 placed us in an adversarial position where over
10 the next year and a half we probably will ask
11 these questions at a good deal of expense to
12 both of us. And I really feel that it's
13 unnecessary, and I would like for you to
14 address the technical questions that I've
15 asked.
16 MR. NESBIT: You cited Dr. Lyman's
17 statement that implied that Duke would cut
18 corners in a way that could seriously impact
19 safety, not intending to install additional
20 control rods or to place limits on irradiation
21 time of the plutonium fuel.
22 Dr. Lyman's statement is erroneous.
23 We never said that. As we've said today, we
24 are going to thoroughly study the impacts of
25 using mixed-oxide fuel on our plants and make

1 whatever modifications are necessary to ensure
2 the safety of the workers and the public.
3 Because at this present time we do
4 not see the need to add control rods in order
5 to achieve reactivity control at our reactors
6 does not mean that we're cutting corners on
7 safety. If it turns out that for some reason
8 they are needed, we'll make those
9 modifications.
10 I'd also like to address another
11 point. Duke Power has been very open with the
12 public and the media about its involvement in
13 this program, going back to 1996, when we first
14 responded to the Department of Energy's request
15 for interest from commercial public utilities.
16 At that time, approximately 18
17 utilities responded to DOE's RFI. We made our
18 response public. We have been open every step
19 of the way about our involvement up to when we
20 submitted a proposal back last fall, and when
21 we received our contract this spring.
22 Furthermore, if the program goes
23 forward and we're going to use MOX fuel at our
24 plants, the NRC licensing process provides an
25 ample opportunity for public involvement in the

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1 surrounding communities, and we look forward to
2 those opportunities.
3 MR. ROGERS: Thank you. Just in
4 closing, I don't find it comforting that we're
5 going to do all these studies about how we're
6 going to use this MOX fuel sometime after we've
7 spent a significant amount of money to build
8 the facility.
9 SENATOR LEVENTIS: Thank you.
10 Mr. Mel Jenkins, and after him is
11 Claude Gilbert.
12 MR. JENKINS: It is still evening.
13 Good evening. I'm Mel Jenkins. First of all,
14 thank you, Senator Leventis, for bringing this
15 about.
16 I'm here as a part of
17 Environmentalists, Incorporated, and as an
18 active participant in dealing with civic and
19 community process toward direct advocacy and
20 through the neighborhood project. In both of
21 those roles, I have several simple questions,
22 and you will be surprised that they are
23 questions.
24 Number one: I would like to repeat
25 Mr. Kawaguchi's question about International

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1 Nuclear Services here in Columbia. Will there
2 be more contaminated materials coming to that
3 INS plant? Call this 1A. Since logic impels
4 the handling of this material will produce more
5 contaminated items as a result of handling MOX
6 materials, how much more will be coming here to
7 Columbia? That's a specific question, which,
8 of course, you can't answer tonight, but I
9 would appreciate some workup on that. That is
10 important to us here.
11 Number two -- again, I regret that
12 there's not an agenda, so I don't know the
13 names of the people participating here. So
14 I'll simply say, DOE said tonight there have
15 been over 90 public meetings on this issue. I
16 would appreciate a list of those, giving dates,
17 places and such, and that's a question. Will
18 you provide that?
19 Number two: What public meetings
20 have been held here in South Carolina?
21 Number three: What public meetings
22 have been held in Georgia? And you can answer
23 that tonight, I think.
24 MR. NULTON: I don't know the number
25 of meetings that we've -- I don't know the

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1 dates and so forth or the exact number, but
2 we've had several meetings in North Aiken, I
3 guess -- in North Augusta, rather, Aiken.
4 MR. STEVENSON: I can name some of
5 them.
6 MR. NULTON: Go ahead.
7 MR. STEVENSON: To name some of
8 those meetings, one of the very first ones was
9 a planning and scoping meeting for our
10 programmatic -- in 1994 in North Augusta.
11 There was another meeting for the
12 draft of the PEIS in North Augusta. There was
13 one on highly enriched uranium disposition in
14 Augusta itself.
15 There was another one on the scoping
16 in the final of the HEU. There was a meeting
17 on the scope of this draft EIS. There was a
18 meeting on the draft of this EIS. There were
19 some other group meetings where the public was
20 invited between those meetings on specific
21 topics. I don't remember exactly what they
22 were, but that's the ones that I just remember
23 off of the top of my head.
24 MR. JENKINS: So all these meetings
25 were in the back yard of the Savannah River

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1 Site, some of which I have heard characterized
2 as pep rallies, none of them held in Atlanta,
3 none of them held in Columbia; is that correct?
4 MR. STEVENSON: Yes, there was one
5 meeting held in Atlanta in this process. I
6 believe, it was in -- and I'll double-check
7 myself. It was in 1995 that we held the
8 meeting in Atlanta.
9 MR. JENKINS: And I would, of
10 course, be interested in the publicity that was
11 given to those meetings.
12 So given that it seems like there
13 was some decision made to limit public input on
14 this issue, I would be very interested to know
15 who arrived at the public input plan for this
16 process.
17 Again, I think we here in Columbia
18 certainly would feel that we have been excluded
19 from the process; and therefore, I would be
20 very curious as to who it was specifically, by
21 department and by names, that decided that
22 there would be a limited public input on this.
23 And three: Is this the new DOE
24 policy regarding public input?
25 Thank you.

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1 SENATOR LEVENTIS: By the way, if
2 you have asked for a specific response --
3 MR. JENKINS: I don't expect it
4 tonight.
5 SENATOR LEVENTIS: -- please give
6 that person that you asked -- this applies to
7 anyone who asked -- your name and address so
8 that they may be able to access you.
9 MR. JENKINS: That's on the sign-in
10 form. Do I need to do that separately?
11 SENATOR LEVENTIS: No. You need to
12 do it in addition, because it's hard for us to
13 pull out each individual person that may have
14 made a request to any of these gentlemen on the
15 panel here.
16 MR. JENKINS: Thank you.
17 SENATOR LEVENTIS: Did anybody want
18 to address that?
19 MR. STEVENSON: Was the number of
20 them -- within the department as to who makes
21 the policy of what meetings we have, that is a
22 process as opposed to one individual.
23 But typically, it is the head of our
24 office, and it -- we've had several office
25 directors who make that. It's also done in

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1 consultation with our Office of General
2 Counsel, our lawyers, and with the Office of
3 Environmental Policy and Assistance. So that
4 it's reviewed by the people who are in charge
5 of the National Environmental Policy Act
6 Enforcement, our lawyers, and the people within
7 our office, as a minimum.
8 MR. JENKINS: Thank you. I realize
9 that you're saying it's difficult to arrive at
10 a person or a particular -- but I've worked
11 with the government myself and have dealt with
12 them enough to know that paperwork is the
13 essence of government, and that you have to
14 sign off on things like that.
15 So there is a paper trail that could
16 be arrived at.
17 MR. STEVENSON: That is correct,
18 because part of the requirement of the National
19 Environmental Policy Act is that you prepare
20 the administrative record, and that
21 administrative record contains that type of
22 information upon which those decisions are
23 arrived at.
24 MR. JENKINS: That will be
25 interesting.

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1 SENATOR LEVENTIS: Thank you.
2 MR. JENKINS: Thank you.
3 MR. ROGERS: Senator Leventis, I
4 just wanted to submit this for the record.
5 SENATOR LEVENTIS: Just bring it
6 around.
7 Next would be Mr. Claude Gilbert,
8 and after him is Mr. Bert Cutts.
9 MR. GILBERT: Thank you, Senator,
10 for this meeting tonight. I'll be very brief,
11 because I think we've touched on most
12 everything.
13 I would like to say for the record I
14 think that I would like more discussion on the
15 environmental record of Cogema. I think we let
16 him off mighty light tonight. There's a lot of
17 questions concerning what's going on in France,
18 and the contamination, and it's pretty
19 well-known. So I know there's some violations
20 there. I'm very much concerned with Cogema
21 working on this project.
22 I have a statement I would just like
23 to leave for the record, I think.
24 I have one question for Duke Power
25 concerning the fuel rods. I remember reading

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1 before that I think you all have removed them
2 from reactor to another reactor.
3 Are you planning on doing that type
4 of thing with this MOX?
5 MR. NESBIT: No. You're referring
6 to transshipment, which occurred between Oconee
7 and McGuire, when we were running out of space
8 in the Oconee spent fuel pool. We've since
9 instituted on-site dry storage of the sites
10 that need it. We have no plans for doing that
11 with mixed-oxide fuel.
12 MR. GILBERT: Thank you. If I can
13 just submit this.
14 SENATOR LEVENTIS: Thank you. Just
15 bring it on around.
16 I think it's Mr. Bert Cutts,
17 C-u-t-t-s.
18 SPEAKER: He's already gone, sir.
19 SENATOR LEVENTIS: Brian Carnes and
20 then Mr. Michael Moore. Are they here? We've
21 outlasted. Okay.
22 Merison Niri, N-i-r-i? Shin Yun?
23 It seems Mr. Cutts signed up twice, and he's
24 not here once.
25 (Laughter.)

1 SENATOR LEVENTIS: Mr. Poe?
2 MR. POE: Thank you, Senator. I
3 appreciate the opportunity to be here tonight.
4 And Mr. Nulton, thank you for coming and
5 sharing with us.
6 Up front I'll tell you that I'm
7 pro-MOX. Okay? I'm just disappointed we don't
8 go further than one pass with it, but that's
9 not the question at hand tonight.
10 I will say that I am -- consider
11 myself to be informed, and I've been very
12 slightly tasked here tonight to be informed.
13 This is a complex subject that we're talking
14 about.
15 I've heard citizens on both sides of
16 the coin. I learned from both. I said I'm
17 pro-MOX. So I'm in favor of this activity.
18 The most compelling story that I've
19 heard tonight was the one that Mr. Chaput
20 talked to when he talked to the fact that by
21 denaturing this material we're moving in the
22 right direction. If we don't get all the way
23 there, we at least are moving in the right
24 direction.
25 I do have two points that I want to

1 make. They'll turn out to be questions, I
2 hope.
3 The first one is: You know, there's
4 been a lot of discussion about we don't
5 understand what all is going on here tonight.
6 They are questions which tells me, in my
7 limited knowledge, that we're not meeting often
8 enough.
9 So I would like to address you,
10 Mr. Nulton, and say what are we going to do
11 about that? You've got citizens of South
12 Carolina, citizens of Georgia that are
13 interested in your program. Some opposed to
14 it. Some for it. But nonetheless, there are
15 probably questions among all of us that don't
16 have the benefit of all the time and effort
17 that you guys have put at it to understand
18 that.
19 Let me just tell you that I spend
20 probably three or four days a week working to
21 understand the goings on at Savannah River.
22 I'll tell you that my judgment is that after
23 you work the problems well, you and they meet
24 in a meeting of the minds, and you understand
25 where each other is coming from and where

1 they're going. I haven't gotten to that point
2 with this program yet.
3 So what are we going to do about
4 that?
5 MR. NULTON: Part of our effort, now
6 that we have DCS under contract, is to develop
7 an outreach program. We're in the process of
8 doing that. I'm not sure what nature it will
9 take, but it is one of our activities that
10 we're undertaking.
11 MR. POE: Well, I would encourage
12 you to do that strenuously because there have
13 been an awful lot of people here who are
14 stakeholders of this activity that you're
15 planning for us here, and we don't understand,
16 and we have nagging concerns that continue with
17 us.
18 Now, the second question. Senator,
19 I guess I address this one to you. You were
20 nice enough to set up this meeting. And for
21 the first two hours, about 60 of us sat out
22 here and listened to you all talk back and
23 forth about things we didn't even know what you
24 were talking about, because there were pieces
25 of paper -- and I made a list of seven things

1 that you talked about in that two hours that we
2 don't have copies of. Now, if we're going to
3 be informed citizens, we need to have that
4 information.
5 The list that I ended up with were
6 the environmental synopsis somebody mentioned,
7 and I don't remember who that was; the cost
8 report; the contract, a copy of what the
9 contract looks like; the contract cost analysis
10 that someone referred to. In September, when
11 we get the U.S. Russian agreement, we need to
12 see that. Then so that we can remember all
13 these good things that you guys have talked
14 about, Senator, I would like to suggest that
15 this group of papers that have been talked
16 about here be mailed out to the people who came
17 here, along with a copy of the transcript of
18 the meeting so we can hear the questions and
19 read some of the information.
20 I'll tell you, for one, that I don't
21 like to read, but I do read an awful lot of
22 this kind of stuff to keep myself informed so
23 that I can become a reasonable stakeholder and
24 understand the process.
25 So can we arrange something like

that? I don't know whether it's you or whether it's Mr. Nulton. Everybody had different pieces of paper that most of us sitting out here in the audience didn't have.

SENATOR LEVENTIS: Certainly it's a valid criticism. We didn't know how many folks to expect, and we will try to arrange the results of this meeting and the transcript into some logical fashion and see who among those who are here would like it because -- and I see one taker already -- because that's the purpose of having the meeting.

So we'll try to get that together in conjunction with the Department of Energy, who was very supportive in our efforts to get the meeting together.

In relation to one criticism that we had earlier about a notice that the meeting was going on, of course, we did publish it widely in the public media. We did also mail to a list provided to us by the department, and I don't know precisely the origin of that list, but -- how was it constructed?

MR. STEVENSON: I think I can answer that and would like to offer my comments.

The list -- over the past five years that we have been a program, we have been collecting a stakeholder database. That stakeholder database is now up to 7,500 individuals of which 1,300 are South Carolinians.

MR. POE: Good. I'm glad we're represented.

MR. STEVENSON: Of the 1,300 South Carolinians, they represent 100 individual communities around the state who are on our routine mailing list.

We try very hard to keep that mailing list up to date, but people move, and we only make mailings every so often. But we really do try to make sure that everybody who wants to receives copies of our information.

Further, Senator, I'd like to make a suggestion that might help out here. When the transcript is prepared and you're going to make distribution, if you could, put a statement in there that if people are interested, who have access to the worldwide web, they could get all of the documents that you mentioned from there, or we have a mailing address where, if they

wish to get those by mail, they can also do that.

One other new piece of information also that I would add is that, since we entered into a partnership with DCS, our website will now include linkages to these partners that we have so that you also can gain information from their websites, so that you have an ability -- if you were interested in more of the Cogema information, you could go directly to that site and obtain what information that they have there --

MR. POE: Thank you.

MR. STEVENSON: -- which also includes mailing addresses, so that you aren't fully dependent on the web for these documents.

MR. POE: Well, I, for one, received my invitation in a white envelope. It didn't look like a DOE envelope. Senator, I thought you had mailed it to me. It was a plain white wrapper. I saw in the Augusta paper yesterday the announcement of the meeting. I had received the announcement out of The State several days earlier.

So I was aware of the meeting, and

the Aiken/Augusta area stakeholders do communicate with each other, and we talk a whole lot. So that word gets around.

I want to thank you again for having us here tonight and sharing this information with us. It's a little bit frustrating to try to understand and take it all in. So help us, bear with us, and continue this sort of thing. Thank you.

SENATOR LEVENTIS: I should point out, of course, that the Department supplied us with a large list of folks to mail to, and they also supported us with the postage and whatnot to make that mailing.

In relation to a comment you made, when we do prepare the transcript, we will try to prepare an index of the documents that we used or were referenced so that you might be able to go get them.

Mr. Poe, do you use the worldwide web?

MR. POE: I'm a -- while my friends up here -- let me just -- yes, I do a little bit. I'm not terribly fluent. I got a copy of a defense board thing sent to me this morning

1 that I couldn't open and read, and I had to get
2 somebody else to come help me figure out what
3 was wrong with my web.
4 SENATOR LEVENTIS: But you do access
5 that?
6 MR. POE: Yes, sir, I do.
7 SENATOR LEVENTIS: That's fine.
8 Ms.--
9 MS. THOMAS: I wanted to correct an
10 oversight. I wanted to thank you, Senator
11 Leventis, and I wanted to speak to
12 Mr. Stevenson.
13 Even though I've been doing it all
14 these years, I'm still not comfortable standing
15 up and talking to people, but I think I do
16 better on the telephone one to one. So thank
17 you both.
18 SENATOR LEVENTIS: Is there anyone
19 else that I have not recognized that would like
20 to speak?
21 In fact, of course, I didn't get to
22 raise all the questions that I would like.
23 That may sound strange, but it's true. I have
24 passed some questions on to some of the
25 gentlemen here.

1 But my main purpose, I think, has
2 been met, and that is to bring everyone
3 together and to create more of a record
4 available to these gentlemen, to us, as we
5 discuss these issues.
6 I would like to thank first and
7 foremost those people who supported this
8 meeting, Ms. Jeter, and the people from
9 security who have been here all day, because
10 I've been here with them. We appreciate you
11 being here a great deal, and those folks who
12 have come from out of town. I know a lot of
13 you have. From DOE, Mr. Stevenson, Mr. Nulton,
14 Mr. Selby, and a lady whose name I did not get.
15 I'm sorry.
16 MR. NULTON: Pat Wherley.
17 SENATOR LEVENTIS: Ms. Wherley.
18 Those folks from Melox and Cogema, Mr. Ihde
19 from Duke, Cogema, Stone and Webster, and
20 Mr. Nesbit from Duke. All those folks who came
21 representing Representative Orrock from
22 Atlanta, and our Representative Clyburn,
23 Senator Courson, Dr. Makhijani, Mr. Brown.
24 We did what I intended to do. We
25 took about as much time as I thought we would

1 to do it.
2 So with that, unless anyone else
3 would like to comment --
4 MR. NULTON: Senator, can I just
5 make one brief comment? Can we enter, for the
6 record, from Cogema some reports on their
7 facilities?
8 SENATOR LEVENTIS: Yes, please. We
9 would like that, and if we need any more, we
10 can certainly give you those.
11 MR. NULTON: And also, I would
12 suggest, if you want to enter for the record,
13 the question and answers that we sent to you in
14 there under the Cogema section of that document
15 are two websites that were identified that also
16 provides access to Cogema environmental data
17 that would perhaps help some folks.
18 SENATOR LEVENTIS: All right. We'll
19 do that. Anyone else? Thank you for your
20 great patience and all of your input and
21 participation.
22 (The proceedings concluded at about
23 11:22 p.m.)
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CERTIFICATE OF REPORTER
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3 I, Lisa D. Jeter, Court Reporter and
Notary Public in and for the State of South
4 Carolina at Large, do hereby certify:
5 That the foregoing proceedings was taken
before me on the date and at the time and
6 location stated on Page 1 of this transcript
and was recorded stenographically by me and
7 were thereafter transcribed; that the foregoing
proceedings as typed is true, accurate and
8 complete record of the proceedings to the best
of my ability.
9
Witness my hand, I have hereunto affixed
10 my official seal this 2nd day of September,
1999, at Columbia, Richland County, South
11 Carolina.
12
13
14
15
16 Lisa D. Jeter
Court Reporter, Notary Public
17 State of South Carolina at Large
My Commission expires
18 September 11, 2002
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